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Past racial discrimination exacerbates the effects of racial exclusion on negative affect, perceived control, and alcohol-risk cognitions among Black young adults

Michelle L. Stock¹  · Laurel M. Peterson² · Brianne K. Molloy¹ · Sharon F. Lambert¹

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Abstract Racial discrimination is associated with alcohol use and risky sex cognitions and behaviors, which are risk factors for negative health outcomes, including human immunodeficiency virus infection. The current study investigated the causal impact of racial discrimination on alcohol and sexual-risk cognitions while exploring potential mediators that might help explain this relation: negative affect, perceived control, and meaningful existence. We also examined if past discrimination impacts the strength of (moderates) these effects. Participants were 287 Black/African American young adults aged 18–25. They were randomly assigned to be excluded or included by White peers via the game Cyberball. Racial exclusion (vs. inclusion) predicted greater: perceived racial discrimination, negative affect, alcohol use willingness, and reduced perceived control and meaningful existence. Furthermore, excluded participants who experienced more past racial discrimination reported the lowest perceived control, and greatest negative affect and alcohol-risk cognitions. The findings suggest that past racial discrimination exacerbates the harmful health effects of immediate experiences of discrimination.

Keywords Racial discrimination · Racial exclusion · Alcohol cognitions · Negative affect · Self-control · Cyberball

Introduction

Alcohol is the most commonly used substance among Blacks and rates of heavy use tend to peak around age 25 (Chen & Jacobson, 2012). Of concern, alcohol use is associated with numerous health and social consequences, including: employment problems, criminal behavior, relationship troubles, later alcohol and other drug abuse, car accidents and death (Centers for Disease Control (CDC), 2014; National Institute on Alcohol Abuse and Alcoholism, 2015). Although Black young adults tend to drink less than other racial groups (Chen & Jacobson, 2012; Keyes et al., 2012; Zapolski et al., 2014), they are at greater risk for recurrent or persistent alcohol dependence, alcohol-related mortality, car fatalities, and social consequences (e.g., problems with work, family, and the judicial system; Chartier & Caetano, 2010; Kerr et al., 2013; Keyes et al., 2012; Mulia et al., 2009). Greater frequency of alcohol use is also associated with increased risky sexual behaviors (i.e., lack of condom use, sex with casual partners, greater number of sexual partners), and sexually transmitted infection (STI) and human immunodeficiency virus (HIV) infection among African Americans (Fisher et al., 2008; Khan et al., 2012; Morrison et al., 1998; Raj et al., 2009). Severe racial disparities exist for HIV, with Blacks accounting for 68 % of recent HIV diagnoses among 13–24 year olds (CDC, 2014) despite only representing approximately 13.2 % of the US population (U.S. Census Bureau, 2010).

Racial discrimination and negative health outcomes

One important factor that may contribute these racial disparities is racial discrimination (D'Anna et al., 2010; Mays et al., 2007; Williams & Mohammed, 2009; Zapolski et al.,

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2014). Racial discrimination is a psychosocial stressor that involves unfair or negative treatment directed at an individual due to their racial/ethnic background (Landrine & Klonoff, 1996; Williams & Mohammed, 2009). Blacks report experiencing more racial discrimination compared to other racial groups in the U.S. (e.g., Borrell et al., 2010; Tropp et al., 2012). Perceived racial discrimination (PRD), typically examined as self-reported cumulative or chronic experiences over time (e.g., past year or lifetime), is linked to worse physical health (e.g., higher blood pressure), mental health (e.g., greater psychological distress; see Pascoe & Smart Richman, 2009 and Williams & Mohammed, 2009, for reviews), and negative health behaviors that are associated with HIV-risk, including alcohol use (e.g., Borrell et al., 2010; Hunte & Barry, 2012; Smart Richman et al., 2013) and risky sex (Roberts et al., 2012; Stock et al., 2013).

Alcohol use

Several studies have found positive associations between past PRD among Blacks and reports of alcohol use or abuse and problems associated with use (e.g., Borrell et al., 2010; Boynton et al., 2014; Broman, 2007; Hunte & Barry, 2012). Longitudinal research with Black adolescents from the Family and Community Health Study (FACHS) revealed a prospective link between racial discrimination and vulnerability to alcohol (and drug) use, and self-reported use two and five years later (Gibbons et al., 2004, 2010). Among Black emerging adults, increases in racial discrimination predicted increases in alcohol use over a three-year period (Hurd et al., 2014). In addition, among Blacks who drank, past year racial discrimination was positively correlated with number of drinks consumed, and reports of discrimination doubled the odds of problem drinking (Kwate et al., 2003; Martin et al., 2003).

Risky sex

Additional prospective analyses among the FACHS adolescents demonstrated that cumulative experiences with racial discrimination (between the ages of 10 and 19) were associated with sexual risk-taking (greater number of partners, sex under the influence of alcohol/drugs, lack of condom use) and alcohol and drug use at ages 21–22 (Stock et al., 2013). Roberts et al. (2012) also found a significant prospective relation between racial discrimination (at ages 10–11) and sexual risk-taking 9 years later and this relation was mediated by negative affect and affiliation with “deviant” peers. Thus, there is evidence that PRD predicts alcohol (and drug) use and risky sex among Black young adults.

However, few studies have examined the *causal* impact of racial discrimination on *alcohol* and *sexual risk* (Gibbons et al., 2010, 2014; Stock et al., 2013) and factors that help *explain* this relation. To address this limitation, we developed a mediational model that incorporates aspects of previous findings on racial discrimination and substance use, as well as experimental research on social exclusion and both the Need to Belong theory (Baumeister et al., 2005, 2007) and Temporal Needs Threat Model of Ostracism (Williams, 2009). According to the Need to Belong theory, a primary reason for negative, self-defeating, reactions to exclusion is reduced self-control (i.e., impaired logical reasoning, Baumeister et al., 2005, 2007). According to Needs Threat Model (Williams, 2009), exclusion results in negative affect (*anger* and *sadness*) and threatens four fundamental needs: (a) *perceived control* (over one’s environment), (b) *belonging*, (c) *meaningful existence* (feel important and meaningful), and (d) *self-esteem* (see Williams & Nida, 2011; Zadro, Williams, & Richardson, 2006). However, *perceived control* and *meaningful existence* needs are more central when reinclusion with the excluders is less likely, which is usually the case for exclusion by out-group members (e.g., members of another race; Williams & Nida, 2011). Thus, we included negative affect, perceived control, and meaningful existence as potential mediators of this relation. It is also important to examine how cumulative experiences with past racial discrimination interact with the immediate experience of racial discrimination to directly impact both these potential mediators and alcohol-risk cognitions. This was the second aim of our study. Thus, our overall aim is to provide a model to help explain the causal processes by which an experience of racial discrimination (versus non-discrimination) leads to alcohol-risk cognitions (that are associated with future risk behaviors) and to examine if the associations between racial discrimination, our proposed mediators, and willingness, are moderated by past PRD (see Fig. 1).

Examining the causal effects of discrimination on risk cognitions in the lab

Cyberball and discrimination

The most commonly used paradigm to manipulate social exclusion and measure how it affects negative affect, perceived control, meaningful existence, and cognitions associated with coping responses (e.g., substance use) is via a virtual ball-tossing game “Cyberball,” created by Williams, Cheung, and Choi (2000). Social exclusion is one of the most common forms of racial discrimination faced by racial/ethnic minorities (Brondolo et al., 2011; Smart Richman & Leary, 2009). Racial exclusion (social

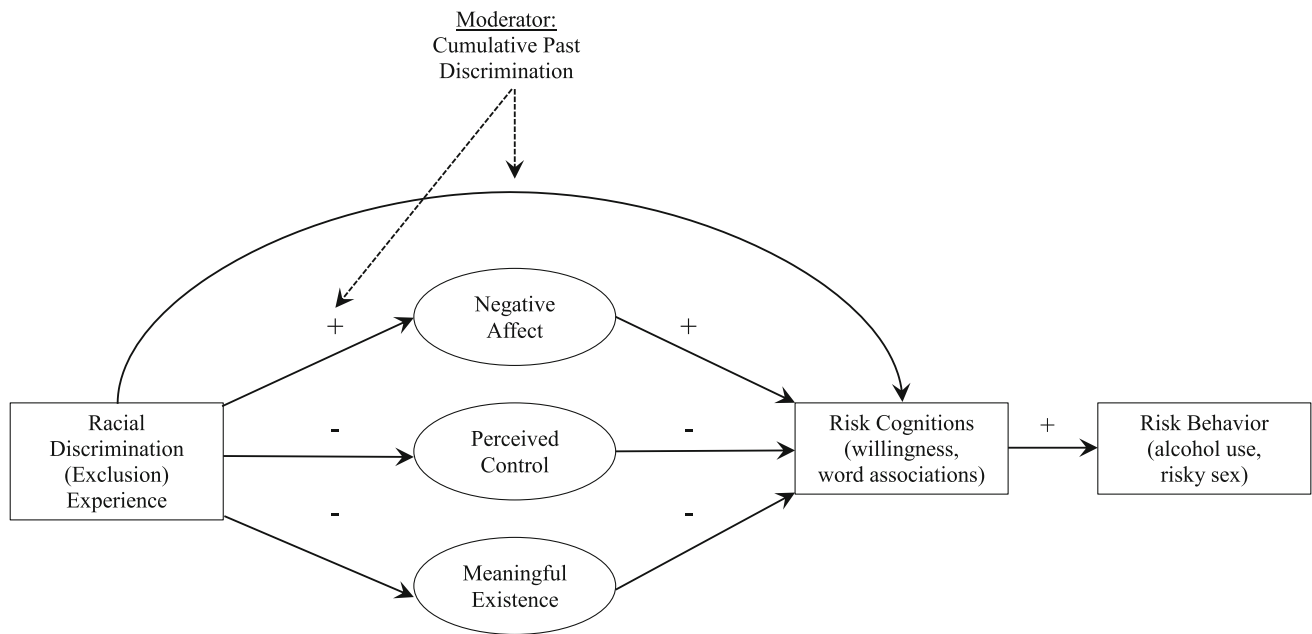


Fig. 1 Mediation model

exclusion by members of a different race, often attributed to racial discrimination) results in immediate affective and psychological reactions (Smart Richman & Leary, 2009; Stock et al., 2015; Zadro et al., 2006), but less is known regarding the effect of racial exclusion on risky behavior cognitions. A recent meta-analysis based on 120 Cyberball studies demonstrated the strong effects this game has on psychological outcomes (Hartgerink et al. 2015). Cyberball has been demonstrated to be a useful way to experimentally examine the casual effects of racial discrimination; exclusion of Blacks by Whites (racial exclusion) has been consistently attributed to racial discrimination (Goodwin et al., 2010; Masten et al., 2011; Stock et al. 2011, 2013).

Risk cognitions as outcomes

To measure alcohol and sexual risk cognitions in the lab, we included both explicit and indirect measures. Our explicit measure is taken from previous research on substance use vulnerability associated with racial discrimination (e.g., Gibbons et al., 2010, 2012; Stock et al., 2011, 2013) guided by the prototype/willingness model (PWM; Gerrard et al., 2008; Gibbons et al., 2015). The PWM is a modified dual-processing model that focuses on the cognitions that mediate the effects of the social environment on health behavior, including substance use. A central tenet of the PWM is that not all health behaviors are planned or intentional, especially when they involve health risk among adolescents and young adults (Reyna and Farley, 2006; Ravis, Sheeran, & Armitage, 2006). Instead, many risky

behaviors are reactions to risk-conducive situations (Gibbons et al., 2015). These reactions are captured in a proximal antecedent to behavior in the model, behavioral willingness. Willingness is influenced by social/contextual factors and (negative) affect. Several studies and reviews have demonstrated that willingness is a strong predictor of engagement in the risk behavior for adolescents and young adults (e.g., binge drinking; Andrews, Hampson, & Peterson, 2011; Dal Cin et al., 2009; Gerrard et al., 2008; Gibbons et al., 2015; Pomery et al., 2009). Willingness is both a direct predictor of behavior, and also a strong predictor of intentions to engage in the behaviors (see Todd et al., 2016). For these reasons, we included willingness as our explicit indicator of alcohol use vulnerability. We also assessed more implicit alcohol cognitions (e.g., Kelly et al., 2008; Stacy, 1997; Thush et al., 2007), which help predict additional variance in substance use behavior and capture cognitions not always found using more explicit methods (e.g., Krank et al., 2010). For example, experimental studies have shown that racial discrimination predicts greater willingness to use alcohol and drugs and greater substance use word associations (Gibbons et al., 2012; Stock et al., 2013). The word association tasks these studies have employed ask participants to respond, with the first word that comes to their mind, to substance-related words they see on screen (e.g., the word pitcher for alcohol-related association; joint for marijuana-related associations). These associations implicitly activate responses related to use behaviors and are a reliable predictor of future substance use (Rooske, Hine, & Thorsteinsson, 2008; Thush et al., 2007).

Potential mechanisms linking racial discrimination to health risk cognitions

There are several reasons why racial discrimination may lead to alcohol and risky sex cognitions. From a stress-coping perspective, young adults who do not have the resources or ability to engage in problem-focused coping may instead rely on more avoidant or negative coping mechanisms (e.g., negative health behaviors) when dealing with the stress and negative affect that arise from discriminatory experiences (Borrell et al., 2010; Clark et al., 2015; Gerrard et al., 2012). Young adults who experience stress and negative emotions due to racial discrimination may focus on the “quick fix” that alcohol use and sex offer (Elkington et al., 2010; Pascoe and Smart Richman, 2009). Alcohol and risky sex could also be potential negative coping methods to try and repair negative affect and “threatened needs” due to social exclusion. According to the Temporal Need Threat Model (Williams, 2009), the initial reaction to an experience of exclusion is painful and results in *negative affect* (anger, sadness). In addition, exclusion also threatens: (a) *perceived control*, (b) belonging, (c) *meaningful existence* (feel important and meaningful), and (d) self-esteem (e.g., Hartgerink et al., 2015; Williams & Nida, 2011). According to this model, belonging and self-esteem needs are more focal if reinclusion with the excluders is perceived as possible (with one’s own peer group, for example). However, *perceived control* and *meaningful existence* needs are more central when reinclusion is less likely, which is likely the case for racial discrimination (Williams & Nida, 2011). Previous studies have demonstrated that feelings of belonging do not explain the relation between racial exclusion and substance use cognitions (Stock et al., 2011). Current models of the relation between both self-reported and lab-based experiences of racial discrimination and substance use propose that in addition to risk cognitions (e.g., willingness to use, alcohol word associations), both negative affect and self-control mediate these relations (Gibbons & Stock, in press). Thus, the current study focuses on meaningful existence, in addition to negative affect and perceived control, as outcomes of the experience of racial exclusion.

Negative affect

Several studies have found that reactions to racial exclusion and past racial discrimination included heightened levels of negative affect (Chow, Tiedens, & Govan, 2008; Clark et al., 2015; Gibbons et al., 2004, 2012, 2014; Hurd et al., 2014; Pascoe & Smart Richman, 2009). Longitudinal research with Black adolescents from FACHS found that anger/hostility mediates the relation between past racial discrimination and substance use cognitions and behaviors

(Gibbons et al., 2010, 2012, 2014) and negative affect (depression and anxiety) mediate prospective relations between racial discrimination and risky sex behaviors (Roberts et al., 2012) and substance use (Gibbons et al., 2004). One explanation for these associations, according to stress-coping and self-medication models, is that substance use can mute negative affect (e.g., Aklin et al., 2009; Khantzian, 1997; Wills & Stoolmiller, 2002). In addition, according to motivational models of alcohol use, young adults may use alcohol to regulate negative (or positive) emotions (Cooper et al., 1995) due to stressful (including discriminatory) experiences (Hatzenbuehler, Corbin, & Fromme, 2011). Another reason negative affect might predict substance use cognitions is that negative affect prompts more heuristic processing (i.e., processing that is more affect-based, less reasoned; Wang, 2006), which, in turn, often leads to riskier decision-making (Gibbons et al., 2015; Schroder & Carey, 2005).

Perceived self-control

According to the Temporal Need Threat Model, antisocial and self-defeating responses to exclusion are due, in part, to the need to re-establish perceptions of control (e.g. Williams & Nida, 2011). In addition, research on social exclusion, the Need to Belong theory, and the self-control strength model maintains that these negative responses to exclusion are likely due to the inability to control impulses (Baumeister et al., 2005, 2007; Dewall et al. 2012). An increase in both demands on self-control (e.g., Baumeister et al., 2005; Muraven et al. 2005) and reductions in self-control (Quinn & Fromme, 2010) in turn, have been associated with higher levels of alcohol intake and risky sex among young adults (Quinn & Fromme, 2010; Wills et al., 2006; Wills & Stoolmiller, 2002). Racial discrimination, in particular, has been linked to a loss of self-control, because the experience itself is especially unfair, unjust, and, of course, uncontrollable. The impact of racial discrimination on reduced self-control among Blacks has been established (Branscombe & Ellemers, 1998; Gibbons et al., 2012; Gibbons & Stock, in press). Longitudinal research with adolescents from FACHS (Gibbons et al., 2012, Study 1) has shown that, over time, racial discrimination is associated with reduced self-control, which then predicts substance use. Causal effects have also been demonstrated in an experimental study; envisioning an experience involving racial discrimination increased both alcohol and drug word associations among Black young adults, especially those who were low in self-control (Gibbons et al., 2012, Study 2). Thus, reduced self-control is linked with a reduced ability to inhibit impulsive and risky actions.

Meaningful existence

In addition to perceptions of control, a loss of meaningful existence is likely when reinclusion with the excluding group is unlikely, which is usually the case for exclusion by out-group members (Williams & Nida, 2011). According to Williams and the Temporal Need Threat Model (2009, 2012), a meaningful existence includes feeling one is important and meaningful. Several studies have demonstrated that exclusion predicts lower feelings of a meaningful existence (e.g., Stillman et al., 2009; Williams, 2009). Feeling that one's life is meaningful is associated with greater psychological and physical well-being (King et al., 2006; Mascaro and Rosen, 2005). Similar to perceived control, feeling one's life is meaningful is negatively associated with substance use (e.g., Newcomb and Harlow, 1986; Thege et al., 2013). Antisocial behaviors may provide a way to feel that one "exists," especially when those who are excluded feel they are unable to generate positive responses from the excluders (Williams & Nida, 2011).

Does past discrimination moderate the effects of lab-based discrimination?

Not everyone who experiences racial discrimination responds in the same way and there may be individual difference factors that play a role in these different reactions (e.g., age and sex; Borders & Hennebry, 2015; English et al., 2014; Gerrard et al., 2012). One likely important moderator of reactions to experiences with racial discrimination is past experience; i.e., cumulative experience with discrimination. The enhanced burden of cumulative experiences of racial discrimination among Blacks may exacerbate the negative experience of race-based social exclusion (Goodwin et al., 2010; Stock et al., 2015). Several researchers have proposed that frequent experiences of discrimination can take a cumulative toll and result in negative health consequences (e.g., Brondolo et al., 2015, Williams & Mohammad, 2009). Longitudinal research with Black young adults has shown that cumulative experiences of racial discrimination predict an increase in substance use and risky sex (Gerrard et al., 2012; Stock et al., 2013). We propose that past racial discrimination exacerbates the harmful psychological (i.e., greater negative affect and reduced feelings of control and meaningful existence) and cognitive (i.e., greater risk cognitions) effects of an immediate experience of racial discrimination. According to the Temporal Need Threat Model (Williams, 2009) cumulative experiences of exclusion should be associated with greater feelings of helplessness, worthlessness, and antisocial behavior. Thus, overall, the reactions of individuals to an experience of racial

discrimination should be considered within the context of previous experiences of discrimination, and those who experience discrimination more often may be more affected by a single episode.

In sum, we propose that the harmful effects of immediate, lab-based experiences of racial discrimination are stronger among young adults reporting more past year (cumulative) experiences with discrimination. We predict that Black young adults who report greater levels of past cumulative discrimination and experience (versus do not experience) racial discrimination in the lab, will report the highest levels of negative affect, and lowest perceived control and meaningful existence, which, in turn, will be associated with greater alcohol and sexual-risk cognitions.

Method

Participants

Participants were recruited through advertisements around the Washington, D.C. metro area; they were told the study concerned the relations among health, stress, personality, and the social environment. Two hundred and eighty-seven young adults (155 females; M age = 22.78, SD = 2.22) met the criteria for participation (identified as African American/Black with or without Hispanic ethnicity, ages 18–25).

Procedure

Informed consent was obtained and then participants engaged in a 15-min rest period, after which baseline salivary cortisol levels were measured (for another study). Next participants filled out a survey on the computer, via Medialab (Jarvis, 2008), to measure discrimination experiences in the past year, negative life events, past alcohol use and sexual behaviors, relationship status, demographic variables, as well as additional measures intended for a separate study. Participants then played a modified version of Cyberball (Goodwin et al., 2010; Stock et al., 2011, 2013, 2015). The research assistant took a photograph of the participant, who was led to believe that the image would be uploaded onto the game for the other "players" to see. Participants were shown bogus photos of the other "players," who they were led to believe were all White same-sex 18–25 year-olds. Participants were randomly assigned to be included or excluded during the game. Included participants (n = 143) received the ball 25 % of the time; in the racial exclusion condition (n = 144), participants were tossed the ball twice at the beginning of the game and never again for the remainder of the game.

Participants then completed measures on meaningful existence, control, negative affect, willingness for alcohol use and sex under the influence of alcohol, implicit alcohol attitudes, and manipulation checks. Finally, participants were debriefed and paid \$50 for their time.

Measures

Pre-manipulation measures

Demographics Gender (0 = *male*, 1 = *female*), age, relationship status (0 = *no relationship* to 7 = *married*), and student status (currently enrolled in school; 0 = *no*, 1 = *yes*).

Negative life events Participants reported on negative life events which had happened to them in the past 12 months. Negative life events were assessed using a 23-item modified version of Swearingen and Cohen's (1985) Life Events Survey. Participants were asked to endorse (0 = *no*, 1 = *yes*) whether certain negative events had happened in the past year of their lives, for example, trouble with the law, a family member with a serious illness or injury. These items were summed (possible range = 0–23).

Past alcohol use, risky sex, and sex under the influence of alcohol Participants were asked four items assessing alcohol use in the past year: how often they had consumed more than 4 alcoholic drinks at one time; drank beer; drank wine; and drank hard liquor (1 = *never* to 7 = *every day*). The four items were averaged ($\alpha = .90$). Participants were asked their number of lifetime casual sex partners (fill-in, numeric) as well as how often they used alcohol before engaging in sex (1 = *never* to 5 = *very often*).

Past year discrimination Past year discrimination was assessed using the Schedule of Racist Events (SRE; Landrine & Klonoff, 1996). This measure described various discriminatory events and asked participants to indicate how often they had experienced each event in the past year (e.g., "How many times in the past year have you been treated unfairly by your coworkers, students, and colleagues because you are Black?" 1 = *never* to 6 = *almost all the time*, 22 items were averaged $\alpha = .95$).

Post-manipulation measures

Negative affect Participants responded to 18 affect items (e.g., upset, tense, stressed; 1 = *not at all* to 5 = *ex-*

tremely), which loaded onto a single factor and were averaged ($\alpha = .94$).

Perceived control Participants indicated how in control they felt during the game using five items (e.g., "I felt powerful," Williams, 2009). Participants responded on a scale from 1 = *not at all* to 5 = *extremely*; items were averaged ($\alpha = .82$).

Meaningful existence Participants were told to indicate how they felt during the game using five items (e.g., "I felt important," Williams, 2009). Participants responded on a scale from 1 = *not at all* to 5 = *extremely*; items were averaged ($\alpha = .85$).

Health risk cognitions Alcohol willingness. The alcohol willingness measure began with a hypothetical scenario: "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 (1)...Stay and have just one or two more drinks? (2)...Stay and continue to drink (more than one or two drinks)? (3)...Drink until you were drunk?" An additional willingness item asked "How willing would you be to get drunk when out with friends in the next 3 months?" All four items were accompanied by a 7-point scale from 1 = *not at all* to 7 = *very* (e.g., Gibbons et al., 2004); items were averaged ($\alpha = .88$).

Alcohol word association. Participants were presented with a list of 35 prompt words, one at a time, and instructed to fill in the first word that came to their minds (Gibbons et al., 2012). Of the 35 prompt words, there were five double entendre words with alcohol associations (e.g., bar, pitcher, draft) and six additional words participants related to alcohol (e.g., party, Friday night, fun). Two raters, blind to experimental condition, coded each participant's response to these 11 words in terms of the response's alcohol relation; agreement between them was high (intra-class correlation = .96). Alcohol-related responses were coded as alcohol-relevant (one point for each response); possible range = 0–11.

Risky sex willingness. Risky sex willingness was examined with casual, unprotected sex under the influence of alcohol scenario: "Assume you are not seriously dating anyone. Suppose you were at a party and met a man/woman for the first time and you both find each other to be very attractive. You each have several drinks throughout the night. After spending the evening together, you are both interested in having sex. Neither of you has available a

contraceptive (e.g., condom) of any kind. In those circumstances, how willing would you be to...Stay and (1)...have sex? (2)...have sex but use the withdrawal method?" (1 = *not at all* to 7 = *very*; items were averaged $r = .81, p < .001$; Stock et al., 2013; Thornton, Gibbons, & Gerrard, 2002).

Manipulation checks Participants were asked how much they were ignored and excluded (1 = *not at all* to 5 = *extremely*). These two items comprised the *perceived exclusion* manipulation check ($r = .96, p < .001$). To examine if the Cyberball manipulation resulted in feelings of *perceived racial discrimination*, participants were asked: "To what extent do you feel your inclusion or exclusion was due to your...race?"; a more direct item at the end of the study asked: "To what extent do you feel you were being discriminated against based on your race?" (1 = *not at all* to 7 = *very much*); these items were averaged ($r = .83, p < .001$; Stock et al., 2011).

Results

Manipulation check

To examine whether Cyberball was effective in eliciting a racially-attributed exclusion experience, an ANCOVA was run examining the main effect of exclusion condition (0 = inclusion, 1 = exclusion) and the Exclusion by Past year discrimination interaction on perceived discrimination. Excluded participants expressed greater perceived discrimination ($M = 4.500, SE = .146$) than included participants ($M = 2.220, SE = .146; F(1, 278) = 121.178, p < .0001, \eta_p^2 = .304$; Stock et al., 2011, 2013), and this effect was not moderated by past year discrimination ($p = .81$). Additionally, excluded participants expressed greater feelings of exclusion ($M = 4.477, SD = .069$) than included participants ($M = 1.548, SD = .070; F(1, 279) = 883.798, p < .0001, \eta_p^2 = .760$), and this effect was not moderated by past year discrimination ($p = .71$).

Statistical analysis

A series of hierarchical multiple regression analyses were conducted to investigate the extent to which exclusion, past year discrimination, and their hypothesized 2-way interaction influenced negative affect, perceived control, meaningful existence, and alcohol-risk cognitions. When an anticipated exclusion by past year discrimination interaction was revealed, simple slope analyses examined the impact of past discrimination among participants who were included versus excluded. All analyses controlled for

age, gender, student status, negative life events, and relationship status as well as other controls relevant to the outcome variable of interest (see below). In addition, to further examine the strength of the associations between our primary independent and dependent variables, we controlled for associated outcomes: negative affect and perceived control were included as covariates for meaningful existence and vice versa. In addition, alcohol willingness controlled for alcohol word associations and vice versa. Unstandardized slopes (b) and t tests of multiple regressions are reported. To minimize multicollinearity, continuous variables were centered prior to analyses (Aiken & West, 1991; Fekedulegn et al., 2002). Unless significant differences were found between the steps in the regression models and otherwise noted, all statistics reported are from the final step of the specific regression model, which included all covariates, main effects, and interactions.

Means and correlations

Table 1 presents the means, SDs, and correlations for the primary measures. Being female was associated with being more likely to be enrolled in school and lower reports of racial discrimination and negative life events in the past year ($ps < .05$). Alcohol willingness was positively correlated with greater alcohol word associations, risky sex willingness, negative affect, past year discrimination, and reduced meaningful existence and perceived control ($ps < .05$). The majority of participants were enrolled in school (60 %), with 25 different schools being represented in our sample (e.g., online education classes, local community college, private universities). Only 1 % reported being married and 38 % were not in a relationship of any kind. For health risk behaviors, 88 % reported drinking in past year, 72 % reported at least one casual sex partner in their lifetime, and only 34 % reported wearing condoms all of the time. For the implicit attitudes, 76 % of participants reported at least 1 alcohol word association. The vast majority (95 %) of participants reported past year discrimination, most commonly: treated unfairly by strangers (75 %) and institutions (50 %), misunderstood intentions (68 %), and others were surprised/not expected they would do well (70 %).

Main effects and racial exclusion by past year discrimination interactions

Negative affect

Lower perceived control and greater negative life events were associated with more negative affect ($ps < .01$). Participants in the exclusion condition ($b = .230$,

Table 1 Correlations, means, and standard deviations for primary study variables

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|-------------------------------|--------|--------|------|--------|-------|-------|-------|--------|--------|--------|-------|-------|------|-------|------|
| 1. Age | – | | | | | | | | | | | | | | |
| 2. Gender | –.15* | – | | | | | | | | | | | | | |
| 3. School status | –.38** | .14* | – | | | | | | | | | | | | |
| 4. Exclusion condition | –.06 | .01 | .05 | – | | | | | | | | | | | |
| 5. Past year discrimination | –.01 | –.19** | –.03 | –.04 | – | | | | | | | | | | |
| 6. Negative life events | .06 | –.16** | –.07 | –.07 | .45** | – | | | | | | | | | |
| 7. Past alcohol use | .11 | –.12 | –.01 | –.05 | .14* | .21** | – | | | | | | | | |
| 8. Negative affect | –.04 | .03 | .17 | .57** | .04 | .04 | .08 | – | | | | | | | |
| 9. Perceived control | .09 | –.14* | –.11 | –.69** | .06 | .00 | .07 | –.62** | – | | | | | | |
| 10. Meaningful existence | .09 | –.04 | –.11 | –.70** | .00 | –.02 | –.00 | –.74** | .75** | – | | | | | |
| 11. Alcohol word associations | .14* | .14* | –.06 | .01 | –.02 | .09 | .34** | .02 | .02 | .05 | – | | | | |
| 12. Alcohol willingness | .00 | –.10 | .06 | .07 | .02 | .07 | .54** | .16** | –.14* | –.13* | .24** | – | | | |
| 13. Risky sex willingness | .04 | –.41** | –.11 | .06 | .24** | .15* | .27** | .03 | .07 | –.00 | .09 | .28** | – | | |
| 14. Perceived exclusion | –.05 | .10 | .15* | .83** | –.05 | –.02 | –.05 | .70** | –.76** | –.80** | –.01 | .10 | –.07 | – | |
| 15. Perceived discrimination | –.11 | .05 | .12* | .65** | .05 | .03 | .07 | .62** | –.49** | –.58** | .05 | .14* | .02 | .62** | – |
| <i>M</i> | 21.74 | .53 | .60 | .50 | 1.85 | 4.54 | 2.42 | 2.30 | 2.35 | 3.08 | .05 | 2.84 | 1.97 | 3.04 | 3.37 |
| <i>SD</i> | 2.22 | – | – | – | .78 | 3.02 | 1.08 | .90 | .96 | 1.18 | .05 | 1.66 | 1.55 | 1.70 | 2.08 |

Gender (0 = male; 1 = female); school status (0 = not enrolled; 1 = enrolled); exclusion condition (0 = included; 1 = excluded). All other variables are coded such that higher values indicate more of the construct

* $p \leq .05$; ** $p \leq .01$

$t = 2.295$, $p = .022$, 95 % CI [.04, .42]) reported greater negative affect (Full Model $R_{adj}^2 = .588$). Past year discrimination did not predict negative affect ($p = .981$), however the exclusion by past year discrimination interaction was significant ($b = .194$, $t = 2.137$, $p = .034$, 95 % CI [.09, .37]; see Fig. 2). Participants with greater past year discrimination reported greater negative affect than participants with less past year discrimination in the exclusion condition ($b = .292$, $t = 2.959$, $p = .004$). Past year discrimination was not significant among included participants ($p = .907$).^{1,2}

Perceived self-control

Negative mood and greater negative life events were associated with less perceived control ($ps < .05$). Females reported less perceived control than males ($b = -.235$, $t = -3.235$, $p = .001$) Excluded (versus included) participants reported lower control ($b = -.577$, $t = -5.824$, $p < .001$; 95 % CI [–.38, –.77]; Full Model $R_{adj}^2 = .64$). Although past year discrimination was only marginally

significant ($p = .082$; 95 % CI [–.01, .26]); the interaction of exclusion and past year discrimination was significant ($b = -.215$, $t = -2.268$, $p = .024$, 95 % CI [–.08, –.40]; see Fig. 3). Among participants who were racially excluded, those reporting greater past year discrimination reported significantly lower control than those reporting less past year discrimination ($b = -.198$, $t = -2.313$, $p = .022$). Past year discrimination was not a significant predictor among included participants ($p = .423$).

Meaningful existence

Lower perceived control and greater negative affect were associated with lower meaningful existence ($ps < .01$). Excluded participants reported lower meaningful existence ($b = -.722$, $t = -6.547$, $p < .0001$; 95 % CI [–.51, –.93]; Full Model $R_{adj}^2 = .72$). No main effect of past year discrimination emerged for meaningful existence ($p = .285$), and the interaction was not significant ($p = .117$).

Alcohol willingness

Past alcohol use was added as an additional covariate for all three alcohol-risk analyses. Past use was positively associated with alcohol willingness ($b = .840$, $t = 10.062$,

¹ We also examined if gender moderated the effects of past year discrimination, racial exclusion, and the interaction. The only significant finding was that higher levels of past year discrimination predicted lower levels of perceived control for females only. Gender did not moderate any of the condition or past year X condition results.

² Results do not change if controlling for scores on the Beck Depression Inventory (included at T1 for another study).

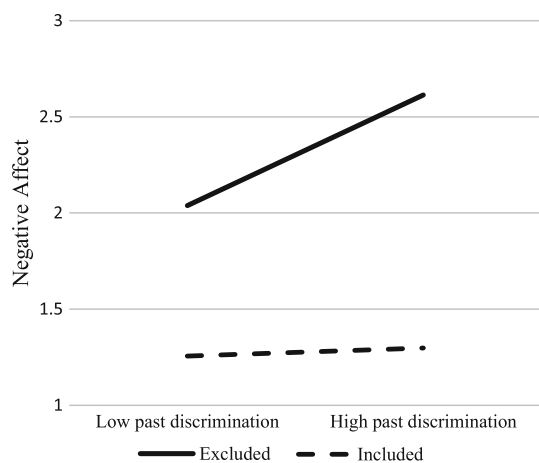


Fig. 2 Interaction of past racial discrimination and racial exclusion on negative affect

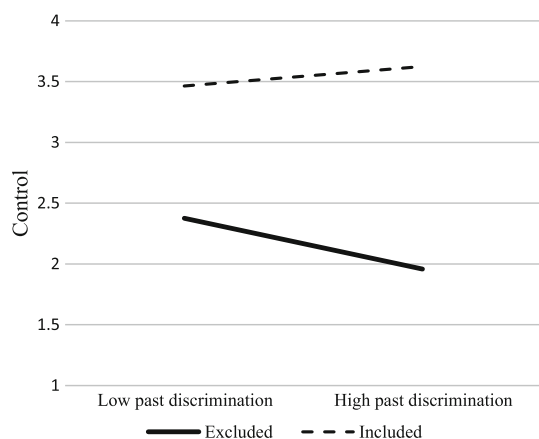


Fig. 3 Interaction of past racial discrimination and racial exclusion on perceived control

$p < .001$). Excluded participants reported greater willingness ($b = .342, t = 2.064, p = .040$; CI [.02, .66]; Full Model $R^2_{adj} = .335$). Past year discrimination was not significant ($p = .680$), but there was a significant racial exclusion by past year discrimination interaction ($b = .446, t = 2.128, p = .034, 95\% \text{ CI } [.06, .86]$; see Fig. 4). Among participants who were excluded, those reporting greater past discrimination reported greater alcohol willingness ($b = .457, t = 3.076, p = .003$). There was no significant effect of past year discrimination among included participants ($b = .107, t = .574, p = .567$).

Alcohol word association

Past alcohol use ($b = .373, t = 3.421, p = .001$) and past year discrimination ($b = .437, t = 2.318, p = .021$; Full Model $R^2_{adj} = .184$) were associated with a greater number of alcohol-relevant word associations. The exclusion main effect was not significant ($p = .357$), however the exclu-

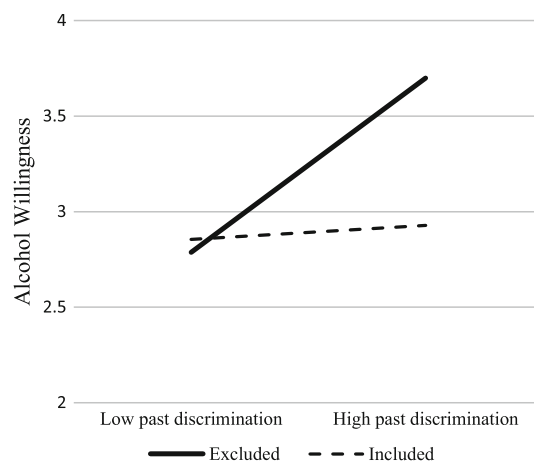


Fig. 4 Interaction of past racial discrimination and racial exclusion on alcohol willingness

sion by past year racial discrimination interaction was significant ($b = .602, t = 2.508, p = .013, 95\% \text{ CI } [.15, 1.07]$; see Fig. 5). Again, racially excluded participants with greater past year discrimination reported the highest levels of alcohol word associations ($b = .341, t = 1.987, p = .049$). Past year discrimination was not significant among included participants ($b = .050, t = .242, p = .809$).

Sex under the influence of alcohol willingness

Number of casual sex partners and engagement in sex under the influence of alcohol were added as covariates. Three outliers were removed (participants who reported more than 50 casual sex partners). Males ($b = -1.107, t = -5.526, p < .001$), and participants reporting a greater number of casual sex partners ($b = .037, t = 3.073, p = .002$), and greater past year discrimination ($b = .585, t = 3.140, p = .002$; CI [.23, .95]; Full Model $R^2_{adj} = .262$) reported higher willingness. Exclusion condition was not significant ($b = .048, t = .256, p = .798$), however there was a marginal past year racial discrimination by exclusion interaction ($b = .459, t = 1.933, p = .055, 95\% \text{ CI } [-.00, .92]$). The pattern was the same as above: greater past discrimination predicted greater willingness to have sex under the influence of alcohol in the racial exclusion condition ($b = .629, t = 3.232, p = .002$), but past discrimination was not significant in the inclusion condition ($b = .039, t = .215, p = .830$).

Mediation

To examine whether the significant effect of racial exclusion on alcohol willingness was mediated by negative affect, perceived control, and/or meaningful existence, a

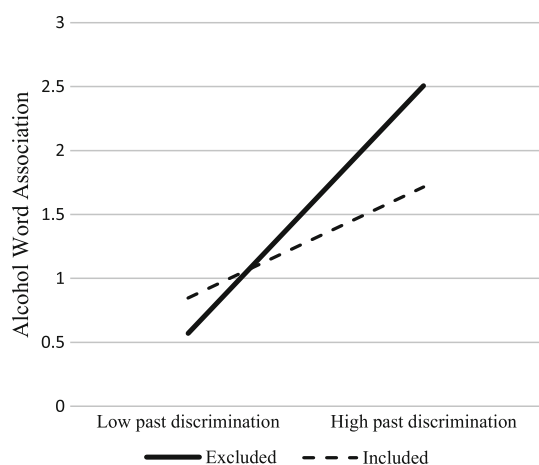


Fig. 5 Interaction of past racial discrimination and racial exclusion on alcohol word associations

bootstrap test of multiple mediation (Hayes, 2013; Preacher & Hayes, 2008) using the PROCESS macro in SPSS (Hayes, 2012; Model 4) was conducted. This method allows us to test whether the sizes of each indirect effect via different mediators differ significantly from each other. Thus, all three potential mediators were examined together in the same model and both direct and indirect effects were examined. Age, gender, student status, past year negative life events, relationship status, and past alcohol use were included as covariates. Results from the bootstrapping procedure using 1000 resamples revealed that past alcohol use was the only covariate significantly associated with alcohol willingness ($p < .001$). As expected, exclusion predicted greater negative affect, and lower perceived control and meaningful existence ($ps < .001$; see Fig. 6 for coefficients). Neither negative affect nor meaningful existence significantly predicted alcohol use willingness ($ps > .60$). However, perceived control was a significant predictor of willingness ($t = -2.13$; $CI = -.57, -.03$; $p = .034$). In addition, the bias-corrected 95 % confidence interval for the indirect effect of perceived control on alcohol willingness did not contain zero (.06, .74). Thus, the relation between racial exclusion and alcohol willingness was mediated by reduced perceived self-control.³

Discussion

In the present study, racial exclusion (perceived as racial discrimination), predicted several health-related outcomes: greater negative affect, alcohol use willingness, and reduced feelings of self-control and meaningful existence.

³ No mediated moderation of past year discrimination was observed in the relationship between racial exclusion and alcohol willingness via perceived control or negative affect.

Our study also demonstrated the importance of taking into account how past experiences with racial discrimination negatively impact both psychological and risky health reactions to experiences with racial exclusion: the negative effects of racial exclusion on self-control, negative affect, and relevant HIV-risk cognitions (alcohol and risky sex willingness, as well as alcohol word associations), were only present for Black young adults who reported greater frequency of past-year racial discrimination experiences. All results were significant controlling for participants' age, gender, student status, past year negative life events, relationship status, associated outcomes, and past risk behaviors.

Why is discrimination associated with alcohol-risk cognitions?

Based on theorizing from The Temporal Needs Threat Model, the Need to Belong, the PWM, and previous studies on racial discrimination and substance use among Black young adults, we examined several factors that may help explain the association between racial discrimination and risky alcohol cognitions. In the present study, although racial exclusion directly affected negative affect, perceived control and meaningful existence, it significantly impacted only one alcohol-risk cognition: willingness. Of the potential mediators, only reduced perceived control mediated the effects on alcohol willingness. These findings are consistent with research demonstrating that repeated exposure to racial discrimination can erode self-control and, in turn, increase substance use (Gibbons et al., 2012, 2015). The present study did not find that negative affect mediated the association between racial exclusion and alcohol-risk cognitions. One reason for this may be that our measure focused on a combination of negative feelings, including feeling upset, hopeless, and stressed (which all loaded onto a single factor). However, previous studies have demonstrated that anger/hostility, in particular, mediates the relation between racial discrimination and substance use (Gibbons et al., 2010, 2014). The lack of mediation effects for negative affect, however, are consistent with other lab-based studies that include a social exclusion paradigm; these studies found that negative emotions did not mediate the relation between exclusion and negative health-related outcomes (Twenge et al., 2002, 2003).

Racial discrimination, Cyberball, and moderation of cumulative effects

Our results highlight the importance of examining individual differences in cumulative discrimination as a moderator of the association between lab-based experiences of

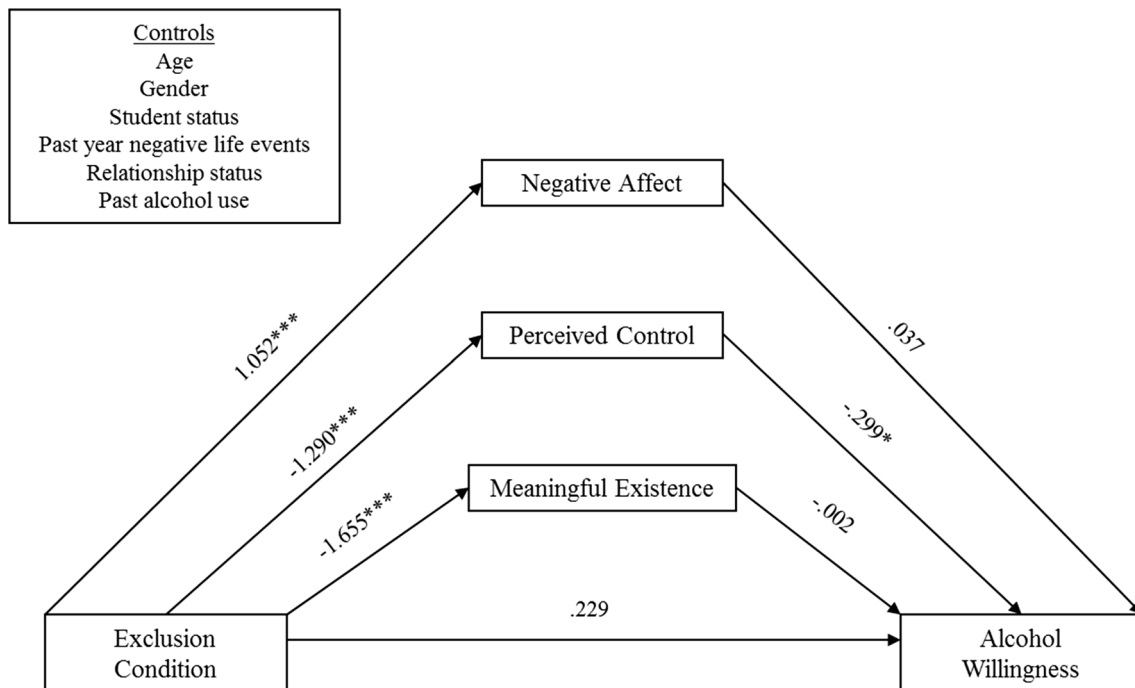


Fig. 6 Mediation pathways between racial exclusion condition (0 = included, 1 = excluded) and alcohol willingness

racial exclusion and negative health cognitions. Overall, the evidence suggests that individuals who report greater experiences of past racial discrimination are more negatively affected by an immediate episode than those who do not. Thus, our findings suggest that combating the negative effects of experiences of racial discrimination does not become easier over time. Rather, repeated exposure appears to lead to a cumulative effect in a way that is similar to how repeated physical stress increases allostatic load (Brody et al., 2014). These results also suggest that individuals who experience high levels of racial discrimination are at greater risk for alcohol use after experiences of racial exclusion. Recent research indicates that the increase in substance use cognitions due to racial exclusion is greater when Blacks are excluded by Whites than by other Blacks (Stock et al., 2015). Thus, there is evidence for some differences in responses to the exclusion episode based on the race of the excluders. This may be due, in part, to differences in levels of previous experiences with racial exclusion and coping patterns.

Limitations and future research

There are several limitations that should be addressed. Consensus surrounding the operationalization of cumulative discrimination is still emerging. Although the SRE is a commonly used and valid measure (Williams & Mohammed, 2009), future studies should examine reports of discrimination over differing time frames (e.g., lifetime versus

year) as well as repeated measures over time (e.g., Peterson et al., 2016). A recent study by Brondolo et al. (2015) found that both past week and lifetime reports of discrimination predicted smoking behaviors among Black adults. However, after controlling for gender, the effects on current smoking status were stronger for the past week reports. Thus, research should continue to examine different measurements of discrimination, as well as how the effects might vary based on the risk behavior (e.g., smoking versus drinking). Secondly, just as the cognitive risk-response to discrimination may vary by person, these responses may also vary in regard to the perpetrators of interpersonal discrimination. In the present study, the lab-based racial exclusion was perpetrated by same-age, same-gender, White peers; however the SRE does not condition a participant's responses on the race, sex, or age of the perpetrator. For example, young adult Black women may experience exacerbated effects of exclusion by White men as an intersectional experience of identity-based unfair treatment.

Although we found similar patterns on several risk cognitions among participants who were excluded and reported higher levels of cumulative discrimination, we did not find any evidence of mediation within this group. It is important to further understand how and why cumulative experiences of discrimination impact alcohol and sexual-risk cognitions and behaviors. Previous research on the effects of discrimination suggest future research should also examine coping strategies (e.g., substance-use-as-

coping, Gerrard et al., 2012) as additional moderators of the relation between discrimination and alcohol-risk. Another possibility is that reduced self-regulation (vs. just reduced perceptions of control) played a role in our findings (Stock et al., 2015). Studies manipulating social exclusion (Baumeister et al., 2005; DeWall et al., 2012) or interracial interactions (Richeson & Shelton, 2007), have demonstrated immediate effects on a reduction in self-regulatory strength. Examination of the role that self-regulation impairment plays in experiences of racial exclusion, particularly among individuals who report repeated exposure to these types of aversive events, may provide insight into the pathways between discrimination and health risk. Finally, we did not include behavior as an outcome due to the lab-based design. Proximal antecedents like willingness and word associations are common in experimental studies on risk behavior and are predictive of future behavior (Gerrard et al., 2008; Gibbons et al., 2010; Rooke et al., 2008; Stock et al., 2013); however, additional research methods are needed that allow for the examination of behavioral outcomes.

Conclusion

These results further demonstrate the importance of examining both past (cumulative), as well as the immediate (causal) effects of racial discrimination on the psychological, alcohol, and HIV-risk cognitions of Black young adults. They show that the health-related reactions of young adults to experiences of racial exclusion should be considered within the context of past experiences of racial discrimination, and that those experiencing more frequent episodes of discrimination often may be more negatively affected by the immediate context. Combating the harmful effects of racial discrimination on negative affect, reduced feelings of control, and alcohol and risky-sex decisions does not become easier with more experiences. These findings add to previous research on the deleterious contribution of racial discrimination to alcohol and HIV-risk decisions. Both alcohol and sexual-risk behaviors can have immediate and chronic personal health and societal consequences, which contribute to the health disparities that exist between Blacks and Whites today in the U.S., particularly disparities in HIV infection and alcohol abuse outcomes. Once researchers have a better understanding of the mechanisms that help explain, and potentially reduce, the associations between racial discrimination and both substance use and risky sex decision-making, we can use these findings to help inform more effective interventions.

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Compliance with ethical standards

Conflict of interest Michelle L. Stock, Laurel M. Peterson, Brianne K. Molloy and Sharon F. Lambert declares that they have no conflict of interest.

Human and animal rights and Informed consent All procedures followed were in accordance with ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2000. Informed consent was obtained from all participants for being included in the study.

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