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**Association of Racism and Substance use Treatment with Belief in the Myth of an
American Indian/Alaska Native Biological Vulnerability to Alcohol Problems**

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Author Note

This research was supported by the National Institute of General Medical Sciences of the National Institutes of Health under Award Number 5P20GM104417–02. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health. The authors express sincere gratitude to the Community Advisory Board for their guidance and feedback on this project, and to the participants who generously shared their time and experiences. Correspondence concerning this article should be addressed to Vivian M. Gonzalez, University of Alaska Anchorage, Department of Psychology, 3211 Providence Drive, Anchorage, AK 99508. Email: vmgonzalez@alaska.edu.

Abstract

Objectives: Belief in an American Indian/Alaska Native (AIAN) specific biological vulnerability (BV) to alcohol problems is associated with worse alcohol outcomes among AIANs. Despite a notable lack of evidence that biogenetic factors play a greater role in the development of alcohol problems among AIANs than other groups, many people still believe this myth. Consistent with theory and evidence that greater experiences with discrimination leads to the internalization of stereotypes and oppression, we hypothesized that greater perceived racial discrimination (racism) would be associated with greater BV belief, but that having a stronger ethnic identity would weaken this association. We also examined whether previous substance use treatment as well as participation in Alcoholics Anonymous (AA) or Narcotics Anonymous (NA) was associated with BV belief. **Method:** Participants were 198 reservation-dwelling AI adults with a substance use problem who completed a survey as part of a larger community-based participatory study. **Results:** A multiple regression analysis revealed that greater systemic racism was associated with greater belief in a BV; this association was not moderated by ethnic identity. Greater interpersonal racism was also associated with greater BV belief—but only among those low in ethnic identity. A regression analysis revealed that previous treatment, AA, and NA participation were not associated with BV belief. **Conclusions:** Greater systemic and interpersonal racism were associated with belief in a BV, and greater ethnic identity buffered the association between interpersonal racism and BV belief. This suggests that both combatting racism and fostering positive ethnic identity may help to lessen BV belief.

Keywords: American Indian, alcohol, stereotype, internalized racism, firewater myth

Public Significance Statement

People who report experiencing more racial discrimination are more likely to accept stereotypes and negative societal beliefs about their own group (i.e., to internalize racism). In this study with American Indian/Alaska Natives (AI/AN), systemic and interpersonal racism were associated with greater belief in the unfounded and harmful stereotype that AI/AN people have a unique biological vulnerability (BV) to alcohol problems. However, a stronger ethnic identity was protective against the effects of interpersonal racism on belief in a BV.

Introduction

One of the more central stereotypes regarding American Indians and Alaska Native (AIAN) peoples and alcohol relates to the notion that there are biological (e.g., alcohol metabolism) or genetic differences that make AIAN peoples more prone to developing problems with alcohol than non-AIANs (Covone, 2022). This erroneous notion of “constitutional” or inborn differences regarding the effects of alcohol on North American Indigenous Peoples was introduced during early colonization by Europeans (Leland, 1976; Long et al., 2002; Mail, 2002; Quintero, 2001). This idea did not fade with time, but instead came to focus on modern understandings of genetics and alcohol metabolism to explain alcohol-related health disparities, and fueled studies looking for evidence of biogenetic differences between AIANs and Whites or non-AIANs (see Ehlers & Gizer, 2013 and Enoch & Albaugh, 2017 for reviews). Despite these attempts, there is a notable lack of evidence to support the notion that biogenetic factors play a *greater* role in alcohol use disorder among AIANs compared to other racial groups (Ehlers & Gizer, 2013; Enoch & Albaugh, 2017). In fact, there is evidence that the heritability of alcohol use disorders is lower among AIANs when compared with heritability estimates from the general population (see Ehlers & Gizer, 2013). However, this myth continues to be pervasive, which is problematic for a number of reasons. Not only is it unsupported by evidence, it also contributes to racial stereotyping, stigma, and discrimination against AIANs (Covone, 2022; La Marr, 2003). Further, it has long been suggested that belief in an AIAN-specific biological vulnerability (BV) to alcohol problems may have negative effects on AIANs' drinking behavior and strategies used to limit drinking and/or avoid alcohol-related consequences (La Marr, 2003; Quintero, 2001). Recent research supports these concerns and suggests that the myth of an AIAN-specific BV may contribute to alcohol-related health disparities (Gonzalez et al., 2019, 2021; Gonzalez &

Skewes, 2016, 2018, 2021).

Association of BV Belief with Alcohol Outcomes

Believing that one is less capable of controlling one's drinking and is at risk for experiencing alcohol problems because of racial biogenetic differences may influence affect and cognition about alcohol – including one's self-efficacy to control intake (Gonzalez & Skewes, 2016). This may affect strategies used to moderate alcohol use and thereby result in greater alcohol use and consequences (Gonzalez et al., 2019; Gonzalez & Skewes, 2016, 2018). In fact, research with AIAN college students in Alaska who drink has shown that belief in a BV is associated with greater temptation to drink heavily, lower confidence in ability to avoid drinking heavily or to use harm reduction strategies to avoid alcohol consequences, greater heavy episodic drinking, and more negative alcohol consequences, while also being associated with guilt for drinking even small amounts of alcohol and greater attempts to control drinking (Gonzalez & Skewes, 2016, 2018). Further, a study with AIAN students from 10 U.S. states found that among students who drink, BV belief was positively associated with greater alcohol use and consequences via its negative effect on the use of protective behavioral strategies to moderate alcohol use and avoid consequences (Gonzalez et al., 2019). Among American Indian (AI) participants with a substance use problem who drank but did not use hard drugs (e.g., methamphetamine, opioids), greater BV belief was associated with substance use consequences through its association with greater craving and drinking days (Gonzalez & Skewes, 2021). A study with college students from two large universities in Alaska found indirect associations between BV belief and alcohol consequences through the association of BV belief with greater depression and drinking to cope with negative affect among those who may have been concerned about fulfilling a negative AIAN stereotype (i.e., among those who more frequently drank

heavily; Gonzalez et al., 2021).

Thus, the current evidence suggests that BV belief may affect alcohol-related cognition (e.g., self-efficacy to regulate alcohol use or avoid harms), affect (e.g., guilt for drinking, depression), and behavior (e.g., decreased use of protective strategies, increased drinking to cope) in ways that could contribute to the development of alcohol problems among AIANs who drink as well as potentially hinder efforts to change drinking. These potential negative effects are particularly concerning given the high rates of BV belief found among AIANs who drink. In two quite different samples of individuals who were not abstinent from alcohol, AIAN college students in Alaska and Northern Plains reservation-residing AIs with substance use problems, over half of participants (50.3%, Gonzalez & Skewes, 2018, and 59.6%, Gonzalez & Skewes, 2021, respectively) agreed with the notion of a BV. Further, in both samples, degree of belief in a BV was normally distributed with means, medians, and modes indicating slight agreement with this notion (Gonzalez & Skewes, 2018, 2021). Thus, while rates appear high, these findings also suggest a good deal of variability in this belief, but no studies to date have examined factors that may affect degree of belief in a BV. The present study examined two potential factors that may affect belief in a BV: perceived racial discrimination and previous substance use treatment.

Racial Discrimination and Internalized Racism

Racial discrimination is associated with poorer physical and mental health outcomes, including greater substance use (Armenta et al., 2016; Carter et al., 2019; Lewis et al., 2015; Williams & Mohammed, 2009). Another consequence of racial discrimination can be internalized racism (Pyke, 2010; Speight, 2007), which has been defined as acceptance of stereotypes and negative societal beliefs that suggest that one's racial group is inferior or less capable than the majority racial group (Williams & Williams-Morris, 2000). For example,

Graham et al. (2016) found a moderate association between experiences with racism and internalized racism among Black Americans. Likewise, among Filipino Americans, experiences with racism are positively associated with internalized cultural and ethnic inferiority (David & Okazaki, 2006; Felipe, 2016). Hughes et al. (2016) proposes that ethnic identity, socialization, and discrimination are interdependent phenomena that inform one's racial knowledge. One way that racial discrimination is theorized to lead to the internalization of messages regarding the inferiority of one's group (i.e., internalization of racism) is through the repeated exposure to these negative messages about one's group, particularly in the absence of counteracting forces that would disrupt the internalization of these negative appraisals, such as positive ethnic or racial socialization and identity (Fuller-Rowell et al., 2021; Hughes et al., 2016; Neblett et al., 2009).

Belief in a BV among AIAN people can be conceptualized as an internalized stereotype, as it suggests that because of genetics, AIAN people are less capable than other Americans of drinking without harm or developing an alcohol use disorder. Thus, BV belief is a form of internalized racism (Gonzalez et al., 2021). Similar to findings in other groups where experiences with racial discrimination (i.e., racism) were associated with greater internalized racism (David & Okazaki, 2006; Felipe, 2016), greater experiences with racial discrimination may likewise affect degree of BV belief among AIANs.

Ethnic Identity as a Protective Factor

A potential protective factor against the negative effects of discrimination is positive ethnic identity. Ethnic identity has been defined as a sense of belonging, involvement, and pride in one's ethnic or racial group (Phinney & Ong, 2007). Among diverse samples, including AIANs, research has found that having a positive ethnic identity helps to reduce the association

of racism with poorer psychological wellbeing. For example, ethnic identity has been found to buffer the association of racism with depressive symptoms and distress (Galliher et al., 2011; Jaramillo et al., 2016; Mossakowski, 2003; Romero et al., 2014; Sellers et al., 2003; Whitbeck et al., 2002) as well as lower self-esteem (Greene et al., 2006; Romero et al., 2014; Romero & Roberts, 2006).

It has been suggested that ethnic identity may serve as a protective factor by preventing the internalization of negative stereotypes (Mossakowski, 2003) and aiding in the interpretation of discriminatory experiences as owing to societal injustice rather than personal deficits (Lee & Ahn, 2013). Thus, while greater experiences with racism may contribute to the internalization of BV belief, having a more positive ethnic identity may protect against this.

Substance Use Treatment and Disease Model Conceptualizations

The notion of a BV is related to the disease model of “alcoholism” (Covone, 2022; Gonzalez & Skewes, 2016; Thatcher, 2004), which classically has viewed alcohol use disorder as strongly heritable, largely biogenetically-based, incurable, and only capable of being arrested through abstinence (Humphreys et al., 1996; Miller, 1993). Studies with AIAN college students have found greater BV belief to be associated with greater endorsement of a disease model of “alcoholism” (Covone, 2022; Gonzalez & Skewes, 2016), but not with belief in a psychosocial model that explains problems with alcohol as a learned behavior influenced by culture and family environmental factors (Gonzalez & Skewes, 2016).

The association of belief in a disease model with BV belief is noteworthy, as the disease model is one of the dominant models for understanding substance misuse in the United States, and the majority of American treatment programs have been based on it (Humphreys et al., 1996; Russell et al., 2011; Stolberg, 2006; Thombs & Osborn, 2013). Twelve step mutual support

groups such as Alcoholics Anonymous (AA) and Narcotics Anonymous (NA) also are based on the disease model and have been instrumental in promoting this model in the United States (Russell et al., 2011). It is possible that previous substance use treatment or participation in AA or NA may reinforce belief in a BV among AIANs — either directly by stating it as fact, or indirectly by reinforcing the disease model.

The Present Study

This study examined two factors that may be associated with belief in a BV, racism and substance use treatment history. We hypothesized that greater perceived racism would be associated with greater belief in an AIAN specific BV. We also hypothesized that having a stronger ethnic identity would help to buffer (weaken) associations between perceived racism and belief in a BV. Finally, we hypothesized that having been in substance use treatment as well as AA or NA attendance would be associated with greater belief in a BV.

Method

Participants

The data for the present study were drawn from a larger community-based participatory research (CBPR) project that aimed to understand substance use and develop culturally grounded intervention strategies for tribal members from a rural AI reservation in the Northern Plains region of the United States (Skewes et al., 2019, 2020; Skewes & Blume, 2019). In this study, participants were 198 AI adults from the same rural Northern Plains reservation community who self-identified as “having a substance use problem and trying to recover.”¹ Participant mean age

¹ A subset of this sample, specifically those who drank alcohol in the 90 days prior to the interview ($n = 141$), was used in a previous study of the effects of BV belief on substance use and consequences (Gonzalez & Skewes, 2021). Also, data from the larger sample was used in previous study to examine the association of historical trauma with substance use (Gameon & Skewes, 2021).

was 37.4 years ($SD = 11.8$; range 18-65). In this sample, 52% ($n = 103$) of participants were women and 48% ($n = 95$) were men. Regarding education, 12.7% of participants completed at least some college, 34% completed a high school diploma or the equivalent, and 50.2% did not complete high school. Median income was \$190.50 per month.

Procedure

This project represents a long-term collaboration between academic and community research partners from a reservation in the Northern Plains region of the United States. Using a CBPR framework (Israel et al., 2008; Wallerstein & Duran, 2010, 2016), we sought input from a community advisory board (CAB) of AI community members at all phases of the project. The CAB and the Tribal IRB approved the study and this manuscript.

Recruitment began when the local project manager made an in-person announcement to eight patients at a recovery support group at the on-reservation outpatient treatment center. The project manager extended an invitation to contact the research team at the local tribal college if interested in participating. After this initial recruitment effort, news of the survey spread rapidly across the reservation, with subsequent recruitment taking place exclusively through word-of-mouth.

Data were collected during in-person one-on-one interviews conducted by a member of the research team, which included the non-Native academic partners, the AI project manager, and two AI research assistants. Following an introduction to the larger project and informed consent, participants completed the survey, which included interview and self-report measures that took approximately two hours to complete. For participants who reported problems with reading, all survey items were read aloud by the interviewer. After the survey was complete, participants were provided a referral sheet for substance use disorder and other mental health

treatment, and were thanked with a \$50 gift card.

Measures

Belief in a Biological Vulnerability

Belief in an AIAN BV to alcohol problems was assessed using three items from the nine-item biological vulnerability subscale of the Revised Firewater Myth Scale (RFMS; Gonzalez & Skewes, 2016). These items were selected based on having the strongest factor loadings on the BV subscale (Gonzalez & Skewes, 2016). Items refer to Alaska Natives and American Indians: feeling the effects of alcohol, or feeling intoxicated, more easily than people of European descent; metabolizing alcohol differently than non-Native people; and being more likely to have a genetic vulnerability to problems with alcohol. Items were rated from 1 (*strongly agree*) to 6 (*strongly disagree*), then reversed scored. A mean score was calculated, with higher scores indicating greater belief in a BV. In this sample, internal consistency was high (McDonald's omega [ω] = .90) as were inter-item correlations (.74 to .78).

Perceived Racism

Participants responded to items designed to measure experiences of interpersonal (eight items), internalized (four items), and systemic racism (three items) from the Measure of Indigenous Racism Experiences (MIRE; Y. C. Paradies & Cunningham, 2008), adapted for use with AIs. Interpersonal items asked respondents how often they are treated unfairly in eight interpersonal settings (e.g., at work, at school, by police, by medical providers), with items rated from 1 (*never*) to 5 (*very often*). Internalized racism items relate to feeling good about being Native, accepted by other Native peoples, Native peoples having less opportunities, and that Native people should act more like other Americans. Systemic racism items reference common stereotypes or prejudices. Items refer to others thinking Native people get “special treatment

from the government,” others thinking they are better than Native people, and lack of positive portrayal of Native people in the media. Internalized and systemic items were rated *strongly disagree* (1) to *strongly agree* (5). After appropriate reverse scoring, mean subscale scores were calculated, with higher scores indicating greater experiences of racism in each domain.

Because the MIRE was originally designed for use with Aboriginal Australians and was adapted in this study for use with AIs, the factor structure in this sample was examined using principal axis factoring with oblimin rotation. A parallel analysis and the scree plot indicated a two-factor solution, which yielded good simple structure, while a three-factor solution did not. All eight items representing interpersonal racism loaded together on the first factor, with moderate to high factor loadings (.41 to .80) and internal consistency was good ($\omega = .84$). Similarly, all 3 items representing systemic racism loaded together on a second factor with high factor loadings (.55 to .60) and an omega of .61. All items designed to measure internalized racism showed low factor loadings (at or below .32) on both factors, and also had low factor loadings when a three-factor solution was examined. Thus, in the present study, only the Interpersonal Racism and Systemic Racism subscales of the MIRE were used to measure perceived racism.

Ethnic Identity

The 12-item version (Roberts et al., 1999) of the Multigroup Ethnic Identity Measure (MEIM; Phinney, 1992) was used for the present study. The MEIM measures feelings of belonging, pride, and positive attitudes toward one's ethnic group. It has two subscales, the 5-item exploration scale (“I talked to other people to learn more about my ethnic group”) and the 7-item commitment scale (“I have a lot of pride in my ethnic group”). Participants are asked to indicate how strongly they agree with each statement, rated from 1 (*strongly disagree*) to 4

(*strongly agree*). In the present sample, the correlation between these subscales was high ($r = .79$) and a study conducted with adult participants from a Northern Plains Reservation found a one factor solution using exploratory and confirmatory factor analysis (Schiefer & Krahé, 2014). Thus, in the present study, the MEIM mean total score ($\omega = 0.91$) was used to measure ethnic identity.

Substance Use Treatment History

Participants were asked if they had ever attended (a) residential substance use treatment, (b) outpatient substance use treatment, (c) AA, or (d) NA.

Analyses

Prior to analyses, data were screened following the procedures outlined in Tabachnick and Fidell (2014). Two participants were extreme univariate outliers ($z < -3.29$), with markedly low scores for ethnic identity. These outlying scores were changed to be less extreme (within 3.29 *SD* of the mean), while maintaining their positions in the distribution of scores (Tabachnick & Fidell, 2014).

A simultaneous multiple regression analysis was conducted to examine the association of interpersonal racism, systemic racism (SR), and ethnic identity with belief in a BV. Two-way interactions between racism variables and ethnic identity were included (Interpersonal Racism $\times$ Ethnic Identity, SR $\times$ Ethnic Identity). Variables were mean centered before calculating interaction terms to avoid issues with multicollinearity. Significant interactions were probed at one standard deviation above and below the mean on the moderator variable (ethnic identity) to examine the nature of the association of racism with belief in BV among those high versus low in ethnic identity.

A variable representing previous residential or outpatient substance use treatment was

created (*previous treatment*), with participants who had a history of residential and/or outpatient treatment coded as 1 and participants reporting neither coded as 0. A simultaneous multiple regression analysis was then conducted to examine the association of previous treatment, AA, and NA attendance with belief in a BV. For AA and NA variables, previous attendance was coded 1 and no history of attendance was coded 0. Gender (female coded 1, male coded 0) and age were included as covariates in all analyses to account for the potential confounding or extraneous effects of these variables on the associations of experiences with racism (Paradies, 2006; Williams & Mohammed, 2009) and substance use treatment experiences (Green, 2006; ten Have et al., 2013; Wang et al., 2005) with belief in a BV.

Results

Descriptives

Means, standard deviations, and intercorrelations of the study variables are presented in Table 1. Mean belief in a BV was 3.92 ($SD = 1.54$; median and mode = 4.00), with 60.6% ($n = 120$) endorsing some degree of belief in a BV based on a mean score of “slight agreement” (rating of 4) or higher. Regarding treatment history, 57.1% ($n = 113$) reported having had inpatient or outpatient alcohol or drug use treatment, 48.0% ($n = 95$) reported having attended AA, and 20.7% ($n = 41$) reported having attended NA. Of individuals who reported previous inpatient or outpatient treatment, 68.1% ($n = 77$) reported AA attendance and 28.3% ($n = 32$) reported NA attendance. Few participants who reported they did not have previous treatment ($n = 85$) reported AA (21.2%; $n = 18$) or NA (10.6%; $n = 9$) attendance.

Regarding bivariate associations among the study variables, small positive correlations were found among belief in a BV, systemic racism, and ethnic identity. Age was positively associated with greater reported interpersonal racism as well as previous treatment and AA

attendance. No significant bivariate associations were found between BV belief and previous treatment, AA, or NA attendance. Systemic and interpersonal racism were not significantly correlated.

Association of Perceived Racism with Belief in a BV

Overall, the multiple regression model examining the associations of interpersonal racism, systemic racism, and ethnic identity with belief in a BV was significant ($R^2 = .15, p < .001$; see Table 2). Greater systemic racism was significantly associated with greater BV belief, but contrary to our hypothesis, this association was not moderated by ethnic identity. However, ethnic identity did significantly moderate the association of interpersonal racism with BV belief. A probe of this interaction revealed that among those lower in ethnic identity ($-1 SD$), as interpersonal racism increased so too did belief in a BV ($B[SE] = 0.54[0.20], \beta = 0.27, p = .010$) and notably the association of interpersonal racism with belief in a BV was of a very similar magnitude as that found for systemic racism ($\beta = .24$). In contrast, among participants with average ($B[SE] = 0.17[0.14], \beta = 0.08, p = .241$) or higher ($+1 SD$) ethnic identity ($B[SE] = -0.20[0.20], \beta = -0.10, p = .243$), interpersonal racism was not found to be significantly associated with BV belief. Age and gender were not found to be significantly associated with BV belief.

Association of Treatment, AA, or NA with Belief in a BV

The multiple regression examining the association of previous substance use treatment, AA, and NA attendance with belief in a BV was not significant ($R^2 = .02, p = .477$). Controlling for age and gender, previous treatment ($B[SE] = -0.12[0.25], \beta = -0.04, p = .638$), AA ($B[SE] = -0.24[0.27], \beta = -0.08, p = .379$), and NA ($B[SE] = -0.07[0.30], \beta = -0.02, p = .824$) attendance in the past were not found to be significantly associated with degree of belief in a BV.

Discussion

Racism and Ethnic Identity

While there is evidence to suggest that greater belief in an AIAN-specific BV to alcohol misuse is associated with worse alcohol outcomes among AIANs who drink (Gonzalez et al., 2019, 2021; Gonzalez & Skewes, 2016, 2018, 2021), no studies to date have sought to examine factors that may influence BV belief. Consistent with previous research that has found that experiences with racism are positively associated with internalizing stereotypes and negative beliefs about one's race (Felipe, 2016; Graham et al., 2016), in the present study we found that greater systemic and interpersonal racism were associated with greater belief in a BV, and that greater ethnic identity was protective against the effects of interpersonal racism on internalization of belief in a BV. Specifically, interpersonal racism was only significantly associated with greater BV belief among those low in ethnic identity. In contrast, among those with average or higher levels of ethnic identity, interpersonal racism was not associated with belief in a BV. Although ethnic identity was protective in the association of interpersonal racism with BV belief, it was not protective for systemic racism. While this buffering effect for only interpersonal racism was contrary to our hypothesis, it is consistent with previous research examining the protective effects of ethnic identity in the associations of discrimination with mental health.

Ethnic identity has been found to buffer some associations of discrimination with mental health, but it is not universally protective against the negative effects of discrimination (Pascoe & Smart Richman, 2009). Equivocal findings in this literature are potentially related to design issues (e.g., specific constructs and measures used, populations and forms of discrimination examined) but also may reflect that the protective benefits of ethnic identity are nuanced. For example, Whitbeck (2002) found that ethnic identity, as indicated by participation in traditional

activities, buffered the association of racial discrimination with depressive symptoms among AI adults. In contrast, Whitbeck et al. (2004) found that enculturation, as indicated by cultural identification as well as participation in traditional activities and spirituality, did not moderate the association of racial discrimination with a diagnosis of alcohol abuse disorder among AI adults. Among adolescents, Galliher et al. (2011) found that ethnic identity served as a buffer in some associations of racial discrimination with mental health, but not others. This suggests that greater ethnic identity is not necessarily a panacea for racial discrimination, but in some cases may help to counter these negative experiences.

While a positive ethnic identity may affect attributions made regarding mistreatment at the interpersonal level (i.e., directed at the individual), in this study it did not buffer the effects of more pervasively perceived negative evaluations regarding AIs. In this study, the more participants believed that AI people were seen negatively or as an inferior group, the more they reported believing in a BV – an idea that implies AIAN people's biogenetic inferiority regarding ability to avoid problems with alcohol. It is possible that, in contrast to perceived racism that is aimed at the group as a whole, interpersonal encounters that are perceived as racially discriminatory are more readily buffered by ethnic identity, as this positive identity may allow the individual to avoid attributing their mistreatment to internal or stable aspects of themselves (Crocker & Major, 1989; Lee & Ahn, 2013). In fact, attributing mistreatment to discrimination has been found to protect self-esteem when the threat was experienced personally, but not when it was directed to the group as a whole (Major et al., 2002). It is possible that interpersonal experiences with racism do not lead to negative evaluations of one's entire group (i.e., internalized stereotypes or racism) among those higher in ethnic identity because they are able to correctly identify the unfair nature of their experiences and properly attribute them to the

aggressor. In contrast, when they feel that their group is generally devalued or viewed as inferior (systemic racism), people may be more likely to internalize these perceptions, overriding the protective effects of ethnic identity. Our findings suggest that perceiving that systemic racism was more harmful than interpersonal racism, not in magnitude of effect, but because its effect was not buffered by a positive identity and instead affected participants at all levels of ethnic identity.

It has been suggested that stronger ethnic identity is protective against the effects of racism because this positive identity helps one to interpret interpersonal experiences with racism as unjust (Lee & Ahn, 2013). Future studies should more directly examine the mechanisms through which positive ethnic identity may serve as a protective factor, including awareness of social justice issues relating to racism. A better understanding of these associations may help to explain equivocal findings in this area of research and aid in the development of interventions that seek to reduce the negative effects of racism on AIAN and other people experiencing oppression.

Previous Treatment and 12-Step Group Participation

Substance use treatment providers and programs in the US have largely adopted the philosophy of 12-step recovery programs, which favor a disease model to explain substance misuse; therefore, we hypothesized that having previously participated in treatment and 12-step groups would be associated with greater belief in a BV. However, our findings suggest no effect of treatment or 12-step group participation on BV belief. Although contrary to our hypothesis, this is a positive finding, as it suggests that a potentially iatrogenic effect of increased BV belief during interventions meant to aid those attempting to recover from substance misuse was not found in this study. Our failing to find an association of this myth with treatment may reflect that

treatment or 12-step groups did not reinforce the notion of a BV in ways that are influential above and beyond other sources of this myth. However, we know little about how this myth continues to be spread or why it is believed by some.

It has been suggested that treatment providers who serve Native clients may propagate the myth of an AIAN-specific BV (Thatcher, 2004). However, no study to date has examined the extent to which substance use treatment providers and other health care providers believe in this notion. If treatment providers do believe in a BV, it is possible that this belief could lead to an overidentification of alcohol use disorder or overattributing poor health outcomes to alcohol misuse among AIANs. It also could affect care, for example, by leading providers to favor abstinence-based treatments over harm reduction-based interventions for AIAN patients. Although studies are lacking in this area, similar research has been conducted to help explain the well-documented racial bias in the underestimation and undertreatment of pain in African American patients (e.g., Meghani et al., 2012; Stolberg, 2006). Hoffman et al. (2016) found evidence that false beliefs about biological differences between Blacks and Whites were not uncommon and were related to racial bias in the estimation of pain and in treatment recommendations. Similar studies are needed to examine AIAN-serving providers' belief in an AIAN-specific BV and its potential influence on diagnosis and treatment.

Constraints on Generality and Other Limitations

All participants in this study self-identified as having a substance use problem, were from the same AI reservation in the Northern Plains, and there were high rates of poverty in this sample. It is not known if the results would generalize to AIs who do not live on the reservation, who are from other reservations or parts of the country, or who do not self-identify as having a substance use problem. Further, it is important to consider the measures used, such as the MIRE

to measure systemic and interpersonal racism, and the MEIM to measure ethnic identity. As previously noted, the literature on the protective effects of ethnic identity in the association of discrimination with mental health outcomes is mixed (Pascoe & Smart Richman, 2009), and this may be owing to the specific constructs or measures examined (e.g., how ethnic identity is defined and measured, specific aspects of racial discrimination). For this study, the MEIM was used, which primarily is a measure of ethnic pride and belonging rather than adherence to traditional cultural beliefs and practices. Future studies may wish to examine whether AIAN enculturation, as indicated by traditional cultural beliefs and practices, serves as a buffer for systemic racism or as an additional buffer for interpersonal racism. A potential limitation of the MIRE was that the time frame for experiences with racism is not specified. Research shows that more recent (e.g., past year) experiences with discrimination are more influential on mental and physical health outcomes (Pascoe & Smart Richman, 2009). The focus of the present study was on the potential association of experiences with racism with a belief rather than with a health behavior or outcome, thus time frame may have been a less salient issue. Another limitation was that the MIRE's internalized racism items did not form a factor, interfering with our ability to examine the association of a general measure of internalized racism with belief in a BV. We would expect that a valid general measure of internalized racism would be particularly associated with belief in a BV given our conceptualization that belief in this negative stereotype is a form of internalized racism. Nor did we examine experiences with racism specific to alcohol, which would likely reinforce the notion of a BV and in theory would lead to greater belief in a BV in absence of specific knowledge regarding the lack of evidence for this notion or a positive ethnic identity.

An important limitation to consider is that this study was a cross-sectional survey, thus

directionality of effects and causality cannot be established. Another limitation is that our measurement of previous treatment and AA or NA participation were single yes/no questions, which may have affected the results. As an example of study findings that were affected by how 12-step group participation was measured, Russell et al. (2011) found that among substance use treatment providers, a simple yes/no dichotomy regarding previous 12-step group attendance was not significantly associated with degree of belief in a disease model of addiction, while years of 12-step group membership was significantly associated with greater belief in a disease model. Likewise, the degree of buy-in to these 12 step programs was not assessed. Future studies are needed to examine the extent of participation in AA or NA relative to BV belief as well as degree of buy in to 12 step program philosophy. Studies are also needed to further understand why some individuals believe in a BV, whereas others do not.

Conclusion

Consistent with previous studies that have found experiences with racial discrimination to be associated with internalized racism, we found that greater systemic racism and interpersonal racism were associated with BV belief, with ethnic identity attenuating the association of interpersonal racism with BV belief. We did not find that previous substance use treatment or 12-step group participation affected belief in a BV. The findings of this study suggest that both fostering positive ethnic identity and combatting racism may help to lessen BV belief. More importantly, efforts to directly debunk this myth are needed among AIANs as well as non-AIANs.

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Table 1*Bivariate Correlations Among Study Variables*

	1	2	3	4	5	6	7	8	<i>M</i>	<i>SD</i>	Range
1. Belief in a BV	—								3.92	1.54	1-6
2. Interpersonal racism	.09	—							2.06	0.77	1-4.3
3. Systemic racism	.27***	.09	—						3.37	0.82	1-5
4. Ethnic identity	.19**	.06	.16*	—					3.06	0.48	1.8-4
5. Previous treatment ^a	-.05	.00	-.17*	.00	—						
6. Alcoholics anonymous ^b	-.08	.01	-.15*	.04	.47***	—					
7. Narcotics anonymous ^b	-.06	.14	-.12	.12	.22**	.43***	—				
8. Age	.10	.25***	.02	.08	.25***	.21***	.06	—	37.39	11.79	18-65
9. Gender ^c	-.05	.05	.06	-.02	-.04	.01	.07	.03			—

Note. BV = biological vulnerability.

^a Participants who reported previous inpatient and/or outpatient alcohol or drug use treatment were coded 1, those who reported no such history were coded 0.

^b Participants who reported having attended Alcoholics or Narcotics Anonymous were coded 1, those who had not were coded 0.

^c Gender was coded: men = 0 and women = 1.

* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 2*Multiple Regression Analysis Predicting Belief in an AIAN-Specific Biological Vulnerability*

Variables	<i>B</i>	<i>SE</i>	CI 95%		β	<i>sr</i> ²
			LL	UL		
Interpersonal racism (IR)	0.17	0.14	-0.11	0.44	0.08	0.01
Systemic racism (SR)	0.45	0.13	0.19	0.70	0.24***	0.05
Ethnic identity	0.42	0.22	-0.02	0.85	0.13	0.02
IR $\times$ Ethnic Identity	-0.78	0.27	-1.30	-0.25	-0.20**	0.04
SR $\times$ Ethnic Identity	0.05	0.24	-0.43	0.54	0.02	0.00
Covariates						
Age	0.01	0.01	-0.01	0.03	0.07	0.00
Gender	-0.15	0.21	-0.56	0.26	-0.05	0.00

Note. CI = confidence interval; LL = lower limit; UL = upper limit.

** $p < .01$. *** $p < .001$.