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Coping with Racial Discrimination: The Role of Substance Use

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Abstract

Three studies tested the hypothesis that the relation between perceived racial discrimination and substance use reported in previous research is moderated by use of substances as a coping mechanism. Studies 1 and 2 were experimental studies of African American adolescents' and young adults' reactions to a discrimination experience. Results revealed that those who endorsed substance use-as-coping reported more willingness to use substances after experiencing discrimination. Study 3 was a prospective study of the relation between perceived discrimination and substance use over an 8-year period in African American adolescents. Results demonstrated that discrimination is associated with increases in substance use, but only among adolescents who endorse substance use-as-coping. Together, these three studies provide evidence that experiencing discrimination has both short- and long-term detrimental effects on African Americans' substance use, but significantly more so for those who adopt a pattern of using substances as a coping mechanism.

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Keywords

Discrimination; African Americans; Substance use; Coping

A number of studies have documented synchronous relations between perceived racial discrimination (discrimination) and various forms of substance use, including smoking (Bennett, Wolin, Robinson, Fowler, & Edwards, 2005), alcohol consumption (Martin, Tuch, & Roman, 2003), and drug use and abuse (Borrell et al., 2007). Recently, researchers have employed prospective designs to examine the long-term impact of adolescents' perceptions of discrimination on their subsequent health-promoting and health-impairing behaviors, including substance use. The first of these studies revealed a 2-year prospective relation between discrimination and substance use in African American children who were participants in the Family and Community Health Study (FACHS; Gibbons, Gerrard, Cleveland, Wills, & Brody, 2004). A second study used the same sample 3 years later, and replicated these findings over a 5-year period (from age 10 to 15; Gibbons et al., 2010, Study 1). This study also explored mediators and moderators of this link and demonstrated that adolescents' anger mediated the effect of discrimination on substance use, whereas effective parenting (monitoring, warmth, consistent discipline) ameliorated (buffered) the effect.

Experimental studies have also provided evidence of these effects of discrimination. Gibbons and colleagues showed that imagining a discriminatory experience in the laboratory is associated with an increase in substance-related responses to double entendre words (Gibbons et al., in press; Study 2). Similarly, Stock Gibbons, Walsh, and Gerrard (2011) found that inducing the perception of discrimination by excluding African Americans in an on-line ball tossing game (Cyberball) increases willingness to use substances. However, few studies have examined the question of why some African Americans who experience this pernicious form of stress respond with health-impairing behaviors like substance use while others do not, i.e., are there subgroups of African Americans for whom discrimination is more or less likely to be associated with increased substance use? The current studies examined a risk factor suggested by Stress Coping Theory – using substances as a coping mechanism – to address this question.

Individual Differences in Substance Use-as-Coping

Many models of substance use focus on the important role of stress. Tension-reduction models (Kassel, Stroud, & Paronis, 2003; Sher, 1987), for example, posit that some individuals engage in substance use because they believe it will reduce negative affect and relieve stress (cf., Carver & Connor-Smith, 2010; Jackson, Knight, & Rafferty, 2010). Likewise, negative reinforcement models (Baker, Japuntich, Hogle, McCarthy, & Curtin, 2006) suggest that stress predicts relapse. Motivational models (Cooper, Frone, Russell, & Mudar, 1995; Cox & Klinger, 1988) further elucidate the process, by specifying that the relation between chronic stress and alcohol use is mediated by various motives—including coping motives. For example, Cooper et al. (1995) suggests that drinking motives are precipitated by differences in temperaments (e.g., negative affect, Cooper et al., 2000).

Drinking motives, then, are strategies that are the proximal factors through which these more distal individual differences in personality influence alcohol use.

Another relevant theory is Stress-Coping Theory (Wills & Shiffman, 1985), which focuses on individual differences in coping tendencies rather than personality. In addition to hypothesizing main effects for chronic stress and coping tendencies on substance use, this theory suggests that individual differences in coping patterns that develop in childhood *moderate* the relation between stress and substance use, i.e., adolescents who have a tendency to engage in specific generalized patterns of coping and experience chronic stress are prone to transition from experimental substance use to regular use. Thus, in contrast to motivational models, the Stress-Coping model addresses the question of *which adolescents* respond to stress with substance use, more than the question of *why* people respond to stress by turning to substance use. Wills (1985) tested this hypothesis in a prospective study that involved four waves of data collection over a two-year period—from the beginning of the 7th grade until the end of the 8th grade. Each wave of data collection included multiple measures of stress, coping patterns, and tobacco and alcohol use. In addition to main effects of stressors on smoking and drinking, Wills reported that some measures of active coping buffered the effect of stress on substance use. He concluded that individual differences in ineffective coping patterns showed vulnerability moderation effects -- when ineffective coping (the moderator) is reported, stress is more strongly associated with substance use. He also noted, however, that his data suggest a good deal of variation in the nature of the interactions which led him to call for further research on the stress-buffering process.

Discrimination and Substance Use among African American Adolescents

Consistent with these models, the most common explanation for the relation between discrimination and substance use among African Americans is that they turn to substances in an effort to cope with the stress associated with experiencing discrimination (Borrell, Kiefe, Williams, Diez-Roux, & Gordon-Larsen, 2006; Clark, 2004; Guthrie, Young, Williams, Boyd, & Kintner, 2002; Landrine & Klonoff, 2000; Mays, Cochran, & Barnes, 2007). A recent review of the literature on the relation between discrimination and substance use, however, reported that to date, no studies have examined this assumption (Pascoe & Smart Richman, 2009). A prospective study of racial differences in motivations to drink provides indirect support for this assumption, however. Cooper et al. (2008) examined trajectories of alcohol use and abuse in African American and White adolescents over a 15-year period from adolescence through early adulthood, comparing participants' self-reports of their strategic use of alcohol to regulate negative emotions (e.g., drinking to forget their worries), and enhance or maintain positive emotions (e.g., drinking because it gives you a pleasant feeling). Although this study was not designed to examine individual sources of stress, the results provide evidence that is consistent with the assumption that African American adolescents use substances to cope with stress in their lives. The African American adolescents in the study were significantly more likely to report drinking in an attempt to escape, avoid, or minimize unpleasant or aversive emotional experiences. White youth, on the other hand, were more likely to report drinking in order to enhance or maintain positive affect.

Current Studies

The current studies were designed to test a set of hypotheses derived from previous research on Stress-Coping Theory, racial differences in motivations to drink, and the effects of discrimination on substance use. We predicted that the relation between racial discrimination and substance use among African Americans, reported in several previous studies, is moderated by the use-as-coping mechanism. Study 1 provided an experimental test of this hypothesis, employing an exclusion manipulation to induce perceived discrimination in a sample of young adults. Study 2 was a replication of Study 1 using an adolescent sample and a different paradigm for the manipulation of racial discrimination. Finally, consistent with recent calls for studies that examine the long-term impact of cumulative discrimination on health (e.g., Williams & Mohammed, 2009), Study 3 provided a prospective examination of the hypothesis that use-as-coping moderates the relation between cumulative discrimination and subsequent substance use in a cohort of African American adolescents.

Study 1

A common form of discrimination faced by minorities is being socially excluded (Smart Richman & Leary, 2009; Williams & Carter-Sowell, 2009). An effective way of manipulating social exclusion is via Cyberball, which is a computer ball-tossing game in which participants are excluded or included by other “players” (in actuality, there are no other players and the tosses are pre-programmed; Williams, Cheung, & Choi, 2000). Two recent studies have demonstrated that Cyberball is an effective way to examine racial discrimination effects (Goodwin et al., 2010; Stock et al., 2011). Goodwin utilized Cyberball to exclude African American and White participants by members of their own or the other race. Consistent with earlier research that employed an exclusion paradigm that involved receiving prejudiced feedback (Crocker, Voelkl, Testa, & Major, 1991), this study found that African American students who were rejected by a White confederate attributed their rejection to racism. In addition, this attribution impeded psychological recovery time as assessed by pre-post change in mood, self-esteem, and sense of belonging). Stock et al. (2011) employed Cyberball in a study that examined whether racial identity is a protective factor against substance use. After being excluded or included in the Cyberball game, half of the participants (experimental condition) were randomly chosen to engage in a racial identification affirming task that involved writing about “what it means to you to be an African American.” The other half (no-affirmation control condition) wrote about “what you did over the last 24 hours.” Results indicated that African American young adults who were excluded by Whites did attribute this exclusion to their race, and did report more willingness to use substances than those who were not excluded. Moreover, as expected affirmation ameliorated this effect on willingness.

We used the Cyberball paradigm to simulate discrimination in order to test the hypothesis that excluded African Americans who endorse using substances to cope with stress will report more willingness to use substances after exclusion than will those who do not report using substances to cope.

Method

Participants and Procedures—Young African American adults (ages 18 to 25) were recruited through advertisements online and in newspapers around the Washington, D.C. area to participate in a study of “health, emotions, and the social environment.” Participants in the current study (100 African American adults; 56 females; M age = 22.0, SD = 1.8) were those who were assigned to the control (non-affirmation) group in Stock et al. (2011).¹

Use-as-coping and past substance use (and a number of “filler” questions) were measured over the phone when scheduling the experimental appointment. Upon arrival at the laboratory, participants were told they would be playing an on-line ball-tossing game with three other participants. They were then randomly assigned to the inclusion or exclusion condition. The game was a version of the Cyberball game employed by Goodwin et al. (2010) -- participants were shown bogus photos of three young White adults of the same gender and similar in age, and told they would be playing ball with these people. The participants also had their picture taken with a digital camera and were told the three other players could see their photo (in actuality their photo was deleted). Exclusion participants received the ball two or three times and then were excluded for the remainder of the game; inclusion participants received the ball 25% of the time – the same as the other (bogus) players. The game lasted approximately three minutes. Manipulation checks and willingness to use substances were assessed after the game; participants were then debriefed and paid \$40 for their time. Participants in this (and Studies 2 and 3) were provided with, and signed university-approved informed consent statements.

Measures

Past substance use: Participants were asked how often in the past six months they had: “... drunk a lot (more than 4–5 drinks in one sitting), ...used marijuana, ...used crack or cocaine, ...used other illegal drugs?” (1 = *never*, 7 = *more than 8 times*). The responses to these 4 items were averaged (α = .69).

Substance-use-as-coping: Use-as-coping (coping) was assessed with a modified version of the brief COPE scale (Carver, 1997) and the Drinking Context scale (Farber, Khavari, & Douglass, 1980). Participants were told “These questions ask about what happens when people drink or use drugs (If you have never drunk alcohol or used drugs, please indicate what you think would happen if you did).” These statements were followed by four items, “Using alcohol or drugs helps me forget my worries, ...when I am feeling angry, ...to feel better when in a bad mood, ...to calm down when tense or nervous (1 = *not at all true*, 5 = *very true*). All four items were averaged (α = .77).

Substance use willingness: Following the game, participants responded to the willingness scale - a measure of their openness to use substances when an opportunity arises (Gerrard, Gibbons, Houlihan, Stock, & Pomery, 2008; Gerrard, Gibbons, Reis-Bergan, Trudeau,

¹This study was an analysis of data from control group participants in the Stock et al. (2011) Cyberball study (i.e., those who were excluded or included in Cyberball, but did not engage in the racial identity self-affirmation task). We also conducted a second set of analyses that included all participants in the Stock study (control and self-affirmation conditions). These analyses yielded essentially the same results.

Vande Lune, & Buunk, 2002; Gibbons, Gerrard, Ouellette, & Burzette, 1998). The measure described two hypothetical scenarios: Drugs: "Suppose you were with some friends at a party. A group of people at the party is using drugs, and they said you could have some if you wanted them. How willing would you be to do each of the following? ...try some of the drugs? ...use enough to get high? ...buy some to use later?" Alcohol: "Suppose that you are at a party. After several drinks you begin to feel that you may have had enough, and you are getting ready to leave. Then a friend you haven't seen for a while starts talking to you and offers to get you another drink. How willing would you be to do each of the following ...stay and have a few more drinks? ... stay and drink more than a few drinks?" All options were accompanied by a 7-point scale (1 = not at all to 7 = very). These five items were averaged ($\alpha = .82$).

Reactions to Cyberball: Participants indicated how much they felt they belonged to the group (1 = *not at all*, 7 = *very much*), and how included they were (1 = *totally excluded*, 7 = *totally included*). These items comprised the *belonging* manipulation check ($\alpha = .89$). *Perceived discrimination* was assessed with two items: "To what extent do you feel your inclusion or exclusion was due to your race?" and "To what extent do you feel you were being discriminated against based on your race?" (1 = *not at all*, 7 = *very much*; $\alpha = .77$; Stock et al., 2011). The average of these two items comprised the perceived discrimination score.

Analysis Plan—Hierarchical multiple regression analyses were employed to examine the hypothesized Coping X Exclusion interaction on willingness to use substances, controlling for gender, age, and past use. For all interactions, the continuous variables were centered (Aiken & West, 1991). The covariates were entered in the first step, followed by the main effects of Coping and Exclusion; the Coping X Exclusion interaction was entered in the last step. Values obtained from the final step are reported. A second (internal) regression analysis was conducted that substituted perceived discrimination for Exclusion condition.

Results

Descriptive Statistics, Correlations, and Manipulation Checks—Table 1 presents the means, *SDs*, and zero-order correlation matrix for all variables. Seventy-two percent of participants reported some use in the past six months: 71% reported drinking a lot, 45% reported using marijuana, 11% reported using at least one other illegal drug. These rates are comparable to those reported in national surveys of young adults this age (SAMHSA, 2009). An ANCOVA controlling for past use, gender, and age revealed a main effect for exclusion such that excluded participants reported lower levels of belonging, $F [1, 99] = 135.41, p < .001, Ms = 2.31$ vs. $4.77; d = 2.24$, and higher levels of perceived discrimination, $F [1, 99] = 42.86, p < .001; Ms = 2.29$ vs. $4.17; d = 1.29$.

Coping X Exclusion Interaction—The Coping X Exclusion regression model (controlling for gender, age, and past use) accounted for 46% of the variance in willingness. The analysis revealed main effects for past use, $\beta = .57, t = 7.34, p < .001$; and coping, $\beta = .46, t = 3.46, p < .001$; as past users and participants who reported more use-as-coping reported higher willingness. The anticipated Coping \times Exclusion interaction was also

significant, $\beta = .33$, $t = 2.57$, $p = .01$. Regression slopes for the interaction, plotted with predicted values for representative high and low coping participants ($+1/-1$ SD ; Preacher, Rucker, & Hayes, 2007) are displayed in Figure 1. Simple slope analyses revealed that the relation between discrimination and willingness was significant for high coping participants, $\beta = .32$, $t = 2.98$, $p < .005$, $R^2 = .56$; but not low coping participants, $p > .50$. In order to address the possibility that non-users' responses to the hypothetical question, "If you have never drunk alcohol or used drugs..." biased the results, analyses were re-run using only the participants who reported that they had used substances ($n=76$). The interaction between exclusion and coping became slightly stronger, $\beta = .43$, $t = 2.87$, $p = .005$, $R^2 = .43$.

Perceptions of Discrimination—Because exclusion during the game was intended as a manipulation of perceived discrimination, an internal analysis that substituted participants' self-reports of discrimination for (exclusion) condition was also conducted. This model accounted for 54% of the variance in willingness and resulted in the same pattern of results: main effects for past substance use ($\beta = .69$, $t = 9.97$, $p < .001$) and coping ($\beta = .15$, $t = 2.12$, $p < .04$), and a significant Coping \times Perceived Discrimination interaction, $\beta = .18$, $t = 2.56$, $p = .01$, $R^2 = .49$. The slope for perceived discrimination was significant for participants reporting high levels of coping, $\beta = .20$, $t = 2.16$, $p < .04$, $R^2 = .54$, but not for those reporting low levels ($p > .10$). The Perceived discrimination by Coping interaction was also found when abstainers were omitted from the analysis, $\beta = .31$, $t = 3.47$, $p = .001$. A second internal analysis was conducted to examine the possibility that participants' perceptions that they did not "belong" to the group interacted with Coping to predict willingness; it did not.

Discussion

Study 1 provided experimental evidence that the relation between exclusion (and resulting perceptions of discrimination), and willingness to use substances is moderated by endorsement of use-as-coping. Specifically, young adult African Americans who thought they were excluded by White players in a computer game reported more willingness to use substances than those who were not excluded, and this effect was significantly stronger among those who reported using substances as a coping mechanism. Importantly, these relations existed controlling for the strong associations between willingness and both past use and use-as-coping, suggesting it was a reaction to the discrimination manipulation that resulted in increased willingness, and not just a reflection of previous behavior.

Study 2

Study 2 was designed to replicate these findings with a different manipulation of discrimination and a younger sample of African Americans from a different geographic and cultural milieu. The sample was a subset of participants in the Family and Community Health Study (FACHS), a prospective study of health behaviors in African American families (Gerrard, Gibbons et al., 2005; Gibbons et al., 2004; see Study 3 for a more complete description of FACHS procedures).

Method

Participants and Procedures—Between waves 3 and 4 of FACHS, 175 FACHS participants from the Des Moines, Iowa area were recruited to participate in this experimental study. Because we were interested in substance use as the dependent variable, we attempted to oversample participants who reported some substance use at T3. Of the 175 we recruited, 149 agreed to participate, and 139 (88 females, 51 males; M age 18.5) completed the study. Participants were told that the goal of the study was to examine African Americans' health attitudes and their responses to stressful situations. They were then randomly assigned to one of three conditions in which they were asked to envision themselves in a work-related situation (no-stress, stress-only, discrimination-stress). After they were given their scenarios, they were instructed to think about how they would deal with the situation, indicate if they had ever experienced a similar situation, and then report how stressful they thought that situation would be. The no-stress scenario involved working as a delivery person and trying to find an address when there was no time pressure. The stress-only scenario involved falling behind at work because of a sick co-worker and equipment problems and, as a consequence, getting a negative evaluation from the boss. In the discrimination condition, participants were asked to imagine being in a situation in which their boss and co-workers discriminated against them because of their race. (Similar manipulations have been employed in previous research; see King, 2005; Yoo & Lee, 2008). Participants then completed a questionnaire that included a measure of willingness to use drugs. After debriefing, participants were paid \$105 for their time and travel expenses (see Gibbons et al., 2010, Study 2, for additional details on the procedure).

Measures

Past substance use: Past use was measured with the same questions employed in Study 1; $\alpha = .62$.

Coping: Coping was assessed by averaging participants' responses to two questions about how they respond when they confront difficult or stressful events in their lives: "I drink alcohol or take drugs, in order to think about it less" and "I drink alcohol or take drugs, in order to feel better" (1 = *not at all true*, 4 = *very true*; $r = .77$).

Substance use willingness: Participants indicated their willingness to use drugs with the same willingness scenario and questions employed in Study 1. These three items were averaged ($\alpha = .85$).

Analysis Plan—Hierarchical multiple regression analyses were again employed to examine the hypothesized Coping X Discrimination (0 = non-discrimination, 1 = discrimination) interaction on willingness to use substances, controlling for gender, age, and past use. For all interactions, the continuous variables were centered. The covariates were entered in the first step, followed by the main effects of Coping and Discrimination; the interaction was entered in the last step.

Results

Table 2 presents the means, *SDs*, and zero-order correlation matrix for all variables. Seventy-two percent of the participants reported some use in the past six months: 71% reported drinking a lot, 45% reported using marijuana, 11% reported using at least one other illegal drug. These rates are also comparable to those reported in national surveys of adolescents this age (SAMHSA, 2009). Initial regressions comparing across conditions revealed that willingness was higher in the Discrimination condition than in each of the other two (both p s $< .05$), whereas the other two conditions did not differ from each other ($p > .40$). Consequently, the two nondiscrimination conditions were combined in the regression analyses and then compared with the Discrimination condition, as in Gibbons et al., 2010, Study 2.

The hierarchical regressions accounted for 47% of the variance in willingness and replicated the results of Study 1: there was a significant main effect for Discrimination, $\beta = .29$, $t = 2.00$, $p < .05$, and a marginal main effect for Coping ($p = .08$). More important, the Coping X Discrimination interaction was significant ($\beta = .41$, $t = 2.77$, $p < .01$), and the pattern was identical to that in Study 1, i.e., the greatest willingness was reported by participants in the Discrimination condition who endorsed use as a coping mechanism. As in study 1, the Discrimination slope was significant for participants reporting high levels of use-as-coping, $\beta = .55$, $t = 2.35$, $p = .02$, but not for participants reporting low levels ($p > .70$). Repeating these analyses without the participants who reported no substance use also resulted in a significant interaction between discrimination and substance use-as-coping, $\beta = .42$, $t = 2.32$, $p < .03$.

Discussion

This second experimental study replicated the results of Study 1 with a different sample of African Americans (in a different geographic and cultural context), and with a different manipulation of discrimination. This replication supported our contention that discrimination is more likely to lead to substance use for African Americans who endorse using substances (alcohol and drugs) as a coping mechanism. Study 3 was designed to address the next important question: Is increased substance use a long-term consequence of employing this type of coping with the cumulative effects of discrimination?

Study 3

Although our previous research has demonstrated the prospective effect of discrimination on later substance use (Gibbons et al., 2010; Gibbons et al., 2004), to our knowledge, no prospective studies have examined the role of use-as-coping as a moderator of this effect. Consequently, Study 3 explored these relations using prospective data from FACHS. Specifically, this study was designed to test the hypothesis that African American adolescents who endorse use of substances as a way of coping with stress will respond to cumulative experience of discrimination with increased substance use.

Method

Recruitment and Sample—FACHS recruited African American families from neighborhoods representing the full range of SES and racial composition in rural communities and small metropolitan and suburban areas in Georgia and Iowa. The neighborhoods varied considerably on demographic characteristics such as racial composition and economic level. Relevant characteristics of these neighborhoods from census data were as follows: poverty rates (percentage of families with children living below the poverty line) ranged from below 20% to over 50%, mean = 25%; average male unemployment was 52% across all neighborhoods; mean proportion of single parents was 19%. Community coordinators and school liaisons compiled lists of all families in their area that included a fifth grade child. Families were chosen randomly from these lists. Seventy-two percent of the families contacted agreed to participate; those who declined most often cited the length of the interview (up to 3 hours) as the reason. Of the 889 families recruited at T1, 779 remained in the study at T2 (retention rate = 88%); 767 remained at T3 (86%); 714 remained at T4 (80%). Full information maximum likelihood (in *Mplus 6.11*; Muthén & Muthén, 2010) was used to allow for the inclusion of all T1 participants who provided data on the variables of interest by estimating model parameters and standard errors directly from all available data. This resulted in a total sample of 800 adolescents (91% of the T1 participants; 46% male).

At T1, each family had a child age 10 to 12 years ($M = 10.5$) and a primary caregiver, defined as a person living in the same house who was primarily responsible for the child's care. Participants' mean ages at T1–T4 were 10.5, 12.4, 15.6, and 18.8, respectively. At T1, 18.7% of the caregivers had not finished high school, 41.3% had earned a high school diploma, 30.4% had attended vocational school or some college, 5.1% earned a bachelor's degree, and 4.5% had post-baccalaureate education; their mean age was 37. The mean number of children in the household was 2.7 ($SD = 1.4$). Mean household monthly income was \$1,927 ($SD = \$1,498$) and the mean per capita monthly income was \$474 ($SD = \398). Although 71% of the caregivers were employed outside the home and worked an average of 39 hours per week, median family income was low, \$20,803, and 33% were at or below the poverty line for households their size. Thus, this sample of families would be characterized as “working poor.” (For further details on FACHS see Gerrard, Gibbons et al., 2005; Gibbons et al., 2004).

Interview Procedure—All interviewers were African American and most resided in the study communities. The interview required two visits, each with two interviewers, at the family's home or a nearby location; each one lasted about 90 minutes. The adolescent and his/her parent were interviewed in separate rooms. A computer-assisted personal interview (CAPI) technique was used; at T3 and T4 adolescents were given a keypad to enter their responses (for privacy). Compensation was increased from \$70 to \$80 for T3 and T4.

Measures

Discrimination: Discrimination was assessed at T1, T2, and T3 with 13 items from a modified version of the Schedule of Racist Events (Landrine & Klonoff, 1996), which describes discrimination experiences in the last year, e.g., “How often has someone said

something insulting to you just because you are African American?” (1 = *never*; 4 = *several times*). Modifications included simplifying the language for adolescents and replacing items about discrimination in the workplace with items about discrimination in the community. Scores were averaged at each wave ($\alpha = .86 - .90$) and then summed to represent cumulative discrimination.

Coping: Coping was assessed at T4 with a slightly modified version of the coping scale from Study 1: the combined alcohol/drug use statements from Study 1 were divided into 4 items for alcohol and 4 items for drug use: “Using alcohol [drugs] helps me...forget my worries...when I am feeling angry...to feel better when in a bad mood...to calm down when tense or nervous” (all responses: 1 = *not at all true*, 5 = *very true*). Participants were again told “These questions ask about what happens when people drink or use drugs (non-users: If you have never drunk alcohol or used drugs, please indicate what you think would happen if you did).” Responses to these eight items were averaged; $\alpha = .70$.

Substance use: Substance use was assessed at T1, T2, and T3, by summing “ever use” and “past year” items about smoking cigarettes, drinking alcohol, and using marijuana ($\alpha = .65, .77, .84$, respectively). These three sums were then averaged to form a *past use* index (T1 – T3 $\alpha = .76$), which was used as a covariate. T4 substance use (the outcome variable) was assessed with the same six items, plus a question about binge drinking (3 or more drinks at one time) in the past year (all responses: 0 = *no*, 1 = *yes*). Participants’ responses to these 7 items were averaged (T4 $\alpha = .81$).

Covariates: Caregivers’ reports of their education level (1 = *less than a high school diploma*; 10 = *graduate degree*) and family income (annual household income including wages for all family members, government assistance, alimony, and child support) were standardized and combined to form a *SES* score ($\alpha = .73$). *Stressful life events* were assessed at T1, T2, and T3 with a modified version of Swearingen and Cohen’s (1985) Life Events Survey. The scale asked whether the adolescent had experienced 45 different stressful events in the last 12 months, e.g., death of a parent or sibling, suspension from school, sibling in trouble with the law (0 = *no*, 1 = *yes*). The modification was that two events related to substance use were dropped from the scale. The remaining items were summed to form a cumulative score, $\alpha > .80$. *Gender* and *state* of residence at T1 were also used as covariates.

Analysis Plan—After zero-order correlations were examined, all variables were standardized and a just-identified regression model was specified according to the hypothesis that discrimination and use-as-coping would interact to predict increases in substance use. *Mplus* 6.11 (Muthén & Muthén, 2010), using the delta method, was employed to assess the specific paths. To avoid multicollinearity and to facilitate interpretation, all variables in the model were standardized.

Results

Descriptive Statistics and Correlations—Table 3 presents the means, *SDs*, and correlation matrix for all variables. At T4, 69% reported some substance use: 66% alcohol use, 36% marijuana use. Once again, these figures are generally comparable with national

norms for these ages (CDC, 2009; SAMHSA, 2009). At T1 90% reported experiencing some discrimination, 62% reported more than occasional experience, and 35% reporting “several times” to at least one item on the scale. Females and Iowa participants reported higher levels of cumulative discrimination than males and Georgia participants, respectively ($ps < .01$). Past use (T1–T3) was positively associated with stressful life events and T4 use ($ps < .001$). Cumulative discrimination (T1–T3) was associated with past use, stressful life events, and T4 use (all $ps < .001$). Discrimination was not associated with endorsing use-as-coping at T4 ($p > .25$), however, suggesting that discrimination does not lead to the use of this coping mechanism.

Coping X Discrimination Interaction—SES, state (both $ps < .04$), and past use ($p < .001$) were significant covariates, as higher SES, living in Iowa, and past use were associated with higher levels of T4 substance use. The effect of T1–T3 Discrimination and T4 Coping on T4 substance use were both significant; Discrimination: $b = .10$, $z = 2.01$, $p < .05$; Coping: $b = .27$, $z = 7.36$, $p < .001$. The predicted Coping X Discrimination interaction was also significant, $b = .16$, $z = 3.78$, $p < .001$.² As in Studies 1 and 2, the simple slope of discrimination on T4 substance use was significant for high coping adolescents (+1/–1 SD), $b = .26$, $z = 3.95$, $p < .001$; but not for low coping adolescents, $b = -.06$, $z = -.99$, $p = .32$. Thus, discrimination was associated with an increase in substance use (T4 substance use controlling for previous use) for high coping adolescents but not for low coping adolescents (Figure 2). As in Study 1 and Study 2, regression analyses that omitted the non-users were significant and revealed the same pattern of results.

Discussion

This study replicates and extends previous prospective research on the relation between cumulative discrimination and substance use by demonstrating that discrimination experienced between ages 10 and 15 is associated with *increases* in substance use by age 18. More important, it replicates the results of Studies 1 and 2 by providing evidence that engaging in use- as-coping moderates the relation between racial discrimination and these long-term increases in use. Because analyses controlled for previous use, they demonstrate that discrimination predicts an *increase* in use among adolescents who endorsed coping motives for substance use, but not among those who do not. This study also controlled for stressful life events, providing further evidence that the association between discrimination and later use is independent of other stressful life events. In addition, the lack of an association between past discrimination and endorsement of this coping mechanism indicates that adoption of this strategy was not a *reaction* to the discrimination these young African Americans had experienced in the past.

General Discussion

Evidence of a relation between the stress of experiencing racial discrimination and health outcomes is not new, and recent research has demonstrated long-term consequences of this

²Because the Iowa adolescents reported more discrimination than the Georgia adolescents, we also conducted this analysis separately for each state. The Coping X Discrimination interaction was significant, and the pattern was the same for both states, Georgia: $b = .12$, $z = 1.98$, $p < .05$; Iowa: $b = .14$, $z = 2.09$, $p < .05$.

source of stress on health risk behaviors such as substance use. The current studies explored the most common explanation of the relation between perceived discrimination and substance use –that people use substances in an effort to cope with the stress associated with discrimination. Study 1 demonstrated that young African American adults who endorse substance use as a coping mechanism are significantly more likely than those who do not to express willingness to use substances after encountering what they perceive to be racial discrimination; Study 2 replicated these results with a different manipulation of discrimination and a different sample. Study 3 demonstrated that discrimination is not associated with endorsing this coping mechanism, but that use-as- coping interacts with cumulative perceptions of discrimination to predict escalation of substance use between middle and late adolescence. These three studies, then, have addressed the question of why some African American adolescents respond to discrimination with increased substance use and others do not, and provide support for Stress-Coping Theory (Wills, 1985) as it applies to the relation between discrimination and increased substance use. It is also worth noting that all three studies controlled for past use. This suggests that the interaction between discrimination and coping in Study 3 predicted a change (*increase*) in substance use over time. In Studies 1 and 2, it suggests that it was *use-as-coping* and not substance use in general that produced the change in willingness.

Stability of Substance Use-as-Coping

For decades, there has been disagreement in the literature about whether individual differences in coping styles are temporary strategies or stable traits. Early research was based on the assumption that coping strategies are flexible, and thus, vary across time and situations (Lazarus & Folkman, 1984). Subsequent research, however, has provided evidence of a dispositional component of coping, i.e., people tend to adopt habitual ways of dealing with stress that can become relatively stable coping tactics, and these coping styles are influenced by, but not simply a manifestation of, personality traits (Carver & Connor-Smith, 2010; Connor-Smith & Flachsbart, 2007).

This issue of the malleability of coping strategies is important. If these strategies are situationally determined, they may be more difficult to predict and to change – changing the situation(s) is likely to be more difficult than changing the individual(s). On the other hand, if these strategies are relatively stable, learned responses to stress, it should be possible to design interventions that can shape them in constructive ways. In fact, there is some evidence that parents can have a significant impact on their children’s responses to discrimination. For example, Fisher, Wallace, and Fenton (2000) found that parents can prepare their children to recognize and cope with racial discrimination, and this preparation attenuates the children’s negative responses to the experience. This kind of preparation for discrimination is likely to be most beneficial in shaping coping strategies at early ages when young children are unlikely to understand the source of these inequalities (Simons et al., 2002), and their coping mechanisms are not yet habitual.

Limitations

Some limitations of the research should be considered. Although the discrimination manipulation employed in Study 1 (“Cyberball;” Williams et al., 2000) was successful at

inducing perceptions of discrimination, it also induced feelings of not belonging. This raises the possibility that it was not just participants' perceptions of discrimination, but also their feelings of not belonging that produced the effects reported in this study. This concern, however, is ameliorated by two other findings. First, the participants in the exclusion condition in this study interpreted the experience as racial discrimination, and when the data were re-analyzed using their perceptions of discrimination instead of their assignment to condition as the predictor of substance use willingness, the results were the same. Second, belonging and willingness are not correlated, and an internal analysis that substituted belongingness for perceived discrimination was not significant. Finally, Study 2 replicated the findings of this study with a more direct manipulation of discrimination.

The absence of the measure of substance use-as-coping prior to T4 (age 18) in Study 3 is a limitation because it precludes examination of the development of use-as-coping in early adolescence; future research should examine this question. Another limitation is that these studies focused on discrimination and use-as-coping only in African Americans. Given that the association between discrimination and substance use has been demonstrated among other minority groups, including Hispanics, Asian Americans, and Native Americans (McLaughlin, Hatzenbuehler, & Keyes, 2010; Whitbeck, Hoyt, McMorris, Chen, & Stubben, 2001), the moderation of this association by use-as-coping is unlikely to be exclusive to African Americans. However, future studies that test these findings in other populations may shed additional light on the etiology and mechanisms of racial disparities in health behaviors such as substance use.

Finally, the three studies used different coping measures. In Studies 1 and 3 the questions were similar to typical substance use expectancy measures (e.g., drinking alcohol helps me calm down). In Study 2 the questions were more like drinking motive questions (e.g., I drink to feel better). The consistency in the patterns of the Coping X Discrimination interactions across the studies suggests that whether "substance use coping" is an *expectancy* that substance use will alleviate stress, or a motivated *strategy* to alleviate stress (or perhaps a combination of both), people who endorse use of substances as a coping mechanism are more likely to respond to stress with substance use than are those who do not.

Future Research

Recent research on chronic racial discrimination has begun to explore emotional, cognitive, and behavioral responses to these experiences as mediators of its effects on various negative outcomes. For example, decreased expectations of academic success mediate the association between early discrimination (in grade school) and college attendance several years later (O'Hara, Gibbons, Weng, & Gerrard, in press). Likewise, negative affect and affiliation with deviant peers mediate the relation between early discrimination (age 10) and risky sex at age 18 (Roberts, Gibbons, Gerrard, & Weng, in press).

This research raises important questions for future research. First, what is the developmental course of the adoption of substance use-as-coping, and its relation to substance use over the course of childhood, adolescence, and emerging adulthood? Because personality is likely to influence coping mechanisms and substance use prior to their development into habitual responses (Carver & Connor-Smith, 2010, Conrod, Castellanos, & Mackie, 2008), future

research should also examine the potential of identifying personality traits that predict substance use-as-coping (cf., Cooper et al., 2000; Connor-Smith, & Flachsbart, 2007). Second, does substance use-as-coping also moderate the relation between affective responses to discrimination and substance use? Finally, is stress that results from experiencing discrimination unique in terms of its impact on African Americans' substance use, or is it only one of a number of stressors that, when combined with the tendency to use substances as a coping mechanism, is associated with increases in substance use. Answering questions such as these could provide important knowledge that would inform the development of effective early interventions for substance use problems.

Conclusion

The current studies contribute to a growing body of literature on the relation between perceived discrimination and substance use. Consistent with Stress-Coping Theory (Wills, 1985), these studies provide experimental and prospective evidence that this relation is moderated by individual differences in coping. Specifically, African Americans who experience discrimination and engage in substance use as a coping strategy: 1) show short-term increases in willingness to use substances after an incident in which they believe they have experienced discrimination, and 2) follow a steeper long-term trajectory of substance use through late adolescence. The current studies also provide evidence that use-as-coping is not caused by discrimination – instead, it increases the relation between discrimination and subsequent substance use. Finally, these studies suggest that the relation between discrimination and substance use reported in previous research is, in fact, evidence of a substance use as a coping mechanism.

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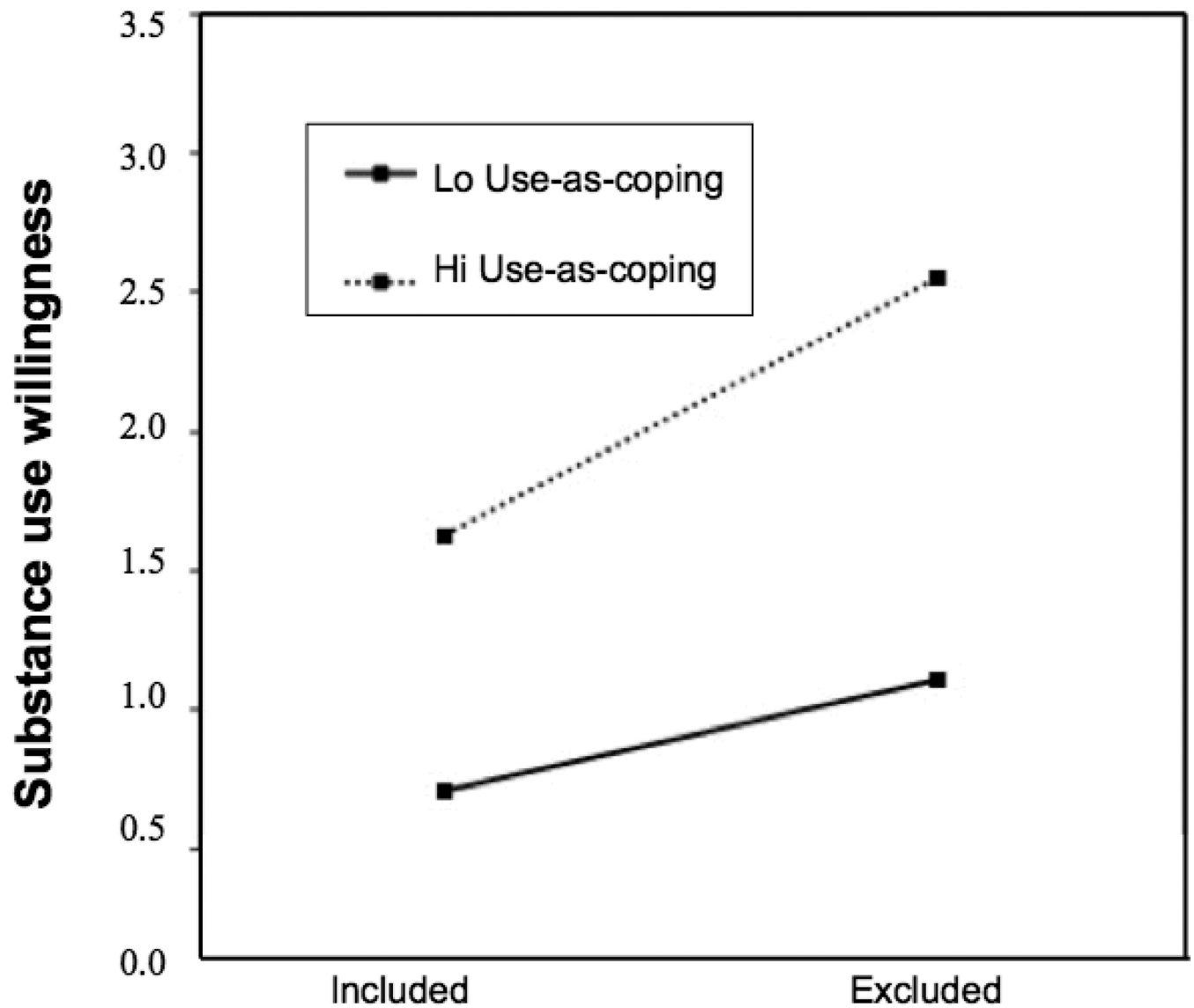


Figure 1. Willingness to use substances as a function of exclusion and use of substances as a coping mechanism controlling for previous use (Study 1).

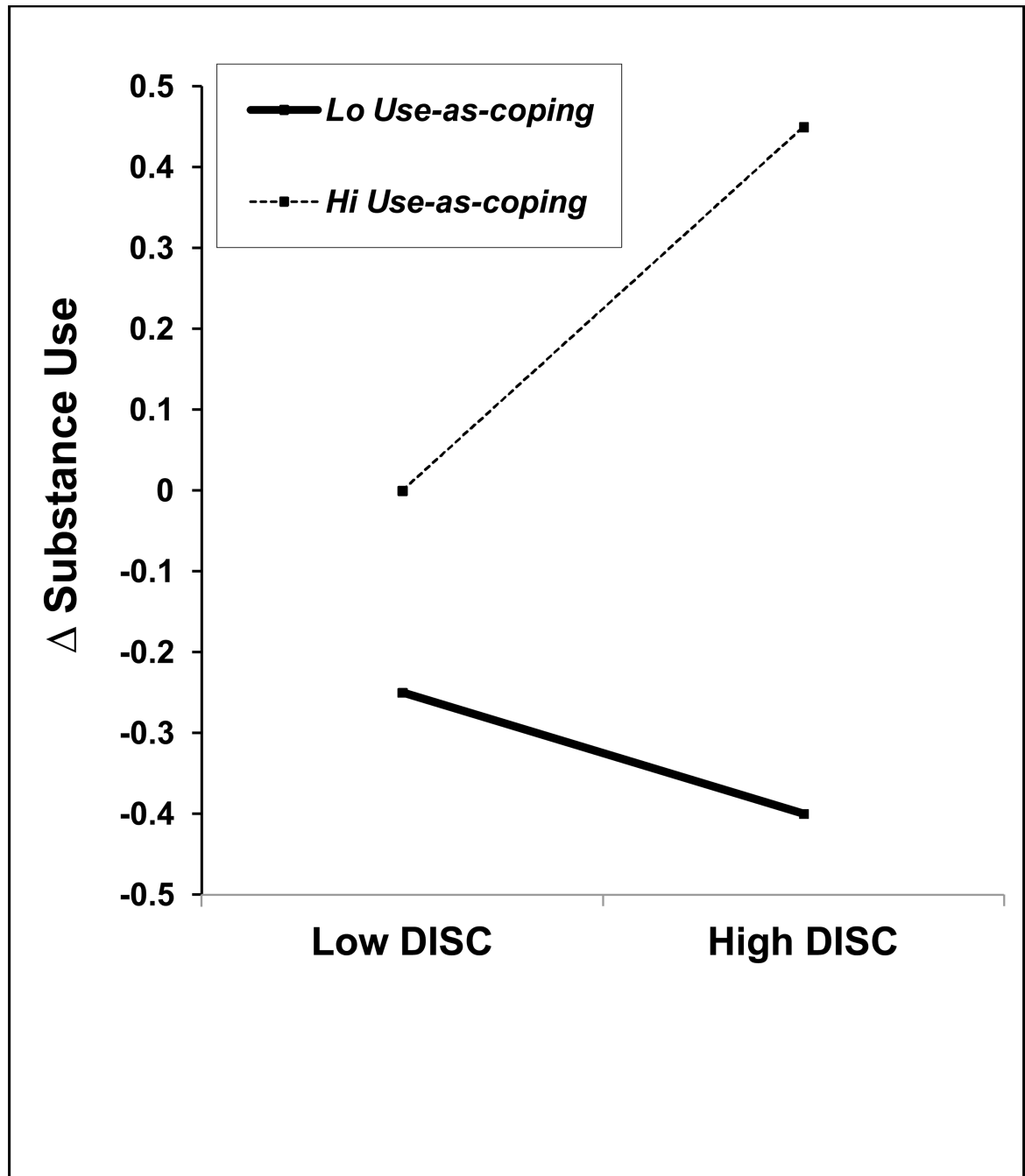


Figure 2.
Change in substance use as a function of discrimination and use of substances as a coping mechanism (Study 3).

Table 1

Means, Standard Deviations, and Correlations for Indices in Study 1

	1	2	3	4	5	6
1 Condition	-					
2 Perceived Discrimination	.55***	-				
3 Use-as-Coping	.11	.16	-			
4 Past Substance Use	-.13	-.05	.13	-		
5 Willingness to Use	.16 ⁺	.12	.19 ⁺	.60***	-	
6 Gender	.06	.15	.08	-.09	.07	-
7 Age	-.05	-.13	-.11	.05	.09	-.11
Mean		3.23	2.29	2.60	2.44	22.00
SD		1.75	.99	1.37	1.27	1.77

Note. $N = 100$; Condition (0 = included, 1 = excluded), Gender (0 = male, 1 = female). All other variables coded such that high scores indicate more of the construct. Perceived discrimination scale = 1–7; Use-as-coping scale = 1–5; Past substance use scale = 1–7; Willingness scale = 1–7.

⁺ $p < .10$.

*** $p < .001$.

Table 2

Means, Standard Deviations, and Correlations for Indices in Study 2

	1	2	3	4	5	6
1 Condition	-					
2 Use-as-Coping	-.06	-				
3 Past Substance Use	.07	.13	-			
4 Willingness to Use	.16+	.42***	.63***	-		
5 Gender	.10	.08	-.01	-.11	-	
6 Age	-.03	-.06	.07	.09	-.04	-
Mean		1.43	1.51	2.06		18.50
SD		.73	.51	1.37		.77

Note. $N = 139$; Condition (0 = non-discrimination, 1 = discrimination), Gender (0 = male, 1 = female). All other variables coded such that high scores indicate more of the construct.

Table 3

Means, Standard Deviations, and Correlations for Indices in Study 3

	1	2	3	4	5	6	7	8
T1-T3 Cum. Disc.	-							
T1-T3 Past Use	.28***	-						
T1-T3 Stressful Life Events	.29***	.41***	-					
T4 Use-as-Coping	-.04	.08	-.06	-				
T4 Use	.18***	.28***	.14***	.24***	-			
State	.32***	.13***	.01	-.07*	.12***	-		
SES	.03	.02	-.12***	.06	.11**	.12***	-	
Gender	.07*	-.02	.06	.05	.02	.02	.00	-
Mean	5.04	1.87	24.32	2.26	1.66	.52	.00	
SD	1.70	2.55	12.41	1.19	2.75	.50	.73	

Note. N = 800; State (0 = GA, 1 = LA), Gender (0 = male, 1 = female). All other variables coded such that high scores indicate more of the construct. Cumulative discrimination scale = 1-13; Use-as-coping scale = 1-5; Past substance use scale = 1-2; T4 substance use scale = 1-2.

* p .05,

** p .01,

*** p .001.