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Discrimination, Substance Use, and Cultural Buffers among Native American College Students

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DISCRIMINATION, SUBSTANCE USE, AND CULTURAL BUFFERS AMONG NATIVE AMERICAN COLLEGE STUDENTS

BY

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DISSERTATION

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ABSTRACT

The negative effects of racial discrimination and microaggressions on health have been consistently documented, but only a handful of studies have examined this topic among Native Americans. The goal of this study was to test the Indigenist Stress-Coping Model (Walters, Simoni, & Evans-Campbell, 2002) among Native American college students attending two post-secondary institutions in the Southwestern United States. It was hypothesized that microaggressions would be positively related to substance use, and that cultural factors would attenuate the strength of this relationship. A total of 347 participants (65% female) completed a one-time online survey that included the Microaggressions Scale, the Actualization subscale of the Urban American Indian Identity Attitudes Scale (a measure of cultural identity), and measures of past-month and lifetime substance use. In the past month, only 43% of participants drank alcohol and only 27% binge drank – figures much lower than national averages for college students. Thirteen percent were current smokers and 20% had used illicit drugs in the past month. Almost all (94%) had experienced a microaggression in the past year. In regression models, microaggressions were positively related to using an illicit drug more than 100 times and to lifetime CAGE-AID score when controlling for gender, age, income, and cultural identity. However, microaggressions were unrelated to past-month substance use variables. While stronger Native American cultural identity was related to less past-month substance use, cultural identity did not moderate the relationship between discrimination and substance use. A subgroup of participants (*n* = 61) from the larger study completed a 21-day daily diary measuring substance use, discrimination, and cultural involvement. The goal was to examine the prospective influence of daytime experiences of racial discrimination on evening substance use, as well as the moderating effects of cultural identity, positive and negative interpersonal interactions, and alcohol expectancies. Using multi-level modeling, daytime discrimination did not predict evening substance use, and moderators could not be tested because of statistical convergence issues. These findings highlight cultural strengths and comparatively low rates of tobacco and alcohol use among Native American college students despite substantial experiences of lifetime discrimination; implications for future research and intervention are discussed.

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Although Native Americans have one of the highest rates of past-month abstinence from alcohol (Substance Abuse and Mental Health Services Administration [SAMHSA], 2014), they also experience some of the greatest substance-related health inequities in the United States, including the highest rates of alcohol-related motor vehicle deaths and among females, the highest rates of drug-induced deaths (Centers for Disease Control and Prevention [CDC], 2011b). A better understanding of factors that contribute to differential use of substances is essential – both to moving beyond stereotypical portrayals of Native American substance use, and for focused prevention and intervention efforts. In the past, this process has centered on individual level factors, such as genetic vulnerabilities or personality dimensions, and overlooked community and societal factors that may contribute to substance-related inequities. This study focused on one such extra-individual factor, racial discrimination, and examined its relationship with substance use and the potentially protective role of cultural factors among Native American college students living in a large Southwestern city. College students were chosen as the focal population because in general college is a high-risk period for substance use (SAMHSA, 2014). In addition, Native American college students have lower retention rates than other racial and ethnic groups (Larimore & McClellan, 2005) and discrimination may contribute to this issue.

Racial Discrimination

“Race” in the United States is a socially constructed heuristic that has been used to exclude particular groups from social and economic opportunity, justify government action or lack thereof, and explain health inequities as innate or natural (Gómez & López, 2013). However, "race" is not biologically based and is instead socially constructed, often based on an individual's physical or phenotypic appearance (Gómez & López, 2013). Racial discrimination concerns differential treatment or access to resources based on "race" (Jones, 2000).

Discrimination defined. Racial discrimination has been described at three levels. The first level encompasses *institutionalized racism*, which refers to "differential access to the goods, services, and opportunities of society by race" (p. 1212; Jones, 2000). For example, groups experiencing racism may have less access to housing, medical treatment, education, and/or employment. Such differential access was initially instigated by historical insults (e.g., forced removal of Native Americans from traditional lands) and is now maintained by lack of individual or governmental action despite need. Institutionalized racism is often invisible both to those who experience it and others in society. *Internalized racism* occurs when individuals belonging to a particular group believe negative messages others tell them and incorporate them into their self-schema. *Personally mediated racism* is the main focus of this study. It refers to both prejudice and discrimination. The former involves racially-specific beliefs about others' motives and abilities; the latter involves differential treatment motivated consciously or unconsciously by these beliefs (Jones, 2000). For example, the "drunken Indian" stereotype concerns the notion that Native Americans cannot hold their liquor and that alcoholism is a way of life among Native Americans (Westermeyer, 1974). Behavior toward Native Americans emanating from this prejudice can contribute to oppression and discrimination (Clark, 2006).

In psychology, personally mediated racism also has been termed *microaggressions*. Sue and colleagues (2007) defined microaggressions as “brief and commonplace daily verbal, behavioral, and environmental indignities, whether intentional or unintentional, that communicate hostile, derogatory, or negative racial slights and insults to the target person or group” (p.273). For people of color, microaggressions are now more often subtle, as many individuals believe we live in a “post-race” or “color-blind” society and that racism was abolished during the civil rights movement (Neville, Awad, Brooks, Flores, & Bluemel, 2013). This can make microaggressions particularly frustrating for those who experience them because the perpetrator may have an alternate non-race-related explanation for their behavior (Czopp, Mark, & Walzer, 2014).

Discrimination as a stressor. Discrimination and microaggressions represent a significant source of frustration that is best conceptualized as a chronic, ongoing stressor. Stressors in general have a negative impact on health through physiological changes in the body (e.g., changes in heart rate, blood pressure, cortisol); this is especially true for stressors such as discrimination that are perceived as uncontrollable (Pascoe & Smart Richman, 2009). Stress activates the hypothalamic-pituitary-adrenal (HPA) axis and extended amygdala and increases cortisol levels (Dickerson & Kemeny, 2004; Uhart & Wand, 2009). Additionally, animal and human studies have solidified the link between stress and propensity to develop substance use disorder and relapse to substance use (Uhart & Wand, 2009). Whether intentional or unintentional, discrimination has been consistently linked to negative health outcomes and increased psychological distress (Kessler, Mickelson, & Williams, 1999; Pascoe & Smart Richman, 2009; Williams, Neighbors, & Jackson, 2008).

Frequency of discrimination. Racial discrimination and microaggressions are a common experience for racial and ethnic minorities. Most research on racial discrimination has focused on African Americans. Ninety percent of African American parents in a community sample in Iowa and Georgia reported experiencing some discrimination during their lives, with 20% reporting more than minimal discrimination (Gibbons, Gerrard, Cleveland, Wills, & Brody, 2004). Ninety-one percent of their 10- to 11-year-old children experienced some discrimination, with 8% reporting more than minimal levels of discrimination. In another African American adult sample, 12% reported no experiences of discrimination, while 34% reported experiencing discrimination in three or more domains (e.g., work, school) at two measurement points eight years apart (Borrell et al., 2007).

A large survey of African American adults distinguished between day-to-day and major experiences of discrimination, and found that both were independently and positively associated with Major Depressive Disorder and general psychological distress (Kessler et al., 1999). Day-to-day discrimination (akin to microaggressions) included experiences such as being treated by sales people with less courtesy than others. Major discrimination included experiences such as not being hired for a job or being denied a loan. Half of the sample had experienced major discrimination during their lives. The most common types of major discrimination included not being hired for a job, being discouraged from seeking higher education, being denied a loan, and being hassled by the police. The reason for discrimination (e.g., gender, race, weight) was queried at the end of the questionnaire; 90% of African Americans tied their discriminatory experiences to race (Kessler et al., 1999).

Similar to African American adolescents, approximately half of Native American adolescents living on or near reservations in the upper Midwest endorsed experiencing discrimination because of being Native American (e.g., insulted, racial slurs, teachers surprised they were doing well; Whitbeck, Hoyt, McMorris, Chen, & Stubben, 2001). One quarter reported being excluded by other children and 15% had been physically threatened because of their race. Gender differences were found for only one of the 10 discrimination items: a higher percentage of girls than boys were disrespected in a store because they were Native American (Whitbeck et al., 2001).

In a small sample of Southwestern Native American college students, 40% endorsed overt discrimination in the past school year. Approximately 25% had been called names or insulted, while 15% had been harassed or intimidated (Perry, 2002). Among Native American young adults (mostly college students at Utah State University), 98% endorsed experiencing at least one microaggression (Jones & Galliher, 2015). The degree to which individuals are affected by discrimination varies. Jones and Galliher (2015) found that participants rated the level of their microaggression-related distress between none and mild, although all possible levels of distress were endorsed. Walters (2010) found that approximately ten to fifteen percent of urban-dwelling two-spirit (lesbian, gay, bisexual, and other sexual minority) Native Americans were bothered “quite a bit” or “extremely” by microaggressions.

Substance Use among Native Americans

Alcohol use. Contrary to common stereotypes, Native Americans are more likely than other racial and ethnic groups (except Asian Americans) to completely abstain from alcohol. The 2013 National Survey on Drug Use and Health found that 62.7% of Native

Americans did not drink alcohol in the past month, compared to 65.5% of Asians, 57% of Hispanics, 56.4% of Blacks, and 42.3% of Whites (SAMHSA, 2014). Rates of lifetime alcohol abstinence are also high; Native Americans from a large Southwest tribe had significantly higher rates of lifetime abstention from alcohol than a national sample (e.g., 61.5% for Southwest women vs. 39.4% of women nationally; O'Connell, Novins, Beals, & Spicer, 2005).

National surveys estimate rates of past-month binge drinking among Native Americans at 15.4% to 23.5%, rates that are comparable to binge-drinking rates among other racial/ethnic groups (CDC, 2011a; SAMHSA, 2014). Overall rates of heavy alcohol use among Native Americans (defined as 5+ past-month binge drinking days) were mid-way between those of other racial/ethnic groups (SAMHSA, 2014).

Group-level differences become more apparent when considering only those Native Americans who drink alcohol. Native Americans who report drinking in the past year report significantly fewer drinking days per month than national samples, with Native Americans living on tribal lands drinking less frequently than Native Americans living in urban areas (Beals et al., 2003; O'Connell et al., 2005). However, current Native American drinkers were more likely to report past-year binge drinking and/or intoxication and a greater number of drinks per drinking day than a national comparison group (Beals et al., 2003; O'Connell et al., 2005). Again, heterogeneity is the norm. While Native Americans in general had higher intoxication rates than the national sample, Southwest Native American women had lower past-year intoxication rates than other Native Americans or national all-race samples (O'Connell et al., 2005).

Because Native Americans nationally have lower rates of past-month alcohol consumption than other groups, but similar overall rates of past-month binge drinking, Native Americans past-month binge drinkers make up a larger proportion of current Native American drinkers than is the case among other racial and ethnic groups (SAMHSA, 2014). The 2009 Behavioral Risk Factor Surveillance System found that among Native Americans who had a past-month binge drinking episode, the number of binge drinking episodes, as well as the number of drinks consumed per binge-drinking episode, was higher than for individuals from other racial and ethnic groups (6.7 episodes on average, with 8.4 drinks per episode; CDC, 2011a). Taken together, these findings suggest that among the subset of Native Americans who do drink, a common pattern is one of sporadic but heavy alcohol consumption – a style that may partially explain elevated rates of alcohol use disorder and alcohol-related mortality among Native Americans.

Drug use. In 2013, the overall past-month illicit drug use rate in the United States was 9.4 percent (SAMHSA, 2014). Illicit drugs encompassed "marijuana, cocaine, heroin, hallucinogens, and inhalants, as well as the nonmedical use of prescription-type pain relievers, tranquilizers, stimulants, and sedatives" (SAMHSA, 2014). Across ages, 12.3% of Native Americans used illicit drugs in the past month, compared to 3.1% of Asians, 8.8% of Hispanics, 9.5% of Whites, 10.5% of African Americans, and 17.4% of those from multi-racial backgrounds (SAMHSA, 2014).

At the population level, drug use rates vary by age. Among young adults ages 18 to 25 years, rates of past-month illicit drug use were much higher than for the general population: 21.5% overall, and 19.1% for marijuana. Similarly, full-time college students between 18 and 22 years old had a past-month illicit drug use rate of 22.3% (SAMHSA, 2014). National rates of drug use among Native Americans ages 18 to 25 have not been reported.

The American Indian Services Utilization, Psychiatric Epidemiology, Risk and Protective Factors Project (AI-SUPERPFP), a large epidemiological survey of Southwest and Northern Plains tribal members, found that *lifetime* drug use rates were highest for marijuana (range of 36.9% for Southwest women to 57.5% for Northern Plains men), cocaine (3.6% for Southwest women to 17.0% for Northern Plains men), and inhalants (4.3% for Southwest women to 21.5% for Northern Plains men; Mitchell, Beals, Novins, & Spicer, 2003). Another large epidemiological survey of four tribes in the northern United States found *past-year* marijuana use rates of 32-37% among men and 18-24% among women ages 20 to 39. Past year-use of prescription painkillers ranged from 8-13% for men, and 8-9% of women. Past-year methamphetamine use ranged from 10-13% among men and 5-7% among women between the ages of 20 and 39. Past-year use of inhalants was very low – 1.3% or less – across ages and gender (May & Gossage, 2001). These studies emphasize intertribal heterogeneity in terms of drug use.

Tobacco use. The 2009 Behavioral Risk Factor Surveillance System found that rates of tobacco use were highest among Native Americans (CDC, 2011b). Similarly, the 2013 National Survey on Drug Use and Health documented current cigarette use rates as 36.5% among Native Americans, 23.0% among Blacks, 22.7% among Whites, 16.8% among Hispanics, and 8.5% among Asians. Among Native Americans living on four reservations in the Northern United States, past-year smoking rates ranged from 60-68%

among men ages 20 to 39, and from 67-70% among women ages 20 to 39 (May & Gossage, 2001).

AI-SUPERPFP data on current smokers found the highest rates of tobacco use among Northern Plains participants, with approximately half reporting current tobacco use (Henderson, Jacobsen, & Beals, 2005). None of these surveys separated out ceremonial tobacco use, which could have led to higher reported rates of use without necessarily indicating problematic use.

Men in the AI-SUPERPFP Southwest sample were significantly more likely to be current smokers than women (19% versus 10%), and younger individuals were also more likely to be current smokers (Henderson et al., 2005). For both samples, alcohol consumption was significantly associated with being a current smoker. Among Native American adults visiting rural and urban health clinics in northern California in 1991, the current smoking rate for men was 47% and 37% for women (Hodge et al., 1995). In a similar sample of only rural Native Americans in northern California conducted in 1998, 44% of men and 37% of women reported being current smokers, similar to 1991 rates (Hodge & Nandy, 2011).

In AI-SUPERPFP, being married and spending less than 75% of one's time on the reservation were associated with greater odds of being a smoker (Henderson et al., 2005). Hodge and colleagues (1995) found that Native American men living in urban areas were more likely to smoke than Native American men living in rural areas. Living in an urban area may confer additional risks in terms of potential for discrimination, stress, less cultural support, and subsequent substance use.

College students. Collapsing across four waves of data from 200 plus campuses in the College Alcohol Study, Ward and Ridolfo (2011) found rates of alcohol use among 267 Native American college students that were similar to rates of alcohol use among general college student samples. Sixty-five percent of Native American students reported drinking in the past month, 82.5% reported past-year alcohol use, and 40.8% were binge drinkers. The schools included had very low Native American student enrollment (< 1% on average). In terms of drug use, 30.7% reported past-year marijuana use, 21.8% reported using other illicit drugs in the past year, and 33.4% reported using alcohol in combination with another drug in the past year (Ward & Ridolfo, 2011). In contrast to these students, in a sample of Native Hawaiian community college students, 13% had used marijuana, 30% endorsed "getting drunk," and 20% had used cigarettes in the past month (Pokhrel & Herzog, 2014).

Hughes and Dodder (1984) compared alcohol consumption among White college students in Oklahoma with 58 Native American students they described as "culturally connected." More than 80% of all students were current drinkers. Rates of alcohol consumption were similar across racial groups, although Whites tended to drink more alcohol, more frequently. Native Americans were less likely to report drinking because they enjoyed the taste or to celebrate and more likely to report drinking to get high. Native Americans were significantly less likely to report drinking and driving, but more likely to be arrested for public intoxication or driving while intoxicated. The authors suggest that discriminatory practices in arrest rates may have influenced this discrepancy.

These substance use rates are higher than those among the general Native American population, and suggest that college may entail a higher risk period for substance use among Native Americans, similar to college samples in general. As discussed earlier, all-race samples of full-time college students between 18 and 22 years old had a past-month illicit drug use rate of 22.3%, compared to 9.4% of all-race and all-age individuals nationally (SAMHSA, 2014).

Substance use disorders. In 2013, Native Americans had the highest rate of past-year substance use disorder (including alcohol) in the nation at 14.9%. This compared to 4.6% for Asians, 7.4% for Blacks, 8.4% for Whites, and 8.6% for Hispanics (SAMHSA, 2014). Here again, it is important to be aware of differences within and between tribes: in AI-SUPERPFP, Southwest Native American women had *lower* rates of past-year alcohol abuse than the national all-races average (1.5% vs. 4.7%), whereas Northern Plains Native American men had the highest rates of past-year alcohol abuse at 8.2% (Beals et al., 2005). However, variability in alcohol dependence prevalence rates reported ranged from 1%-56% among different Native American samples (Koss et al., 2003). Corresponding with substance use prevalence rates found in AI-SUPERPFP, rates for lifetime substance dependence were highest for marijuana (4.5% for Southwest women to 14.1% for Northern Plains men) and cocaine (1.1% for Southwest women to 2.3% for Southwest and Northern Plains men; Mitchell et al., 2003).

Substance-related consequences. Native Americans experience higher rates of substance-related negative consequences than individuals from other racial and ethnic backgrounds (Chartier & Caetano, 2010). In 2009, Native Americans had the highest motor vehicle-related death rate of any racial or ethnic group (29.1/100,000; CDC, 2011b). Forty-eight percent of these crashes were alcohol-related, a figure higher than for all other groups (CDC, 2011b). Rural residence and limited access to health care may contribute to these health inequities. Whereas Native American females consistently have the highest rates of drug-induced deaths in the United States, Native American males have rates similar to those of other racial groups (CDC, 2011b). Drug-induced deaths are those that involve “acute poisoning from drugs” or “deaths from medical conditions resulting from chronic drug use” (p. 60; CDC, 2011b).

Understanding factors that contribute to substance-related health inequities for Native Americans is a key first step to identifying systems- and individual-level interventions to address these inequities. Racial discrimination is one such factor to consider.

Discrimination and Substance Use

In primarily cross-sectional studies, greater discrimination has been consistently associated with more detrimental health behaviors. In a review of 13 studies, Pascoe and Smart Richman (2009) found an average correlation of .18 (95% CI = .21 to .15) between discrimination and negative health behaviors such as substance use. Chronic, recent, and lifetime discrimination were similarly related to negative health behaviors. Perceived discrimination was defined as “a behavioral manifestation of a negative attitude, judgment, or unfair treatment toward members of a group” (p. 533; Pascoe & Smart Richman, 2009). This is in line with Jones’ (2000) definition of personally mediated discrimination.

Other racial and ethnic groups. Most research on racial discrimination and substance use has focused on racial and ethnic groups other than Native Americans. Among 2,129 African American students at historically Black colleges, those who reported any past-year discrimination were more likely to be daily smokers (OR=2.01) and report past-month tobacco use (OR = 1.45) than those who did not (Bennett, Wolin, Robinson, Fowler, & Edwards, 2005). In a smaller sample of African American university students, staff, and faculty, lifetime experiences of discrimination were also associated with being a current smoker (Landrine & Klonoff, 1996). More past-month microaggressions were associated with more alcohol-related consequences among students of color (primarily African American) at a historically White institution in the Southeastern United States (Blume, Lovato, Thyken, & Denny, 2012). Discrimination was associated with anxiety, depression, and somatization, but not substance use in Asian American and Pacific Islander undergraduate and graduate students in the Midwest (Chen, Szalacha, & Menon, 2014). The negative impact of discrimination may manifest differently in different racial and ethnic groups.

A common discrimination measurement strategy involves providing a list of different domains in which discrimination might occur (e.g., schools, banks, employment), and asking participants to report the number of domains in which they have experienced discrimination. This method implicitly assumes that discrimination occurring in *more* domains is most detrimental, and thus will have a stronger link to substance use. Based on the available literature, this appears to be the case.

For example, in a study of 704 Asian, Latino, and African American San Francisco transit workers who reported past-year alcohol use, those who reported lifetime discrimination in five or more domains were significantly more likely to drink more than 60 drinks a month and have a CAGE score greater than two (indicative of problem drinking) than those who reported no discrimination (Yen, Ragland, Greiner, & Fisher, 1999). Those who experienced discrimination in five or more domains drank approximately 13 more drinks a month than those who reported no discrimination. There were no group differences in alcohol-related consequences (Yen et al., 1999).

In the prospective Coronary Artery Risk Development in Young Adults (CARDIA) study of 1,507 African Americans living in urban areas, those who reported lifetime experiences of discrimination in three or more domains at baseline and in three or more domains at the 8-year follow-up were significantly more likely to report current tobacco use, past-year alcohol use, and using marijuana more than 100 times in their life at the 8-year follow-up than those who reported no discrimination at baseline and 8-year follow-up (Borrell et al., 2007).

Researchers have also considered the differential impact of major discriminatory events (e.g., not being hired for a job) compared to ongoing daily experiences of discrimination (e.g., being treated with less respect than others). In a study of 4,454 pregnant African American and Latina women, everyday instances of discrimination were related to greater odds of smoking during pregnancy or alcohol consumption prior to pregnancy, while major discriminatory events were not associated with either outcome variable (Bennett et al., 2010). This is consistent with the larger stress and coping literature, in which ongoing stressors tend to have a stronger influence on health outcomes than one-time major stressors.

Compared with perceptions of group-level racism, instances of interpersonally mediated racism have been more consistently associated with substance use. Among 1,531 African Americans who reported past-year alcohol use, lifetime experiences of discrimination were associated with CAGE scores of two and above (OR = 2.12) and endorsement of “escapist” drinking (e.g., “drinking is a good way to relax after work”;

Martin, Tuch, & Roman, 2003). Perceptions of societal prejudice were not associated with the odds of problem drinking or escapist drinking. Similarly, among African American women living in New York City who reported drinking once a month or more, problem drinking as measured by the CAGE was associated with lifetime experiences of individual racism, but was unrelated to perceptions of group-level racism (Kwate, Meyer, Eniola, & Dennis, 2010).

Native Americans. Although less research on discrimination and substance use has been conducted with Native Americans, available results are generally consistent with findings from other racial and ethnic groups. Among two-spirit Native Americans living in urban areas, Walters (2010) found that discrimination was associated with current smoking status, with individuals who reported being bothered "quite a bit or more" by microaggressions during their life being significantly more likely to be a current smoker than those who reported being bothered "a little or less" (OR = 2.2). Among American Indian fifth through eighth graders who lived on or near three Upper Midwest reservations (N = 220), perceived discrimination was positively associated with number of drugs used in the past six months, alcohol-related problems, and alcohol use (Whitbeck et al., 2001). Furthermore, perceived discrimination experienced by their parents or caregivers was positively associated with a past-year diagnosis of DSM-IIIR alcohol abuse among the parents or caregivers (Whitbeck, Chen, Hoyt, & Adams, 2004).

Evidence on the relationship between discrimination and substance use is accumulating, yet many studies have been cross-sectional and do not permit causal conclusions. Additionally, an association does not suggest *why* the two might be linked. Some researchers have taken this line of inquiry a step further, and investigated potential mediators and moderators in the relationship between discrimination (or general stressors) and substance use.

What Links Racial Discrimination and Substance Use?

Negative mood states. The stressor vulnerability model posits that individuals learn that substances can regulate stress and negative moods, and they then become more likely to use substances to cope with interpersonal stressors (Armeli, Dehart, Tennen, Todd, & Affleck, 2007). This theory can be tested by looking at substance use expectancies and motives to see if individuals who endorse certain expectancies are also more likely to use substances following exposure to stressors. The tension-reduction theory is a related hypothesis about the relationship between discrimination and substance use. Here, substances are seen as a mode of reducing negative emotions following discrimination, and negative emotions (e.g., anger, sadness) are thought to mediate the relationship between discrimination and substance use (Greeley & Oei, 1999). Theoretically, if discrimination is not followed by negative emotions, substance use will be less likely to occur. Several researchers have tested these theories, with varying levels of support for each.

Other racial and ethnic groups. In a study of African American adolescents and their parents, baseline lifetime experiences of discrimination were associated with substance use approximately two and five years later (Gibbons et al., 2010). Past-week affect at two years did not mediate the relationship between lifetime reports of discrimination at baseline and lifetime reports of substance use at five years. Instead, changes in hostility (e.g., theft, reckless driving since age 15) and past-year anger between baseline and two years mediated the relationship between discrimination at baseline and substance use at five years.

In a second study, Gibbons and colleagues had teenagers from the earlier study visualize three job situations: one related to racial discrimination, one related to general work stress, and one non-stressful situation. Reported stress and anger were significantly higher in the discrimination condition than in the other conditions. Anger mediated the relationship between discrimination and behavioral willingness to use substances (Gibbons et al., 2010). Substance use (or intention to use) may facilitate tension reduction by reducing feelings of anger and hostility following discriminatory episodes.

Native Americans. Whitbeck and colleagues (2001) have tested the tension-reduction hypothesis with cross-sectional data. Among Native American middle school students, discrimination was positively related to substance use, and the relationship between discrimination and substance use was partially mediated by feelings of anger and delinquent behavior (e.g., shoplifting and time in jail; Whitbeck et al., 2001). Internalizing behavior (e.g., feeling withdrawn, anxious, or depressed) was not related to substance use and could not be tested as a mediator.

In another cross-sectional analysis, Whitbeck and colleagues (Whitbeck, McMorris, Hoyt, Stubben, & LaFromboise, 2002) found that past-month drinking and discrimination independently predicted self-reported depression among Native American adults living on reservations, while participation in traditional activities was negatively related to self-reported depression. Discrimination significantly moderated the relationship between participation in traditional activities and depression: at high levels of discrimination, participation in traditional activities was negatively related to depression, while at low levels of discrimination participation in traditional activities was unrelated to depression score (Whitbeck et al., 2002). This suggests that participation in traditional activities may be especially beneficial for those who experience high levels of discrimination.

Daily diary studies. Daily diary studies of stress and substance use offer several advantages over more common methods of investigation. Recall issues are minimized because participants complete real-time (or near real-time) assessments, and the moment-by-moment unfolding of relationships can be observed. To date, no daily diary studies with Native American samples had been conducted, but daily diary studies with other populations informed initial hypotheses for this study.

Discrimination and mood. Daily diary studies with African American and Latino adults have tested the link between lifetime discrimination and daily mood, one piece of the tension-reduction theory. Controlling for trait hostility and cynicism, Brondolo and colleagues (2008) found that lifetime discrimination predicted higher daily levels of anger, nervousness, and sadness in a low-income Latino and African American sample in New York City (N = 362). Lifetime reports of discrimination were also positively related with trait negative affect. In a sample of primarily African American and Latino adults, baseline ratings of discrimination were positively associated with daily levels of anger and the propensity to see interpersonal interactions as more unfair and exclusionary (Broudy et al., 2007).

Baseline reports of chronic ongoing discrimination (“everyday mistreatment”) were related to average daily levels of negative affect among African Americans in urban areas, whereas major discriminatory events (e.g., not receiving a promotion) were not related to daily reports of negative affect (Taylor, Kamarck, & Shiffman, 2004). The authors proposed a mediational model, in which the relationship between everyday mistreatment and perceived stress (both measured at baseline) would be mediated by mean levels of daily negative affect. This model was supported: the positive association between everyday mistreatment and perceived stress became non-significant when accounting for daily reports of negative affect.

Among Asian American freshman college students at an elite private university in the Northeast United States, number of daily microaggressions was associated with greater same- and next-day negative affect and somatic symptoms (Ong, Burrow, Fuller-Rowell, Ja, & Sue, 2013). Participants recorded daily presence or absence of 20 microaggressions for two weeks; 78% of participants reported at least one microaggression and microaggressions were endorsed in 18% of all diaries (Ong et al., 2013).

Stress and substance use. Grzywacz and Almeida (2008) used a daily diary design to examine stressor pile-up across different areas and binge drinking in a large sample of mostly White adults. The odds of binge drinking were higher on days with more stressors than on days with fewer stressors, and an accumulation of stressors over a three-day period predicted binge drinking on the third day. Negative affect did not mediate this relationship, but more negative affect was present on days with more stress (Grzywacz & Almeida, 2008).

Using thrice-daily assessments, Armeli and colleagues (2007) found that daytime interpersonal stress predicted afternoon negative affect among White heavy drinkers who wanted to reduce their alcohol consumption. When predicting evening alcohol use from daily interpersonal stress, an interaction emerged: those high in baseline “careless unconcern” (i.e., the belief that alcohol will result in a sense of carelessness) increased their drinking following interpersonal stress, while those low in careless unconcern decreased their drinking.

Studies with repeated daily assessments suggest that the influence of negative mood occurs quickly, over the course of several hours. Among individuals trying to stop smoking, negative mood predicted smoking two hours but not four hours later; this relationship was mediated by craving (Berkman, Dickenson, Falk, & Lieberman, 2011). Shiffman and Waters (2004) examined the processes of smoking lapses among mostly White smokers during a quit attempt. Mood was assessed approximately four times a day and participants also initiated diaries when a lapse to smoking occurred. Lapses were preceded by an increase in negative affect over a six-hour period, but were not preceded by increases in negative affect and stress on the previous day. Consistent with tension reduction models, this relationship occurred specifically for lapses attributed to stress or being in a bad mood.

Cultural Buffers

The Indigenist Stress-Coping Model (Walters et al., 2002) provides a framework in which to consider the relationship between discrimination and substance use. This model emphasizes protective cultural factors and the historical and current socio-cultural context when examining the influence of stress on health. Although discrimination is conceptualized as an ongoing trauma that can lead to substance use, substance use is not inevitable. Cultural buffers such as strong cultural identity and community connections are hypothesized to bolster health and decrease the strength of the relationship between discrimination and substance use (Walters et al., 2002).

Enculturation. Enculturation refers to the degree to which individuals are embedded in their culture and actively participate in cultural and traditional activities. Alaska Native alcohol sobriety movement leaders equated balance and sobriety with ongoing engagement with traditional foods and rituals, tribal history and language, connections with ancestors and ceremonies, and being embedded within family and community structures (Hazel & Mohatt, 2001).

Whitbeck and colleagues (2004) found that participation in traditional activities and identification with Native American culture were associated with decreased risk of past year DSM-III-R alcohol abuse. Participation in traditional activities was also related to alcohol cessation for those who had ever used alcohol. Enculturation (combined with spirituality and Native American identity) did not mediate the relationship between discrimination and alcohol abuse; it was not examined as a moderator (Whitbeck et al., 2004).

On the other hand, enculturation was positively related to discrimination (Whitbeck et al., 2004). Individuals who were more actively involved in Native American cultural activities reported greater discrimination. Conversely, in an African American sample, more acculturated participants experienced *less* discrimination (Landrine & Klonoff, 1996).

Spirituality. Whitbeck and colleagues (2004) found that participation in traditional spirituality was negatively related to past-year DSM-III-R alcohol abuse diagnoses among Native American parents and caregivers and positively associated with alcohol cessation for those who had ever used alcohol (Stone, Whitbeck, Chen, Johnson, & Olson, 2006).

In AI-SUPERPFP, respondents who had sought traditional healing for alcohol problems were more likely to practice tribal religions; those who had attended 12-step programs endorsed higher levels of general spirituality (Spicer, Bezdek, Manson, & Beals, 2007). Addressing drinking through spiritual practices was the only response that distinguished individuals who had been abstinent in the past month from those who had not (Spicer et al., 2007).

Cultural identity. Mainstream U.S. identity and Native American cultural identity are conceptualized as orthogonal constructs, meaning that they do not exist as an either/or dichotomy (Oetting & Beauvais, 1991; Park, Schwartz, Lee, Kim, & Rodriguez, 2013). Native Americans may strongly identify with their own culture, mainstream U.S. culture, both or neither. Other identities (e.g., regional, military, religious, sports) often intersect with racial and cultural identity. Identity is highly context dependent, and is constructed in an ongoing iterative fashion (Gone, 2006).

Walters (1999) found that among Native Americans, actualization identity attitudes, which encompass positive views of Native Americans, were positively related to resisting dominant U.S. cultural norms. In another study, actualization identity attitudes moderated the relationship between discrimination and health: at high levels of discrimination, greater actualization identity was a buffer against poor health (Chae & Walters, 2009). Similarly, actualization identity attitudes may act as a buffer against the negative effects of discrimination on substance use.

Among Native American young adults affiliated with Utah State University, a stronger Native American identity was associated with experiencing more microaggressions, while a stronger White identity was associated with fewer microaggressions (Jones & Galliher, 2015). Overall, females more strongly identified with White culture than males, but there were no gender differences in level of identification with Native American culture.

Social Support. Among Native American women presenting for primary care treatment at an urban Indian Health Service facility in the Southwest, those with substance use disorders were significantly less likely to have instrumental social support (e.g., someone to drive them around) and more likely to feel isolated and disconnected from others than those without substance use disorders (Oetzel, Duran, Jiang, & Lucero, 2007). Focus groups of Alaska Native community members in a remote coastal village cited support from elders, family members, and neighbors as especially important for recovery from problematic alcohol use (Seale, Shellenberger, & Spence, 2006).

Research on discrimination and substance use suggests a positive association between the two constructs, and also has suggested mediators and moderators of their relationship, including negative mood and cultural buffers, such as spirituality. However, most of these studies have been cross-sectional. The few prospective studies have included long periods between follow-ups, which can lead to poor recall of actual events. Daily assessment methods can provide information about the real-time relationship between discrimination, cultural participation, and substance use, while circumventing issues of memory and recall.

Aims and Hypotheses

The current study used a two-part design to (1) examine the relationship between discrimination and substance use, (2) test the Indigenist Stress-Coping Model, and (3) examine other potential moderators of the relationship between discrimination and substance use (social interactions, alcohol expectancies). Participants were Native American students attending two post-secondary institutions in the Southwestern United States where they comprised approximately six percent of students (combined enrollment of 3,500+ Native American students). The first part of the study was a one-time cross-sectional survey and the second part was a 21-day diary study to prospectively examine these relationships. It was hypothesized that discrimination would be positively related to substance use, and that a strong Native American cultural identity would attenuate (moderate) this relationship in both parts of the study.

Part One: Cross-Sectional Survey

Method

Participants. Eligibility criteria for the online survey included: (a) enrolled part-time or more at the four-year public university or a branch of the community college in or near a large Southwestern city, (b) 18 years or older, (c) enrolled tribal member or at least ¼ Native American, and (d) completed the survey while in the Southwestern city. Graduate students at the university were not eligible to participate. Based on an *apriori* power analysis using G*Power 3 with an expected correlation of 0.15 between discrimination and substance use (correlation estimate from Pascoe & Smart Richman, 2009; power = 0.8, two-tailed ∝ = .05; Faul, Erdfelder, Lang, & Buchner, 2007), at least 343 participants were needed to adequately power the online survey analyses.

The final sample included 347 study participants who were 28.45 years old on average (*SD* = 9.97; range = 18 – 65; see Table 1). Participants were female (*n* = 226; 65.1%), male (*n* = 119; 34.3%), and transgender female (*n* = 1; 0.3%). They identified as heterosexual (*n* = 304; 88.9%), bisexual (*n* = 15; 4.3%), gay (*n* = 15; 4.3%), lesbian (*n* = 8; 2.3%) and other (*n* = 4; 1.2%). All participants were Native American; 85.6% selected only Native American as their racial ethnic background (*n* = 297). Those who selected more than one race or ethnicity (14.6%) also identified as White (*n* = 27; 7.8%), Hispanic or Latino (*n* = 13; 3.7%), Asian, Native Hawaiian, or other Pacific Islander (*n* = 2; 0.6%), Black (*n* = 2; 0.6%), Hispanic/Latino and White (*n* = 2; 0.6%), Italian (*n* = 1; 0.3%), and German/British (*n* = 1; 0.3%), or other (*n* = 2; 0.6%). Ninety percent of all participants were from Southwest tribes (*n* = 313).

Sixty-eight percent of participants attended the community college (*n* = 237) and the remaining one-third attended the university (*n* = 110; 31.7%). Three-quarters of participants were first-generation students, defined as having neither a mother nor father who had completed a bachelor's degree (*n* = 245; 72.7%). Most were going to school full-time (*n* = 248; 71.7%). At the university, 46 participants were seniors (42.2%), 26 were juniors (23.9%), 26 were sophomores (23.9%), and 11 were freshmen (10.1%). At both schools, participants had been working on their degree for 2.39 years on average (*SD* = 2.17; range 0-20 years). Most participants usually received A's or B's in their classes (*n* = 305; 87.8%).

Ninety percent of participants were in good, very good, or excellent health (*n* = 312). Employment statuses included not working and looking for a job (*n* = 123; 35.5%), working part-time (*n* = 83; 24.0%), not working and not looking for a job (*n* = 81; 23.4%), and working full-time (*n* =59; 17.1%). Seventy-three percent of participants had an annual household income of less than $30,000 (*n* = 251). More specifically, 26.2% had incomes of less than $5,000 (*n* = 90), 16.6% had incomes between $5,000 and $9,999 (*n* = 57), 30.2% had incomes between $10,000 and $29,999 (*n* = 104), 12.8% had incomes between $30,000 and $49,999 (*n* = 44), and 14.2% had incomes of $50,000 or more (*n* = 49).

Forty percent of participants had children (*n* = 140). Because the community college does not have on-campus housing, place of residence is reported separately by school. At the community college, 38.6% participants lived with parents or other relatives (*n* = 91), 30.5% lived with their significant other and/or children (*n* = 72), 22.0% lived alone (*n* = 52), 6.4% lived with friends (*n* = 15), and 2.5% were homeless (*n* = 6). At the university, 34.5% of participants lived in on-campus student housing (*n* = 38; one of whom lived in Greek housing), 20.9% lived off-campus with their significant other and/or children (*n* = 23), 20.0% lived off-campus with parents or other relatives (*n* = 22), 11.8% lived alone off-campus (*n* = 13), and 10.9% lived off-campus with friends (*n* = 12).

School comparisons. Table 1 provides descriptive information separated by school and also for all students combined. Significant between-school differences are indicated in Table 1. Students at the community college were about five years older than students at the university and were more likely to select only Native American as their race (90.3% versus 75.5%). Students at the university were more likely to identify as lesbian, gay, or bisexual than students from the community college. There were no differences in gender distribution or percent of students from Southwest tribes by school.

Students at the community college were more likely than students at the university to be first-generation college students (76.4% versus 64.8%). Students at the university were more likely to be attending school full-time and had been working on their degrees for about a year longer than students at the community college. This likely was due to the degrees available at each school – the community college offers certificates and associate’s degrees while the university offers bachelor’s degrees. Usual grades received did not differ significantly by school.

Participants at the community college were significantly more likely than those from the university to endorse being in poor or fair health (12.7% versus 4.5%), to have children (49% versus 21%) and to have a lower income. For example, 29.2% of the community college participants had an annual household income of less than $5,000, while only 19.4% of students at the university had a household income of less than

$5,000. Employment status differed significantly by school, with students at the community college more likely than students at the university to be not working and looking for a job (41.4% versus 22.9% at the university). Students at the university were more likely to be working part-time, or not working and not looking for a job.

Despite these differences, the analyses that follow consider participants across schools. This was done to provide adequate power to test the analyses and more broadly generalize to other samples. In addition, there were no between school differences in microaggressions, the outcome variable (see correlational analyses below). Age and income, two areas in which participants did differ by school, were controlled for in subsequent analyses.

Measures. ***Demographics.*** This questionnaire was adapted from a standard CASAA Demographics Questionnaire (http://casaa.unm.edu). Questions inquired about age, gender, sexual orientation, race/ethnicity, annual household income, health status, percent Native American ancestry, whether from a Southwest tribe, tribal enrollment, socially assigned race (Jones et al., 2008), school-related variables, and social variables such as residence, employment, and religious/spiritual preferences.

As described in the Participants section above, the questions on tribal enrollment, school status, and percent Native American ancestry were used to determine eligibility for the online survey. Gender, age, and household income were used as covariates for the online survey regression analyses. For these analyses, household income was divided into five categories and coded as follows: (0) < $5,000, (1) $5,000-9,999, (2) $10,000-29,999, (3) $30,000-49,999, and (4) $50,000 and above.

Microaggressions. The Microaggressions Scale (MAS; Walters, 2005) included 10 questions that inquired about past-year microaggressions related to both overt and subtle forms of discrimination (e.g., “told by non-Natives that they felt a spiritual connection to Indians”; “hit or physically attacked because you are Native”). The MAS was developed specifically for Native Americans, and an earlier version of this measure demonstrated good internal validity ($\propto$ = 0.97; Chae & Walters, 2009).

Each of the 10 MAS items had two parts. Part A asked whether a particular microaggression had occurred in the past year. Response options included (0) No, (1) I’m not sure but I think so, and (2) Yes. Options (1) and (2) were collapsed to create dichotomous response categories of (0) No and (1) Yes/not sure but think so. The responses to these 10 items were summed for the MAS Total variable, which had a range of 0 to 10 and represented the number of microaggressions that participants had experienced in the past year. Person-mean imputation was used to compute the MAS Total for 11 participants who had one missing response. The Cronbach’s alpha for this scale was computed prior to person-mean imputation and was acceptable ($\alpha = .667$, $N = 336$; $k = 10$).

Part B of each MAS item asked how much participants were bothered by each microaggression described in Part A. Part B was only presented if participants responded “yes” or “I’m not sure but I think so” to Part A of each MAS item. Part B response options included (0) not at all, (1) a little, (2) some, (3) a lot, and (4) extremely. To compute the summary variable MAS Bothered, the average of answered responses to part B was taken. The MAS Bothered for participants who responded “no” to all Part A questions ($n = 20$), and thus did not answer any Part B questions, was entered as 0 – not at all for the MAS Bothered summary variable. The reliability of MAS Bothered could not be computed because of the large number of missing responses, which was a function of the skip criterion if Part A (past-year occurrence) was answered as no. The bivariate correlation between the MAS Total and MAS Bothered subscales was $r(346) = .494$, $p < .001$.

Discrimination. The Revised Everyday Discrimination Scale was developed with African American populations and has demonstrated good convergent and predictive validity and adequate internal consistency (α = 0.82-0.84; Stucky et al., 2011). It includes five items tapping everyday experiences of discrimination (e.g., people act like you are not as smart) that are answered on a six-point frequency scale of (0) never, (1) less than once a year, (2) a few times a year, (3) a few times a month, (4) at least once a week, and (5) almost every day. The alpha coefficient, computed prior to person-mean imputation, was 0.897 ($N = 338$; $k = 5$). After answering these five questions, participants were asked to identify the main reason for these experiences. Multiple options (e.g., height, education) were provided and a variable was created to identify whether these experiences were attributed to a Native American-related variable. Options selected could include ancestry/national origin, race, shade of skin color, and tribe. This measure was used only as a screener for the daily diary study and is described in further detail in Part Two below.

Alcohol use. Three questions used in large epidemiological studies were used to quantify past-month alcohol use. Participants were asked to indicate how many days in the past month they drank alcohol (drinking days - DD; Beals et al., 2003), how many drinks they had on average on drinking days in the past month (drinks per drinking day -

DPDD; Beals et al., 2003), and the number of days they had five or more drinks (males) or four or more drinks (females) on one occasion in the past month (binge drinking days - BDD; CDC, 2011a). The question text defined a standard drink as a 12-ounce beer, 5-ounce glass of wine, or 1.5-ounce shot of liquor. Binge drinking was defined as having five or more drinks for men and four or more drinks for women in a single occasion.

Tobacco use. Tobacco use was assessed with a question from the Behavioral Risk Factor Surveillance System (CDC, 2011a). Participants were asked to indicate whether they (a) smoked every day, (b) smoked some days, (c) were a former smoker, or (d) had never smoked. Based on feedback from pilot participants and community advisory board members, two additional response options ("I do not categorize myself as a former smoker but have smoked in the past" and "I smoke only for ceremonial purposes") were added.

Drug use. Participants indicated frequency and quantity of lifetime and past-month drug use in 10 drug categories taken from National Institute on Drug Abuse Clinical Trials Network procedures (Sobell & Sobell, 1996). Drug use categories included (a) marijuana, (b) cocaine, (c) methamphetamines, (d) inhalants, (e) sedatives/sleeping pills, (f) hallucinogens, (g) heroin/opium, (h) prescribed stimulants for non-medical reasons, (i) prescription opioids/painkillers for non-medical reasons, and (j) other (write in drug name). Frequency options paralleled those of Borrell and colleagues (2007) used in a study of racial discrimination and substance use among African American young adults. For each drug category, participants indicated their lifetime frequency of use (never, 1-10 times, 11-99 times, or 100+ times) and whether they had used each drug in the past month. Dichotomous dependent variables included any past-month drug use and lifetime use of any drug more than 100 times.

Problematic substance use. The CAGE-AID (Couwenbergh, Van Der Gaag, Koeter, De Ruiter, & Van den Brink, 2009) is a four-item measure designed to screen for substance use disorders. It is an adaptation of the original CAGE (Ewing, 1984), which asked only about alcohol use. CAGE-AID questions were answered as “yes” or “no” in reference to participants’ entire lives. Scores of two and above (i.e., positive CAGE-AID score) were considered indicative of problematic substance use and were used as a dichotomous outcome variable in this study.

Leonardson and colleagues (2005) gave the CAGE-AID to 50 Native Americans in the Northern Plains who were seeking treatment for Type II diabetes, and found adequate convergent and discriminative validity. In a sample of Dutch adolescents seeking mental health treatment, Couwenbergh and colleagues (2009) found a sensitivity of 91% and a specificity of 96% with a cut-off score of two on the CAGE-AID. The CAGE was found to have a sensitivity of 68% and specificity of 93% in men in a community sample of Native Americans; these figures were 62% and 79%, respectively, for women (Saremi et al., 2001). In this sample the reliability was 0.836, $N = 341$, $k = 4$.

Alcohol Effects Questionnaire. The Careless Unconcern subscale of the Alcohol Effects Questionnaire (Rohsenow, 1983) was used to measure beliefs about alcohol’s ability to decrease attention and reduce self-awareness. This scale included four true or false questions tapping reported experiences after a few drinks. Items were summed for a total possible score of 4, with higher scores indicating higher endorsement of careless unconcern expectancies. In a daily dairy study of community adult drinkers, this scale had an internal consistency of 0.65, and the scale was positively related to increased drinking following interpersonal stressors (Carney, Armeli, Tennen, Affleck, & O'Neil, 2000). The Cronbach's alpha in this study was 0.894 (N = 328, k = 4). Person-mean imputation was used for six missing values.

Traditional Spiritual Activities. A three-item measure was used to gauge participation in and importance of traditional Native American spiritual activities (Whitbeck et al., 2004). An initial question asked whether individuals participated in traditional spiritual activities (response options of yes, no, don't know/doesn't refer to me). If answered affirmatively, a second question asked about frequency of participation in traditional spiritual activities. Response options included (6) every day, (5) two or more times per week, (4) once a week, (3) two to three times a month, (2) once a month, (1) less than once a month, (0) never, or don't know/doesn't refer to me. Participants also were asked to indicate how important traditional spiritual activities were to their daily lives. Response options included don't know/doesn't refer to me, (0) not at all important, (1) not too important, (2) somewhat important, and (3) very important.

This measure of spirituality has been used in conjunction with measures of cultural identity and participation in traditional activities. Internal consistency was only reported in sum with the other measures, and was high in a sample of Native Americans living on or near a reservation in the upper Midwest ($\propto$ = 0.74 to 0.83; Whitbeck et al., 2002; Whitbeck et al., 2004).

Cultural identity. The Actualization subscale of the Urban American Indian Identity Attitudes Scale (UAIIAS; Walters, 1999) is a 17-item measure that captures the "positive integration between self- and group identity with regard to political, ethnic, racial, cultural, and spiritual dimensions of being Indian" (p. S146; Chae & Walters, 2009). Items were scored on a Likert scale from 0 (strongly disagree) to 3 (strongly agree), and the total for this scale was used as an index of strength of Native American cultural identity.

The Actualization subscale of the UAIIAS has demonstrated good internal validity among adult urban Native Americans ($\propto$ = 0.87; Walters, 1999), as well as two-spirit adult Native Americans living in urban areas across the United States ($\propto$ = 0.85; Chae & Walters, 2009). In this sample the measure had an internal consistency of 0.90 (N = 347; k = 17). Person-mean imputation was used for 20 participants with missing values.

Enculturation. The Cultural Questionnaire (May, 1982) measured participation in traditional activities and connection to home reservation or tribal lands. In a sample of Native American college students in the Southwest, the scale had an internal consistency of 0.73 (Venner, unpublished data). Items on the Cultural Questionnaire were modified based on feedback from Community Advisory Board members and several additional items were added.

The final items included months per year spent on tribal lands or home reservation, frequency of past-year visits home, languages spoken and level of proficiency, having ever lived away from tribal lands or home reservation for more than one year, knowing name of father's or mother's clan (if applicable), knowing how to make traditional crafts, having a space or home for ceremonies, setting where most of childhood was spent (e.g., city versus tribal lands), and having ever sought traditional healing. These items were individually considered in the analyses that follow.

Procedure. The university and community college Institutional Review Boards approved this study. Informed consent was completed online before starting the survey. The online survey was created in Opinio, a secure survey software system hosted by the university. Participants could start the survey and return at a later time to complete it. The average time spent on the survey was 27 minutes (*SD* = 14.10; range = 10 – 117 minutes). There were no differences by gender, age, or school in survey completion time. At the end of the survey, participants were given the option to provide their name and contact information for a raffle and participation in the second part of the study. Approximately 90% provided contact information.

The online raffle had gift cards totaling $2,035. Gift cards were from Amazon, Apple, iTunes, Visa, and Walmart and ranged in value from $5 to $200. Eighty-three participants (23.9%) received a gift card for their study participation. Gift cards for $5 were sent via e-mail; participants receiving gift cards with values greater than $5 came to the study research office in the university Psychology Department to pick them up.

Recruitment for the online survey occurred for five months between mid-February 2013 and mid-July 2013. Participants were recruited for the study via flyers posted on-campus and at nearby establishments, e-mail invitations sent out to all students registered for Spring and Summer 2013 courses at either campus who listed Native American as their race or ethnicity, postings to listservs for Native American students at each school, postcards distributed to on-campus organizations serving Native American students and through attendance at Native American student organizations, Facebook advertisements targeted to university/community college students living in the Southwestern city who were 18 and older, and through postings on the study Facebook page -

www.facebook.com/nativeexperiencesstudy. Community advisory board members also greatly assisted in this process. For example, at the community college, a Native American academic advisor had a stack of postcards available for Native American students who came in for academic advisement.

Figure 1 displays the flow of study participation. The survey link was clicked on 490 times. It was opened but not started 39 times and started but not completed 88 times. A total of 363 individuals completed the survey. Sixteen (4.4%) of these individuals were not eligible for participation, leaving a final sample of 347 participants. Reasons for ineligibility included already having completed the survey (n = 11), not tribally enrolled and less than a ¼ Native American or no percent Native American ancestry given (n = 3), no valid age provided (n = 1), and attending a campus of the university outside of the Southwestern city (n = 1). There were no significant differences in gender, age, school, or class load between those who began but did not complete the survey and those who did complete it and were eligible.

Statistical analyses. Analyses were conducted in SPSS version 22. First, descriptive statistics were provided. Responses to the Microaggressions Scale (MAS) were summarized, including the proportion of participants endorsing each microaggression in the past year, bothered ratings for each microaggression, and the MAS Total and MAS Bothered summary statistics. Descriptive information about substance use and cultural identity, spirituality, and traditional activities were also summarized. The bivariate correlations between MAS Total, MAS Bothered, and cultural, substance use, and demographic variables were computed. Pearson's product-moment correlations were used for associations between continuous variables and point-biserial correlations were used for associations between categorical variables. Alpha levels were retained at .05 because these correlations were exploratory.

Regression analyses were used to examine the relationship between discrimination (MAS variables), substance use (six outcome variables), and the moderating role of cultural identity (UAIIAS). Linear regression analyses using forced entry were conducted with the three substance use outcome variables of past-month drinking days (DD), binge-drinking days (BDD), and drinks per drinking day (DPDD). All participants were included in these analyses. Two sets of linear regression analyses were conducted for each outcome variable: the first used MAS Total as the independent variable; the second used MAS Bothered as the independent variable. These independent variables were examined in separate models to reduce multicollinearity ($r = .50$). In addition to each MAS variable, UAIIAS, the interaction between UAIIAS and the MAS variable, and gender, age, and household income were included as predictors of the substance use outcomes. The covariates of gender, age, and household income were chosen based on their observed associations with measures of substance use in this study and prior studies examining the relationship between discrimination and substance use that have included them as covariates (Bennett et al., 2005; Borrell et al., 2007; Gibbons et al., 2010; Whitbeck et al., 2004).

Outliers were considered to be values on the continuous dependent variables (DD, BDD, DPDD) that were three standard deviations or more away from the mean. Identified outliers were winsorized and replaced with the next highest observed value that was within three standard deviations from the mean (Tabachnick & Fidell, 2012). Continuous predictors (MAS Total, MAS Bothered, UAIIAS, and age) were grand mean-centered so that regressions results could be interpreted in terms of the “average” participant. Annual household income was centered at its average value, which was $10-29,999. Centered predictors reduce multi-collinearity when interaction terms are included in a model (Cohen, Cohen, West, & Aiken, 2003).

Logistic regression was used to predict the dichotomous outcome variables of past-month drug use, lifetime use of drugs more than 100 times, and positive CAGE-AID score. For each of these binary outcome variables, the UAIIAS Actualization subscale was tested as a moderator. Similar to above, analyses were conducted separately for MAS Bothered and MAS Total. A hierarchical logistic regression model building approach was utilized (Cohen et al., 2003). First, the Microaggressions Scale variable (MAS Total or MAS Bothered), the moderator (UAIIAS), and the covariates of gender, age, and income were added simultaneously. The ability of this model to account for variability in the dependent variable (substance use) above the intercept-only model was tested by comparing -2 log likelihood values using a chi-square test. Next, the addition of the interaction term (MAS subscale X UAIIAS) was compared to the first model via chi-square test of the -2 log likelihood to determine if it added additional predictive power (Cohen, Cohen, West, & Aiken, 2003).

For the best-fitting model, odds ratios and 95% confidence intervals are reported. Nagelkerke indices, a measure of effect size, are also reported for each model tested. Goodness of fit measures obtained in logistic regression, such as the Nagelkerke index and Cox and Snell, are usually smaller than R-squared measures in Ordinary Least Squares Regression, so they are not directly comparable. Additionally, the Nagelkerke index is always larger than the Cox and Snell because it is adjusted to have a maximum value of 1.00 (Cohen et al., 2003).

Assumptions of multiple regression were examined for each linear regression model. First, multicollinearity was examined using Variance Inflation Factor (VIF) and tolerance. VIF values greater than 10 and tolerance values less than 0.1 were considered to indicate multicollinearity violations (Cohen et al., 2003). The assumption of independent errors was tested using the Durbin-Watson test. In general, Durbin-Watson values less than 1 or greater than 3 are cause for concern regarding the assumption of independent errors (Field, 2013).

Results

Descriptive statistics. ***Microaggressions Scale (MAS).*** The average number of microaggressions participants experienced in the past year (MAS Total) was 3.68 (*SD* = 2.25; range 0-10). Almost all participants (*n* = 327; 94.2%) endorsed experiencing at least one or more microaggressions in the past year. The most commonly endorsed past-year microaggressions were ‘being mistaken by non-Natives as a racial group other than Native’ (*n* = 224; 64.7%), ‘told by non-Native person that they were Indian in a past life or have a Cherokee princess grandmother’ (*n* = 190; 55.1%), and ‘told by non-Natives how “lucky” you are to be Native’ (*n* = 190; 54.9%). The least common microaggression was “being hit, kicked or physically assaulted because you are Native” (*n* = 10; 2.9%). Figure 2 displays the percentage of participants who responded affirmatively (‘yes’ or ‘not sure but I think so’) to each microaggression.

The average bothered rating (MAS Bothered) across microaggressions was 1.45 (*SD* = 1.19, range 0-4), representing a bothered rating between “a little” and “some.”

Table 2 displays the mean and distribution of bothered ratings for the 10 microaggressions on the MAS among participants who endorsed experiencing that microaggression in the past year. The microaggressions that bothered participants the most were not necessarily the most common. Participants were most bothered by ‘unfair treatment by the police because you are Native’ (*M* = 2.88, *SD* = 1.08), being ‘hit, kicked, or physically assaulted because you are Native’ (*M* = 2.80, *SD* = 1.69), and being ‘trailed or followed around in a store because you are Native’ (*M* = 2.67, *SD* = 1.31).

Cultural variables. The average percentage of Native American ancestry was 80.9%. Four participants were less than ¼ Native American (1.2%), 28 were about ¼ Native American (8.8%), 56 were about ½ Native American (17.3%), 36 were about ¾ Native American (11.2%), and 202 were full Native American (61.4%). Most participants were from Southwest tribes (*n* = 313; 90.2%). Ninety-six percent of participants were enrolled tribal members (*n* = 333). Participants reported that if others saw them on the street, they would be socially classified (Jones et al., 2008) most frequently as American Indian or Alaska Native (*n* = 168, 48.6%), Hispanic or Latino (*n* = 104; 30.1%), Asian, Native Hawaiian, or other Pacific Islander (*n* = 48; 13.9%), White (*n* = 24; 6.9%), or Black/African American (*n* = 2; 0.6%). Social classification of race did not vary by gender.

In the past year, 5.2% of participants lived on their home reservation or tribal lands (*n* = 18), 35.2% visited a few times a year or less (*n* = 121), 22.4% visited once a month or less (*n* = 77), 12.8% never visited (*n* = 44), 12.5% visited once a week or less (*n* = 43), 9.3% visited more than once a week (*n* = 32), 0.6% had visited 2-4 times in their lives (*n* = 2), and 2.0% said that this did not apply to them (*n* = 7). Participants spent their childhoods on or near a reservation (*n* = 178; 52.0%), in a city (*n* = 75; 21.9%), in a small town far from a reservation (*n* = 31; 9.1%), some combination of the three (*n* = 56; 16.4%), or on military bases (*n* = 2; 0.6%).

About half of the sample endorsed practicing traditional/tribal spirituality (*n* = 193; 55.6%). When considering all combinations of religious and spiritual practices endorsed, the most common ones (greater than 10% endorsing) included traditional/tribal spirituality only (*n* = 84; 24.3%), traditional/tribal spirituality and Catholicism (*n* = 74; 21.4%), Catholic only (*n* = 48; 13.9%), Protestant only (*n* = 41; 11.8%) and no religion (*n* = 40; 11.5%). Several other traditions, including Judaism, Native American Church, Mormonism, and Buddhism, were also represented, although in smaller percentages.

Half of participants (*n* = 179; 51.7%) spoke their tribe's language. Using a more fine-grained analysis, under half of participants spoke a Native language very well, well, or fairly well (*n* = 152; 43.9%), one-third spoke a Native language a little (*n* = 93; 26.9%), and one-third said they did not speak a Native language (*n* = 101; 29.2%). Six percent (*n* = 20) of participants had some level of familiarity with more than one Native language. Almost all participants (*n* = 324; 98.2%) spoke English well or very well. Eleven percent of participants spoke Spanish very well, well, or fairly well (*n* = 37), fifteen percent spoke a little Spanish (*n* = 53), and seventy-four percent spoke none (*n* = 257). This multilingualism may be influenced by the history of Spanish conquest in the Southwest, New Mexico's position as a border state, and the mixed race background of several participants. Participants also could have taken Spanish classes in high school. Five percent of participants (*n* = 18) spoke both Spanish and a Native language very well, well, or fairly well (in addition to English).

Most participants (*n* = 279; 80.4%) had lived away from their home reservation or tribal lands for more than one year. Twenty-four percent (*n* = 84) knew how to make traditional rugs, baskets, belts, or clothes, 37.9% (*n* = 131) did silversmithing, beadwork, pottery, quillwork, or other traditional crafts, and 41.5% used or had a home or space for ceremonial purposes (*n* = 144). Eighty-five percent knew the name of their mother's or father's clan (*n* = 295), 9.5% did not (*n* = 33), and this did not apply for 5.2% of the participants (*n* = 18). Fifty-nine percent of participants had sought traditional healing at some point in their lives (*n* = 203).

Traditional Spiritual Activities. Sixty-one percent of participants (*n* = 212) endorsed participating in traditional spiritual activities. Among those who endorsed participating in traditional spiritual activities, participation ranged from every day (*n* = 44; 21.3%), once a week or more but less than everyday (*n* = 9; 4.3%), two or three times a month (*n* = 36; 17.3%), once a month (*n* = 36; 17.3%), to less than once a month (*n* = 82; 39.6%). Participants said that traditional spiritual values were very important (*n* = 171; 49.3%), somewhat important (*n* = 82; 23.6%), not too important (*n* = 44; 12.7%) or not at all important (*n* = 35; 10.1%) to the way they led their lives. Fifteen selected don't know/doesn't refer to me in response to this question (*n* = 15; 4.3%).

Urban American Indian Identity Attitudes Scale (UAIIAS). The average UAIIAS Actualization subscale score was 40.28 out of a possible 51 (*SD* = 8.22, observed range = 2 - 51).

Alcohol use. In the past month, 43.2% of participants (*n* = 150) drank alcohol and 56.8% participants did not drink any alcohol (*n* = 197). Among past-month drinkers, the average number of drinking days (DD) in the past 30 days was 4.47 (*SD* = 4.43, range =

1-30 days). When considering all participants, only 26.6% binge drank in the last month (n = 92). The average number of binge drinking days (BDD) was 1.96 (*SD* = 3.37, range 0-30) and the average number of drinks per drinking day (DPDD) was 4.31 (*SD* = 3.76, range 1-30). Table 3 displays past-month alcohol use for past-month drinkers and all participants. Among past-month drinkers, men drank alcohol an average of 5.22 days (*SD* = 5.97; range = 1 - 30) and women drank alcohol an average of 4.04 days (*SD* = 3.22, range = 1 – 18). This difference was not statistically significant. Among participants ages 18 to 25 (n = 177), the past-month binge drinking rate was 28.8% (n = 51).

Tobacco use. Participants described their current tobacco use as follows: have never smoked (n = 99; 28.8%), only smoke for ceremonial purposes (n = 70; 20.3%), do not categorize self as former smoker but have smoked in the past (n = 97; 28.2%), former smoker (n = 34; 9.9%), smoke some days (n = 27; 7.8%), and smoke every day (n = 17; 4.9%). Combining those who smoked some days and every day, the current smoking rate was 12.7% (n = 44). There were significant gender differences, χ^2 (5, N = 342) = 13.93, p = .016, with men more likely than women to smoke everyday (8.4% vs. 3.1%) and some days (12.6% vs. 5.4%), and women more likely than men to have never smoked (32.3% vs. 21.8%). Similar percentages of men and women used tobacco only for ceremonial purposes (21.0% and 20.2%, respectively).

Drug use. In the past month, 20.2% of participants (n = 69) had used an illicit substance (marijuana, cocaine, methamphetamines, inhalants, sedative/sleeping pills, hallucinogens, heroin/opium, or prescription stimulants or opioids for non-medical reasons). There were no significant gender differences. The three drugs most commonly used were marijuana (n = 46; 13.6%), sedatives/sleeping pills (n = 16; 4.7%), and prescription opioids for non-medical reasons (*n* = 15; 4.4%). Twenty-two percent of participants (*n* = 74) had used an illicit drug more than 100 times in their lives. The three drugs most commonly used more than 100 times included marijuana (*n* = 56; 16.3%), cocaine (*n* = 16; 4.7%), and prescription opioids for non-medical reasons (*n* = 13; 3.8%). Table 4 provides further detail about past-month and lifetime drug use.

CAGE-AID. Thirty-eight percent of participants (*n* = 129) had scores of two or higher on the CAGE-AID, indicating a lifetime history of problematic substance use. A larger proportion of men fell into this category than women (52.1% versus 30.2%), χ^2 (1, *N* = 339) = 15.72, *p* < .001.

Alcohol Effects Questionnaire. The average total on the Alcohol Effects Questionnaire Careless Unconcern subscale was 1.72 (*SD* = 1.73; range = 0 – 4). There were no differences according to past-month alcohol use or age. Women (*M* = 1.53; *SD* = 1.70) had significantly lower scores than men (*M* = 2.04; *SD* = 1.73), *t*(330) = 2.61, *p* = .01.

Help-seeking. Seventeen percent of participants had sought formal substance abuse treatment (*n* = 59; e.g., outpatient/residential treatment), 17% had attended a 12-step or Alcoholics Anonymous meeting (*n* = 58), and 8.7% had received traditional healing (*n* = 30). These categories were not mutually exclusive. Combined, 22.3% of participants (*n* = 77) had sought help for substance use problems during their lives. Participants with a positive CAGE-AID score were significantly more likely than those without to have sought such assistance (44.2% versus 9.0%), χ^2 (1, *N* = 340) = 57.09, *p* < .001.

Exploratory bivariate correlations. ***Demographics and discrimination.*** The correlations between the Microaggressions Scale and demographics variables are displayed in Table 5. MAS Total was negatively related to age, $r(347) = -.128$, $p = .017$; older individuals experienced fewer microaggressions in the past year. MAS Total was negatively related to health, $r(347) = -.124$, $p = .021$. Experiencing more past-year microaggressions was associated with poorer health. MAS Total was negatively related to income, $r(344) = -.137$, $p = .011$; as income increased, the number of past-year microaggressions decreased. MAS Total was not significantly associated with gender, sexual orientation, school, grades, or having children. MAS Bothered was unrelated to the demographics variables.

Demographics and substance use. The associations between demographic and substance use variables are displayed in Table 6. Past-month binge-drinking days (BDD) and drinks per drinking day (DPDD) were negatively related to grades, $r(346) = -.144$, $p = .007$, and $r(347) = -.149$, $p = .005$, respectively. Participants who were drinking more heavily had poorer grades. BDD and DPDD were not significantly related to any other demographic variables. Past-month drinking days and past-month drug use were not associated with any demographic variables.

Men were more likely than women to have used a drug more than 100 times in their lives, $r(330) = -.140$, $p = .011$, and to have a positive CAGE-AID score, $r(339) = -.215$, $p < .001$. Older individuals were significantly more likely than younger individuals to have used a drug more than 100 times in their lives, $r(332) = .184$, $p = .001$, and to have a positive CAGE-AID, $r(341) = .220$, $p < .001$. Participants in poor or fair health were significantly more likely than those in good, very good, or excellent health to have used a drug more than 100 times in their lives, *r*(332) = -.123, *p* = .026, and to have a positive CAGE-AID score, *r*(341) = -.155, *p* = .004. Lesbian, gay, and bisexual participants were significant more likely than heterosexual participants to have used a drug more than 100 times in their lives, *r*(327) = .113, *p* = .041. Sexual orientation was unrelated to CAGE-AID score. Participants from the community college were significantly more likely than those from the university to have used a drug more than 100 times in their lives, *r*(332) = -.134, *p* = .015, and to have a positive CAGE-AID score, *r*(341) = -.150, *p* = .006. Participants with lower past-year incomes were significantly more likely to have used a drug more than 100 times in their lives, *r*(330) = -.144, *p* = .009, and to have a positive CAGE-AID score, *r*(338) = -.119, *p* = .029. Usual grades at school and having children were unrelated to CAGE-AID score or using any drug more than 100 times.

Demographic and cultural variables. Bivariate correlations between demographic and cultural variables are displayed in Table 7. Women were significantly more likely than men to endorse knowing how to make traditional basket, belts, rugs, or clothes, *r*(344) = .239, *p* < .001, and practice traditional/tribal spirituality or religion, *r*(345) = .126, *p* = .020. Older individuals were significantly less likely to be from a Southwest tribe, *r*(347) = -.150, *p* = .005; age was not associated with any other cultural variables. Being in good, very good, or excellent health was significantly related to higher UAIIAS score, *r*(347) = .118, *p* = .029. Participants from the community college had a higher percentage of Native American ancestry than participants from the university, *r*(329) = -.202, *p* < .001, had higher scores on the UAIIAS, *r*(347) = -.133, *p* = .013, and rated traditional spiritual values as more important to the way they led their lives, *r*(332)

= -.146, *p* = .008. Better grades were negatively associated with percentage of Native American ancestry, *r*(329) = -.122, *p* = .027, being from a Southwest tribe, *r*(347) = -.135, *p* = .012, and number of months spent on tribal lands, *r*(347) = -.141, *p* = .012. Having children was positively associated with percentage Native American ancestry, *r*(329) = .131, *p* = .017, and UAIIAS score, *r*(347) = .177, *p* = .001. Higher income was negatively associated with being from a Southwest tribe, *r*(344) = -.132, *p* = .014, speaking their tribe's language, *r*(343) = -.111, *p* = .041, and giving more importance to traditional spiritual values, *r*(329) = -.170, *p* = .002. All other correlations were non-significant; sexual orientation was not significantly associated with any cultural variables.

Discrimination and substance use. The bivariate correlations between discrimination and substance use are displayed in Table 8. MAS Bothered was negatively correlated with number of past-month drinking days, *r*(346) = -.115, *p* = .033. Participants who were more bothered by microaggressions drank on fewer days in the past month. MAS Total was positively associated with lifetime drug use of any drug more than 100 times, *r*(332) = .134, *p* = .015, and with positive CAGE-AID scores, *r*(341) = .151, *p* = .005. All other associations with the MAS variables were non-significant.

Discrimination and cultural variables. Table 9 displays the bivariate correlations between the MAS subscales and cultural variables. MAS Total was positively associated with practicing traditional/tribal spirituality or religion, *r*(347) = .133, *p* = .013, and with the importance of traditional spiritual values, *r*(332) = .125, *p* = .023. MAS Bothered was positively related to the number of months spent on one's tribal lands or home reservation, *r*(346) = .173, *p* = .001. This subscale was also positively associated with

UAIIAS total, $r(346) = .151$, $p = .005$, and with practicing traditional/tribal spirituality or religion, $r(346) = .107$, $p = .046$. No other associations were statistically significant.

Cultural variables and substance use. The bivariate correlations between cultural and substance use variables are displayed in Table 10. Participants with a higher percentage of Native American ancestry were less likely to have used illicit drugs in the past month, $r(323) = -.198$, $p < .001$. Those from a Southwest tribe were less likely to have used drugs in the past month, $r(341) = -.271$, $p < .001$, and were less likely to have used drugs more than 100 times in their life, $r(332) = -.201$, $p < .001$. Participants who could speak their tribe's language were less likely to have used drugs in the past month, $r(340) = -.110$, $p = .043$, and were less likely to have used drugs more than 100 times in their life, $r(331) = -.127$, $p = .020$. Knowing how to make traditional rugs, baskets, belts, or clothes was negatively associated with having a positive CAGE-AID score, $r(340) = -.107$, $p = .049$. Higher scores on the UAIIAS were negatively associated with past-month drinking days, $r(347) = -.123$, $p = .021$, past-month binge drinking days, $r(346) = -.141$, $p = .009$, and past-month drinks per drinking day, $r(347) = -.110$, $p = .041$. Past-month drinking days were negatively associated with the importance of traditional spiritual values, $r(332) = -.121$, $p = .027$.

Linear regression models. ***Drinking days.*** The overall linear regression model predicting past-month drinking days from MAS Total, UAIIAS, and the interaction term between the two was significant, $F(6, 335) = 2.26$, $p = .037$. The model accounted for 3.9% of the variance in drinking days (adjusted R-squared = .022). Table 11 displays the variables included in this model, including unstandardized beta coefficients, standard errors, and significance levels. UAIIAS was the only significant predictor of drinking days: those with higher Native American identity had fewer past-month drinking days. Holding constant other predictors, with each one-point increase on the UAIIAS (indicating stronger Native American identity), participants had 0.05 fewer drinking days. The interaction term was not a significant predictor of drinking days, meaning that the relationship between discrimination and number of drinking days did not vary according to level of Native American identity. The Durbin-Watson value was 1.73, suggesting that the assumption of independent errors was tenable. VIF and tolerance values did not violate assumptions of multicollinearity.

The overall linear regression model predicting past-month drinking days from MAS Bothered, UAIIAS, and the interaction between the two was non-significant, $F(6, 334) = 1.99$, $p = .067$ (Table 12). VIF and tolerance values did not violate assumptions of multicollinearity. The Durbin-Watson value was .765, suggesting some violation of independent errors. In an attempt to reduce this dependency, the drinking days variable was log transformed, and also square root transformed. Rerunning the model with these two separate transformations did not ameliorate the problem of dependent errors. The Durbin-Watson value became smaller with these transformations, with a value of .31 for both.

Binge drinking days. The overall linear regression model predicting past-month binge drinking days (BDD) from MAS Total, UAIIAS, and the interaction between the two was not significant, $F(6, 334) = 1.91$, $p = .079$ (Table 11). VIF and tolerance values did not violate assumptions of multicollinearity. The Durbin-Watson value was .127, suggesting that the assumption of independent errors was violated.

To address non-independence of errors, the BDD variable was transformed using a log transformation, which reduces positively skewed distributions (Field, 2013). A constant of 1 was added prior to the log transformation. Following this transformation, the Durbin-Watson value was .371, suggesting that the transformation did reduce dependence of errors. The overall linear regression model predicting binge drinking days was significant, $F(6, 334) = 2.14$, $p = .049$. The model accounted for 3.7% of the variance in binge drinking days (adjusted R-squared = .02). UAIIAS was the only significant predictor ($b = -.163$, $p = .003$), with participants with higher levels of cultural identity reporting fewer past-month binge drinking days.

The overall linear regression model predicting past-month binge drinking days from MAS Bothered, UAIIAS, and the interaction between the two was non-significant, $F(6, 333) = 1.90$, $p = .081$ (Table 12). VIF and tolerance values did not violate assumptions of multicollinearity. The Durbin-Watson value was .61, suggesting some violation of independent errors. In an attempt to reduce this dependency, the BDD variable was log transformed, and also square root transformed. Rerunning the model with these two separate transformations did not correct this assumption.

Drinks per drinking day. The overall linear regression model predicting past-month drinks per drinking day (DPDD) from MAS Total, UAIIAS, and the interaction between the two was non-significant, $F(6, 335) = 1.75$, $p = .110$ (Table 11). Because the overall model was not significant, other significant predictors are not considered here. VIF and tolerance values did not violate assumptions of multicollinearity. The Durbin-Watson value was .040.

To address this non-independence of errors, DPDD was transformed using a log transformation. A constant of 1 was added prior to the log transformation. Following this transformation, the Durbin-Watson value was .047. This value still suggests that the assumption of independent errors was violated. After the log transformation, the overall linear regression model predicting DPDD was significant, $F(6, 335) = 2.23$, $p = .040$. The overall model accounted for 3.8% of the variance in DPDD (adjusted R-squared = .02). UAIIAS was the only significant predictor ($b = -.141$, $p = .010$), with participants with higher levels of cultural identity reporting fewer DPDD.

The overall linear regression model predicting DPDD from MAS Bothered, UAIIAS, and the interaction between the two was non-significant, $F(6, 334) = 1.91$, $p = .079$ (Table 12). VIF and tolerance values did not violate assumptions of multicollinearity. The Durbin-Watson value was .043. In an attempt to address this dependency, the DPDD variable was log transformed, and also square root transformed. Rerunning the model with these two separate transformations did not increase the Durbin-Watson value.

Logistic regression models. ***Past-month drug use.*** The logistic regression model predicting past-month drug use from MAS Total, the UAIIAS, and the covariates of age, gender, and income provided better fit than an intercept-only model, $\chi^2(5) = 12.78$, $p = .026$. In other words, the predictors significantly contributed to the prediction of past-month drug use and accounted for 6.1% of the null deviance based on the Nagelkerke index (Table 13). The odds ratios and 95% confidence intervals for the predictors are presented in Table 14. All confidence intervals included 1, signifying an absence of a relationship between each predictor and the outcome variable, past-month drug use.

When the interaction term was added to this model, its inclusion did not provide improved goodness of fit, χ^2 (1) = .59, p = .44. Because of this, this second model is not detailed in a table.

The logistic regression model predicting the probability of past-month drug use from MAS Bothered, the UAIIAS, and the covariates of age, gender, and income did not provide greater explanation of the model than did the intercept-only model, χ^2 (5) = 10.05, p = .075. Because it was not significant, this model is not presented in further detail. When the interaction term was added to this model, its inclusion did not provide improved goodness of fit, as observed in the chi-squared test of the -2 log likelihood, χ^2 (1) = .34, p = .56 (Table 15).

Lifetime drug use > 100 times. The logistic regression model predicting the probability of using any drug more than 100 times from MAS Total, the UAIIAS, and the covariates of age, gender, and income provided greater explanation of the model than did the intercept-only model, χ^2 (5) = 35.26, p < .001. The predictors accounted for 15.5% of the null deviance in using any drug more than 100 times, based on the Nagelkerke index (Table 13). The odds ratios and 95% confidence intervals for the predictors are presented in Table 16. The odds of using any drug more than 100 times were multiplied by 1.17 for each additional item endorsed on the MAS Total, and by 1.06 for each additional year of age. The odds of using any drug more than 100 times were decreased by 0.49 for women compared to men, and were decreased by 0.72 when moving from a lower income category (of 5 categories) to a higher income category. When the interaction term was added to this model, its inclusion did not provide improved goodness of fit, χ^2 (1) = .58, p = .45.

The logistic regression model predicting the probability of using any drug more than 100 times from MAS Bothered, the UAIIAS, and the covariates of age, gender, and income provided greater explanation of the model than did the intercept-only model, χ^2 (5) = 33.14, $p < .001$. The predictors accounted for 14.7% of the null deviance in using any drug more than 100 times, based on the Nagelkerke index (Table 15). The odds ratios and 95% confidence intervals for the predictors are presented in Table 17. The odds of using any drug more than 100 times were multiplied by 1.28 for each one point increase on the MAS Bothered, and multiplied by 1.06 for each additional year of age. The odds of using any drug more than 100 times were decreased by 0.47 for women compared to men, and were decreased by 0.71 when moving from a lower income category to a higher income category. When the interaction term was added to this model, its inclusion did not provide improved goodness of fit, as observed in the chi-squared test of the -2 log likelihood, χ^2 (1) = 1.11, $p = .29$.

CAGE-AID positive. The logistic regression model predicting the probability of a positive CAGE-AID score from MAS Total, the UAIIAS, and the covariates of age, gender, and income provided greater explanation of the model than did the intercept-only model, χ^2 (5) = 46.87, $p < .001$. The predictors accounted for 17.7% of the null deviance in positive CAGE-AID score (Table 13). The odds ratios and 95% confidence intervals for the predictors are presented in Table 18. The odds of having a positive CAGE-AID score were multiplied by 1.16 for each additional item endorsed on the MAS Total and multiplied by 1.06 with each additional year of age. These odds were decreased by 0.37 for women compared to men, and were decreased by 0.78 when moving from a lower income category to a higher income category. In other words, more microaggressions, older age, male gender, and lower income were associated with an increased likelihood of a positive CAGE-AID score. When the interaction term was added to this model, its inclusion did not provide improved goodness of fit, $\chi^2(1) = .30$, $p = .59$ (Table 13).

The logistic regression model predicting the probability of a positive CAGE-AID score from MAS Bothered, the UAIIAS, and the covariates of age, gender, and income provided greater explanation of the model than did the intercept-only model, $\chi^2(5) = 41.70$, $p < .001$. The predictors accounted for 15.9% of the null deviance in positive CAGE-AID score (Table 15). The odds ratios and 95% confidence intervals for the predictors are presented in Table 19. The odds of having a positive CAGE-AID score were multiplied by 1.06 with each additional year of age. These odds were decreased by 0.36 for women compared to men, and decreased by 0.78 when moving from a lower income category to a higher income category. Table 19 displays the full results of the logistic regression analysis; MAS Bothered was not a significant predictor of CAGE-AID score. When the interaction term was added to this model, its inclusion did not provide improved goodness of fit, $\chi^2(1) = .19$, $p = .66$ (Table 15).

Part One: Summary and Discussion

The first part of the study sought to examine the relationship between discrimination and substance use, and the moderating role of cultural buffers, among 347 Native American college students at two post-secondary institutions in the Southwestern United States. It also offered one of the few overviews of the prevalence of racial discrimination, substance use, and cultural factors in this population. The primary hypothesis relating more discrimination with greater substance use was supported only for lifetime measures of substance use but not past-month measures of use. Although stronger Native American identity was associated with less past-month substance use, it did not moderate the relationship between racial discrimination and substance use.

Prevalence and correlates of microaggressions. Nearly the entire sample (94%) had experienced at least one microaggression in the past year, with an average past-year total of almost four. Similarly, 83% of African American students and faculty at a large university endorsed at least one instance of past-year discrimination (Landrine & Klonoff, 1996), and 98% of Native American young adults reported experiencing at least one microaggression (Jones & Galliher, 2015). Microaggressions appear to be a constant part of life for racial and ethnic minorities. In this sample, the most commonly reported microaggressions included being mistaken by non-Natives as a racial/ethnic group other than Native (65%), told by a non-Native that the non-Native was an Indian in a past life or had a Cherokee princess grandmother (55%), and that the participant was lucky to be Indian (55%). Unfortunately, 10 participants (2.9%) reported being hit, kicked, or physically assaulted in the past year because they were Native American. This figure was similar to rates of physical violence and intimidation found at a college in northern Arizona where 4% of the student body was Native American (Perry, 2002).

Consistent with prior literature linking racial discrimination to poorer health (Williams et al., 2008), experiencing more past-year microaggressions was associated with being in poor or fair health in this sample. In addition, those with lower household incomes reported more past-year microaggressions. Williams and colleagues (2012) found a similar relationship between lower income and more unfair treatment (including racial discrimination) among a Black sample. Because of the cross-sectional nature of these data, the directionality of the relationship between health, income, and microaggressions is unclear. It does suggest that those with less money and poorer health, and consequently less power in society, are more likely to be taken advantage of and experience discrimination.

Male African American college students in North Carolina experienced more racial discrimination than did female students (Bennett et al., 2005), yet in this study and another study of Native American young adults (Jones & Galliher, 2015), there were no gender differences in number of past-year microaggressions. Given that many stereotypes are racially distinct, it is not surprising to find gender differences in experiences of racial discrimination in one racial group but not another. For example, college students rated African American males as significantly more masculine than Asian American males (Wong, Horn, & Chen, 2013) and racial- and gender-specific stereotypes are directed toward Native Americans that differ from those of other racial groups (e.g., Merskin, 2010).

The average amount participants were bothered by microaggressions on the Microaggressions Scale was “some.” However, unfair treatment by the police bothered participants “a lot” and being trailed or followed in a store bothered them between “some” and “a lot.” Jones and Galliher (2015) also found that among Native American young adults, the average level of distress in response to microaggressions was none to mild, although the full range of distress was represented for each item. These findings suggest that there is significant within-group variability in response to microaggressions, as well as variability in how much different types of microaggressions are considered bothersome. However, in this study the degree to which participants were bothered by microaggressions did not differ by gender, age, health, sexual orientation, grades, or income, suggesting a consistent level of frustration regardless of demographic characteristics.

Microaggressions and cultural factors. Preliminary research suggests that a stronger Native American cultural identity (Jones & Galliher, 2015) and greater levels of enculturation with Native American traditions and spirituality (Whitbeck et al., 2004) are associated with experiencing more discrimination. This study provided some support for this association. The importance of traditional spiritual values and practicing tribal spirituality were associated with more past-year microaggressions, although cultural identity and knowledge of tribal language were not associated with past-year microaggressions. Those who value traditional Native American spirituality may be in situations where they are exposed to more microaggressions. This association is concerning given the historical suppression of Native American religious traditions, addressed in part with the passage of the American Indian Religious Freedom Act of 1978.

Participants who had a stronger Native American cultural identity and practiced traditional religion/spirituality also were more bothered by microaggressions. This could be due to feeling that microaggressions are an assault on their core identity. The racial centrality hypothesis argues that race-related microaggressions are more detrimental when racial identity is a more central part of an individual's identity (Burrow & Ong, 2010). In a daily diary study of African American doctoral students and graduates, racial centrality moderated the relationship between discrimination and negative affect. For those with higher racial centrality, the relationship between discrimination and negative affect was stronger (Burrow & Ong, 2010). This corresponds with the current findings and should be explored further in future research.

Prevalence of substance use. This study offered one of the first overviews of alcohol use among Native American college students beyond that offered by the nation-wide College Alcohol Study data (Ward & Ridolfo, 2011) and a small study in Oklahoma from the early 1980s (Hughes & Dodder, 1984). Past-month alcohol use rates in this sample were 43%, much lower than previous estimates of 65% (Ward & Ridolfo, 2011) and 80% (Hughes & Dodder, 1984). In addition, the past-month binge drinking rate of 27% was low compared to other college samples (SAMHSA, 2014). Healthy People 2020 has called for a decrease in binge drinking rates among college students from a 2010 rate of 41% to a rate of 37% by 2020 (Office of Disease Prevention and Health Promotion, 2010). The Native American college students in this study have already reached that goal, similar to Native Hawaiian community college students of which only 30% reported getting “drunk” in the past month (Pokhrel & Herzog, 2014).

These findings suggest that for Native American college students at institutions where they represent a relatively large percentage of students as well as percentage of the state population, excessive alcohol use is *not* the norm and college is less of a risk period in terms of alcohol use. The Ward and Ridolfo study (2011) was conducted across colleges where Native American students were a small minority, which may contribute to this discrepancy in alcohol use findings. At schools where the norm is to drink, Native American students may assimilate more with other students and have similar alcohol use levels. They could also experience more discrimination in settings where they are a small minority, leading to higher levels of stress and more substance use. In addition, perceptions of the purpose of post-secondary education may differ and contribute to differential alcohol use patterns. For some, college is aptly described as “a 4-year party – one long tailgater – with an $18,000 annual cover charge” (Sperber, 2000, p. xii). Native American students, on the other hand, often enter college with a sense of responsibility to give back to their community in a positive way (Lee, 2007). This latter sentiment may be incompatible with heavy alcohol use.

Past studies have identified Native Americans as having the highest rates of tobacco use among all races and ethnicities – a concerning statistic. National estimates of current tobacco use for Native Americans range from 37% to 50%, compared to 22% among all races/ethnicities (Henderson et al., 2005; Hodge et al., 1995; SAMHSA, 2014). Yet in this study, the current rate of tobacco use was 13%. There are two possible explanations for this finding. One is that this figure may reflect regional heterogeneity among Native Americans. In a large epidemiological Native American sample, only 14% of participants from Southwest tribes were current tobacco users (Henderson et al., 2005). This coincides with the rate of 13% found in this study; 90% of participants in the present study were from Southwest tribes. A second explanation for this lower tobacco use rate could be the inclusion of the response option “only smoke for ceremonial purposes.” One in five participants selected this option, and post-hoc analyses revealed that selecting this category was associated with less alcohol use, even more so than for those who selected having never smoked tobacco. Unfortunately, previous studies of Native American tobacco use (Henderson et al., 2005; Hodge et al., 1995) and the yearly National Survey on Drug Use and Health (SAMHSA, 2014) do not include a “tobacco use only for ceremonial purposes” response option. This addition was suggested by the study’s community advisory board to more accurately reflect their experiences with tobacco, and it would be beneficial for this option to be included in other studies going forward. Similar to the common distinction made between non-medical and medical use of drugs, the purpose of and reason for tobacco use (cultural versus recreational) can be more informative than simply inquiring about quantity and frequency.

Twenty percent of participants endorsed past-month drug use, which is much higher than national prevalence estimates (9.4%) as well as Native American specific estimates (12.3%). However, it does concur with the national all-races past-month illicit drug use estimate of 21.5% for 18 to 25 year olds and the estimate of 22.3% for full-time college students ages 18 to 22 (SAMHSA, 2014). Post-hoc analyses of past-month drug use among this sample revealed a past-month drug use rate of 22.0% among participants who were 18 to 25 years old, and a rate of 18.3% among those 26 years and older. This age discrepancy was partially driven by past-month marijuana use estimates: while the entire sample endorsed a past-month marijuana use rate of 13.6%, the younger cohort had a rate of 18.1% and the older cohort had a rate of 8.6%. This maps neatly onto 2013 National Survey on Drug Use and Health data, in which those 18 to 25 years had a past-month marijuana use rate of 19.1%, while the entire sample had a past-month marijuana use rate of 7.5% (SAMHSA, 2014). Here, the past-month marijuana use rate of 13.6% among 18 to 25 year olds mirrors that of 13% in the Native Hawaiian community college sample (Pokhrel & Herzog, 2014).

Discrimination and substance use. The hypothesized positive relationship between past-year microaggressions and past-month substance use was not found in this study, but past-year microaggressions were positively associated with a positive lifetime

CAGE-AID score and using any drug more than 100 times in one's life. Prior studies have generally considered longer periods of substance use or more problematic substance use compared to our utilization of past-month substance use as an outcome variable. This could be one explanation for the non-significant relationship between past-year microaggressions and past-month substance use. In addition, prior studies have generally used lifetime measures of discrimination in relation to substance use. This more accurately captures hypothesized ongoing systematic exposure to discrimination as a risk factor for substance use (Williams et al., 2008).

As an example, *lifetime* experiences of discrimination in more domains were associated with *lifetime* CAGE scores greater than two (suggestive of problematic alcohol use) among a multi-ethnic sample of San Francisco transit workers (Yen et al., 1999) and a national sample of African Americans (Martin et al., 2003). Speaking to the intensity of substance use, *lifetime* discrimination in more domains was associated with a greater likelihood of using marijuana *more than 100 times* in one's life among urban African Americans (Borrell et al., 2007) and with alcohol-related *problems* among American Indian youth and their parents in the upper Midwest (Whitbeck et al., 2002; Whitbeck et al., 2004). The current findings match these prior studies in that measures of past-year microaggressions were associated with *lifetime* substance use intensity and problems (positive CAGE-AID score and use of drugs more than 100 times).

Another difference from prior studies is that this study included substance users and non-users in the analyses, as compared to prior research that included only past-year drinkers (Martin et al., 2003; Yen et al., 1999). For non-users or non-drinkers, substance use may not be considered as an option in response to discrimination. This may be especially true among populations that have high rates of abstinence, as is the case for Native Americans and alcohol use (SAMHSA, 2014). Asian Americans also have high rates of alcohol non-use (SAMHSA, 2014), and among Asian American/Pacific Islander undergraduate and graduate students, ongoing microaggressions were unrelated to past-month substance use, but were positively related to negative mood states and somatization (Chen et al., 2014). Given discrimination's relation to poorer health, future work should examine the relationship between discrimination and negative mood and somatization among Native Americans.

Although findings regarding the relationship between discrimination and substance use were mixed in this study, the relationship between past-year microaggressions and lifetime drug use and problematic substance use (CAGE-AID score) suggest that discrimination is related to detrimental health behaviors and adds to the growing literature linking greater discrimination to poorer health (Williams et al., 2008).

Culture as a moderator. Cultural identity, as measured by the Urban American Indian Identity Attitudes (UAIIAS) Actualization subscale, did not moderate the relationship between past-year microaggressions and substance use. In other words, the effect of microaggressions on substance use did not vary according to level of cultural identity. This contradicts one portion of the Indigenist Stress-Coping Model (Walters et al., 2002) that positions cultural buffers as factors that weaken the influence of stressors such as discrimination. Discrimination may be toxic across the board, regardless of cultural identity, and cultural factors may operate as protective factors via alternate pathways, as discussed below. Although Chae and Walters (2009) found support for the moderating role of cultural identity, their outcome variable was health status, compared to substance use in this sample.

Culture as a protective factor. Despite 80% of participants living away from their home reservation or tribal lands for more than a year, they still had strong cultural ties. Eighty-five percent knew the name of their mother's or father's clan, sixty percent had sought traditional healing at some point in their lives, half spoke their tribe's language, and they endorsed high levels of cultural identity (e.g., pride in, comfort with identity) on the UAIIAS Actualization subscale. Contrary to societal stereotypes about "drunken Indians," those with a higher percentage of Native American ancestry were less likely to have used drugs in the past month. Tribal heterogeneity was also evident: similar to large epidemiological surveys (O'Connell et al., 2005), participants from Southwest tribes were less likely to have used drugs in the past month or used drugs more than 100 times in their life than were participants from other tribes.

In the regression analyses, stronger Native American cultural identity was not associated with past-month drug use, using any drug more than 100 times in one's life, or a lifetime CAGE-AID score indicative of problematic substance use. Cultural identity can shift over time (Sussman, 2000) and thus a measure of current cultural identity, as represented by the UAIIAS in this study, may be less likely to be associated with substance use across the lifespan because current level of cultural identity may or may not correspond to previous levels. However, stronger Native American cultural identity was associated with fewer past-month drinking days, drinks per drinking day, and binge drinking days. Walters (1999) found that stronger Native American cultural identity was correlated with resistance to dominant U.S. norms. Resistance to normative college student alcohol use patterns may be one manifestation of a strong cultural identity.

Taken together, these findings speak to the importance of culture as a protective factor. Similarly, in an upper Midwest sample, greater cultural involvement, cultural identity, and traditional spirituality were related to a lower likelihood of past year alcohol abuse (Stone et al., 2006; Whitbeck et al., 2004). A stronger cultural base may also speak to social cohesion and family support, factors that have been associated with lower likelihood of substance use disorder in Asian Americans and Latinos (Savage & Mezuk, 2014).

Strengths. The first portion of the study had several strengths. First, it was the largest sample of Native American college students focused on substance use and discrimination to date, and offered an important glimpse into their daily experiences with substance use, discrimination, and cultural involvement. Second, multiple measures of substance use and cultural involvement were included, allowing for a multi-faceted picture of these variables. In contrast to prior studies, tobacco use for ceremonial purposes only was included as its own category. Third, this study built on the Indigenist Stress-Coping Model (Walters et al., 2002), a theoretical framework developed by indigenous researchers, instead of taking a model developed with White populations and attempting to fit it to indigenous populations. Cultural factors were measured and considered as protective factors. This is in line with calls to decolonize the dominant Western research paradigm (Smith, 2012) and to work from a strengths-based perspective.

Limitations. The first part of this study was a cross-sectional survey, which by its very nature limits causal inference statements. Its generalizability was limited because it focused exclusively on students in the Southwest living in an urban center. Findings may not generalize to non-college students, those in other parts of the country, or those in rural areas. Findings may not generalize to less enculturated Native Americans – the participants in these study tended to be more enculturated. However, this high level of enculturation may be reflective of the local population. Native American students who were more enculturated may have been more attracted to the study because it was titled "Native American Daily Experiences and Health." Although recruitment occurred via an e-mail sent to all enrolled Native American students at both institutions, recruitment also occurred via Native American student groups and via flyers with art by Native American artists using local Native American designs, which also may have attracted more enculturated students. In addition, university records of Native American students may not always accurately represent race and ethnicity data. Students who are part Native American may not be listed as Native American in the school records. In addition, participants were receiving very good grades in their classes, and these findings may not generalize to students who are doing poorly academically. In the university sample, seniors were overrepresented and findings may be more applicable to those Native American students who continue on through their bachelor's degree.

In terms of measurement, the Microaggressions Scale focused only on past-year experiences of discrimination, whereas other research suggests that systematic lifelong exposure to discrimination presents the largest risk factor for substance use (Williams et al., 2008). The Microaggressions Scale did not assess the frequency of discriminatory experiences, which may be an important marker of risk. The MAS Bothered variable could have been computed in different ways. Here, it was computed by taking the average of “bothered” ratings for those microaggressions that participants endorsed as occurring in the past year. Individuals who reported experiencing no past-year discrimination were coded as “zero” bothered for this variable. They could have been excluded from the summary variable. Additionally, instead of taking the average bothered level of answered responses, the highest rating could have been used for the summary variable. As the field of discrimination research continues to grow, these are important questions to consider to increase the specificity of measurement strategies.

The drug use question about sedatives/sleeping pills did not specify that it be for non-medical use, as was done for the other drugs (e.g., prescribed stimulants for non-medical reasons). This oversight was corrected in the daily diary questionnaire. When participants that selected sedative/sleeping pill use but no other past-month drug use were excluded from the past-month drug use total, the total dropped by 7 participants (20.2% to 18.2% past-month drug use). However, it is unclear if these seven participants used sedative/sleeping pills for medical or non-medical reasons since this was not specified in the question prompt. As a precaution, analyses were rerun excluding these individuals and the results were similar to what was reported above.

Future directions. Future work should further specify the relationship between discrimination, substance use, and other health outcomes, in part through improved measurement. To match prior studies (Martin et al., 2003; Yen et al., 1999), these analyses could be redone looking only at past-year substance users. More clearly specifying the time frame of discrimination (i.e., past-month versus lifetime) and its frequency will also build our knowledge base. Future research should be done to quantify this variability in order to customize intervention strategies to reduce the incidence of the most damaging microaggressions and provide resources, support, and ways to respond most beneficially for those who are most impacted by microaggressions.

One-time prevalence estimates of discrimination can provide the foundation for longitudinal tracking of racial discrimination, particularly if community-level changes or interventions to reduce discrimination occur. Jones and colleagues (2008) added a module on “Reactions to Race” to the CDC Behavioral Risk Factor Surveillance System that measures socially assigned race and is administered at the state level. Changes in the relationship between socially assigned race and health are tracked over time. This can provide much needed evidence about the value of different interventions to reduce racism, and to the impact of larger societal events (e.g., increase in anti-Muslim sentiment post-9/11).

Part Two: 21-Day Daily Diary

Method

Participants. Eligibility criteria for Part Two included (1) endorsing at least one item on the revised-Everyday Discrimination Scale as occurring *a few times a month* or more (see description in Part One Measures above), (2) selecting a reason for this discrimination related to Native American heritage, (3) endorsing at least one past-year microaggression on the Microaggression Scale, and (4) daily access to the internet. Eligibility items 1-3 were included to screen for participants who reported more frequent experiences of discrimination so that the likelihood of them experiencing discrimination during the 21-day daily diary tracking period would be increased. Based on eligibility criteria 1-3, 146 participants (42.1%) from Part One were potentially eligible to participate in Part Two.

Eligible participants who provided contact information in Part One were contacted in the order that they completed Part One. They were contacted via their preferred contact method, which could include e-mail, text, and/or phone call. Approximately 90% of all participants provided contact information. Contact attempts were continued for up to two months or until the individual declined participation. Sixty-two participants attended the Part Two orientation and consented for the daily diary study. However, one participant withdrew from school shortly thereafter and did not begin the daily diary study. Thus, the final daily diary sample included 61 participants, 42% of those who were eligible based on Part 1 responses. This subset of participants was 25.89 years old on average (SD = 7.35; range 18-49) and 63% female (n = 38). Sixty-seven percent (n = 41) attended the community college and 33% attended the four-year university (n = 20).

To ensure an adequate representation of participants who used alcohol, tobacco, or drugs (a key outcome variable in the daily diary study), an additional goal was to have at least 50% of the daily diary participants have a score of two or higher on the CAGE-AID and report past-month alcohol, tobacco, or drug use. However, the final sample included only 17 individuals (27.9%) who endorsed past-month substance use and had screened positive on the CAGE-AID.

Procedure. Individuals who were eligible for and interested in the daily diary study attended an in-person orientation. Participants attended orientation sessions between March and August of 2013. A total of 27 orientation sessions were held, with 1 to 5 participants at each session. At the orientation, they completed an informed consent for the daily diary study and questions about the study were addressed. To facilitate accuracy of standard drink measurements, participants were educated about and quizzed on standard drinks in the orientation session and could click on a help button on the online diary for reference information about standard drinks. Participants were encouraged to complete the first diary at this orientation and 85% did so. They were required to start the first diary within two weeks of the orientation and all participants started within this time frame. Participants were given $30 for attendance at the baseline orientation meeting.

Participants were instructed to complete the daily diary once per day, between the hours of 3:00 and 7:00 PM, for 21 consecutive days. Diaries were completed online through Opinio. However, if participants did not have access to the Internet, they could complete diaries by phone with the research assistant or principal investigator. Less than 1% of participants completed diaries by phone. Each day, participants received a reminder e-mail or text (depending on preference) containing the link to the online diary site. If participants missed two diaries in a row, they received a phone call or text (depending on preferred mode of contact indicated at the start of the study) to encourage participation and trouble-shoot any problems. Participants received $3 for each completed diary, an additional $4 for completing seven diaries in a row, and an additional $5 for completing all 21 diaries, for a maximum total of $80.

At the end of the 21-day tracking period, participants received an e-mail or text message inviting them to schedule an appointment for a debriefing session and to pick up their cash incentive. At the debriefing, participants had the opportunity to ask any remaining questions about the study, and the principal investigator or research assistant thanked them for their participation. Participants were given a small token of appreciation for their participation in the study (notebook and bookmark). Additionally, information about community health resources and on-campus Native American student support services was given to all participants. The principal investigator and research assistant also asked participants for ideas regarding how the study findings should be disseminated.

Measures. ***Discrimination.*** Participants were asked if they had experienced any discrimination due to being Native American in the past day (since the last diary). If they replied affirmatively to this question, they were asked further questions about the incident. These questions included a written description of what occurred, the time of the incident, how much the incident bothered them on a 0-10 scale (0 = not at all; 10 = extremely), the likely race/ethnicity of the individual(s) involved, what they did to cope with the discrimination, and a choice between the following to categorize their response: (0) *accept it as a fact of life* or (1) *try and do something about it*; (0) *keep it to yourself* or

(1) *talk to other people about it* (Krieger, Smith, Naishadham, Harman, & Barbeau, 2005). Because the discrimination incidents were time-dated, they could be split into daytime (pre-diary) and evening (post-diary) events for purposes of the multi-level analyses.

Substance use. All substance use questions were posed separately about the previous evening (from yesterday's diary until bedtime) and the current day (waking until present diary). Alcohol use was measured in standard drinks, and tobacco use was measured in number of cigarettes. Participants were given a list of 10 drug categories and asked to indicate the level of their use the evening before after the diary, and up until today's diary, on a scale ranging from (0) none, (1) single use, (2) several uses, (3) steady/heavy use (adapted from Timeline Follow-back; Sobell & Sobell, 1996). The drug categories included marijuana, cocaine, methamphetamines, inhalants, sedatives or sleeping pills for non-medical reasons, hallucinogens, heroin or opium, prescribed stimulants used for non-medical reasons, prescription opioids for non-medical reasons, and a write-in other category. In a daily diary study of alcohol use, reported alcohol consumption across days had good internal validity ($\propto$ = 0.85), and reports of daily alcohol use were positively correlated with alcohol dependence symptoms (Grzywacz & Almeida, 2008), similar to other studies.

Daily enculturation. This scale consisted of 12 yes or no questions tapping cultural participation during the 24 hours since the previous diary. The questions were derived from prior measures (May, 1982; Whitbeck et al., 2004) and consultation with community advisory board members. Example items included "participate in traditional healing ceremonies," "spend time learning a Native language," and "attend a meeting of a

Native organization.” The sum of these items was used as a measure of past-day enculturation (0-12 range). The measure had an internal consistency of 0.75 (N = 1019; k = 12).

Interpersonal interactions. To account for interpersonal interactions occurring in addition to discrimination, participants completed 10 questions that inquired about levels of stress and enjoyment in interpersonal interactions with (1) friends, (2) partner/spouse, (3) family, (4) coworkers, and (5) classmates since completion of the previous daily diary (Smith & Zautra, 2002). Answer options included (0) not at all, (1) a little, (2) moderately, (3) quite a bit, and (4) extremely. Participants could also indicate if the item did not apply to them. The highest reported stress and enjoyment levels were used as an index of most stressful and enjoyable daily interaction.

Statistical analyses. Multi-level modeling with SPSS 22 was used to conduct these analyses. Multi-level modeling is an approach that can account for nested data in which observations are clustered together into higher-order units (Hox, 2002). In the case of intensive longitudinal studies, of which this daily diary study is an example, days (Level 1) are nested within participants (Level 2) and variability can exist at the within- and between-person level. Intensive longitudinal studies allow for an investigation of “life as it is lived” (p. 2; Bolger & Laurenceau, 2013) and more correctly capture causal relationships as within-subject processes over time, as compared to typical between-subject comparisons.

Prior to completing the multi-level analyses, descriptive statistics about the daily diary study variables (both daily and person-level) were summarized. The qualitative descriptions of daily discrimination events were analyzed using a grounded theory approach. The descriptions of discrimination were read, discussed, and grouped into categories based on their setting, the type of discrimination, and participants' responses to them. This process was done collaboratively with the principal investigator, her mentor, one student from the university, and one academic advisor from the community college. All but the principal investigator were Native American individuals who had lived in the local area for many years.

Using linear regression, gender and the UAIIAS were examined as predictors of percent days discrimination. Percent days discrimination was computed by dividing the total number of days on which discrimination was reported by the total number of completed diaries for each participant.

To examine the prospective influences of daytime discrimination on evening substance use and the moderating effects of cultural involvement and other Level 2 predictors, a multi-level model-building procedure was followed (Hox, 2002). In Step 1, a null model with a random intercept was estimated. In Step 2, the fixed effect of time was added to the model. This second step was a test for assessment reactivity because it provided information about the main effect of time on substance use. A significant main effect would suggest a greater than random change in reports of evening substance use over time. In Step 3, the fixed effect of daytime discrimination (present/absent) was added to the model. In Step 4, the other level 1 covariates (daytime substance use, most stressful interaction, most enjoyable interaction, cultural involvement) were added to the model as fixed effects. In Step 5, random effects were added for each Level 1 covariate individually. In Step 6, the Level 2 predictors of the Alcohol Effects Questionnaire Careless Unconcern Subscale (for alcohol only), gender, and the UAIIAS were added to the model. Interaction effects between Level 2 and Level 1 variables can be tested for Level 1 variables that have significant random slopes (Hox, 2002). A significant random slope indicates variability in the way that participants change over time – variability that could be accounted for by a Level 2 moderator.

All predictor variables (excluding gender and morning discrimination) were mean-centered to increase the interpretability and meaningfulness of each and to allow for interpretation of any interaction effects. Three separate models were constructed using the principles described above for the three substance use outcome variables – evening standard drinks, number of cigarettes, and level of marijuana use.

Results

Descriptive information. Of the 1,281 potential daily diaries (61 participants x 21 days = 1,281), 1,039 daily diaries (81%) were completed and included in the final analysis dataset. The average number of diaries completed per participant was 17.03 (*SD* = 3.69; range 6-21).

Daily discrimination. A total of 65 instances of discrimination were endorsed across the 1,039 diaries, representing 6.3% of all diary entries. More than half of participants endorsed at least one experience of discrimination during the daily diary study (n = 34; 55.7%) Most discrimination (n = 43; 66.2%) occurred during the daytime, prior to completing the daily diary. Although participants had the option to record multiple instances of discrimination over the course of one day, only one participant did this on one day.

At the person level, the average number of instances of discrimination was 1.07 (*SD* = 1.32). The number of discrimination instances experienced per person per day ranged from zero to six (0-32% of all diary days). Only one instance of discrimination occurred while or after drinking alcohol or using drugs (1.5%); nearly all participants reported not using alcohol or drugs before or during the instance of discrimination (*n* = 64; 98.5%).

When given pairs of response choices to characterize their reactions to the instance of discrimination, participants endorsed a tendency to "accept it as a fact of life" (*n* = 55; 85.9%) over "try and do something about it" (*n* = 9; 14.1%). They were evenly split between the options of "talk to other people about it" (*n* = 32; 50.8%) and "keep it to yourself" (*n* = 31; 49.2%).

Participants were asked to take their best guess of the race/ethnicity of those involved in the incident. They could select more than one race/ethnicity for each incident. The most common selections were White (*n* = 45) and Hispanic/Latino (*n* = 18). American Indian/Alaska Native (*n* = 6), Black/African American (*n* = 2), Asian/Native Hawaiian/other Pacific Islander (*n* = 2), and some other group (*n* = 3) were selected less frequently.

Qualitative descriptions of daily discrimination. The most common form of discrimination involved rude behavior toward the participants or others they were with (*n* = 17; 27.0%). For example, "I was laughed at because of my long hair on the city bus." The second most common type was invisibility of the participants (*n* = 10; 15.9%). Participants would need assistance but feel they were overlooked or ignored. This type of discrimination occurred most frequently in stores, but also in the classroom. Other types of discrimination included questioning the participant's degree of "Nativeness," staring, and assuming they had an alcohol problem, were a thief, or were unintelligent. In addition, there were some romanticized stereotypes (e.g., Natives are good storytellers) that could be taken positively or negatively depending on the context and tone. Lastly, some discrimination involved assumptions that participants received "handouts" because of their Native American heritage. A summary of the different types of discrimination along with representative examples is provided in Table 20.

Participants used multiple strategies to cope with their experiences of discrimination. The most common strategy was to ignore it (*n* = 11; 17.4%). The second most common strategy was to talk about it with friends, family, or co-workers (*n* = 7; 11.1%). Tied for the third most common responses were being polite (e.g., smile and walk away; *n* = 6; 9.5%) and responding to the individual(s) (*n* = 6; 9.5%). Verbal responses ranged from education ("Indians don't live in casinos") to "bad mouthing her in English and in my language." Other responses to discrimination are detailed in Table 21 and included pointing out the discrimination to someone in authority, active distraction, brushing it off, doing nothing, finding an explanation for it, prayer, keeping it inside, and drinking alcohol.

The experiences of discrimination occurred across a range of settings. The most common location was in stores such as grocery, electronics, or home supply stores. These settings encompassed 23.8% of all recorded discrimination experiences. Similarly, discrimination in public places like casinos, busses, and parks made up another 23.8% of discrimination experiences. The next most common setting was school-related, reported as 14.3% of the discrimination instances. Table 22 summarizes the settings in which discrimination occurred.

Daily substance use. Across all 1,039 diaries, the average number of standard drinks in the evening after completing the diaries was 0.46 (*SD* = 1.56; range 0-15). The average number of standard drinks in the day prior to the diary was 0.08 (*SD* = 0.59; range 0-9). For cigarettes, these figures were respectively 0.46 (*SD* = 1.40; range 0-10) and 0.28 (*SD* = 1.06; range 0-15). In the evening, cigarette use was endorsed on 11.4% of the total days (*n* = 149), alcohol use was reported on 9.2% of all days (*n* = 120), and marijuana use was reported on 7.1% of all days (*n* = 92). Outside of alcohol and tobacco, marijuana was the most common substance used during the 21-day assessment period. All other substances were used on less than 2.0% of the total diary days. Table 23 displays the distribution of substance use across daily diary assessments. No cocaine use, methamphetamine use, or prescription stimulant use for non-medical reasons was endorsed during the assessment period and these substances are not included in Table 23.

Across all daily diary participants, 44.3% drank alcohol at any point in the study in the evening (*n* = 27), 34.4% smoked cigarettes (*n* = 21), and 24.6% used marijuana (*n* = 15). Across participants, 63.9% reported evening alcohol, cigarette, or marijuana use at least once during the daily diary study (*n* = 39).

Daily enculturation. The most common type of cultural involvement endorsed on the Enculturation Questionnaire was “spending time with Native family or friends” (66.6% of days) and “speaking your Native language” (47.6% of days). Table 24 displays the frequencies for each type of culture-related activity. The daily average on the Enculturation scale was 1.91 (*SD* = 1.84; observed range = 0-10).

Baseline measures. These measures were given during Part One of the study (described above). On the Alcohol Effects Questionnaire Careless Unconcern subscale, the average score was 2.18 (*SD* = 1.72; observed and possible range 0-4) for Part Two participants. On the UAIIAS Actualization subscale, the average score was 41.20 (*SD* = 7.12; observed range 21-51).

Predictors of discrimination. The overall linear regression model predicting percent days discrimination from gender and the centered UAIIAS Actualization subscale total was non-significant, $F(2, 60) = 0.25$, $p = .975$. The model accounted for 0.1% of the variance in drinking days (adjusted R-squared = -0.34). VIF and tolerance values did not violate assumptions of multicollinearity. The Durbin-Watson value was 2.39, indicating that the assumption of independent errors was not violated. The frequency of discrimination endorsed during the daily diary did not differ by gender or level of cultural identity.

Does daytime discrimination predict evening standard drinks? The fixed and random estimates, standard errors, and significance levels of the models below are summarized in Table 25. The AIC and -2 log likelihood values are also included for each model.

Step 1: Null model, random intercept. The intercept for this model was 0.45 (*SE* = 0.12), which represents the average number of standard drinks in the evening. This intercept estimate was significant, $p < .001$, indicating that the overall average number of drinks in the evening was significantly different from zero. The Level 1 residual variance was 1.73 (*SE* = .09) and was significantly different from zero (95% CI = 1.56, 1.90). The intercept variance of 0.76 (*SE* = 0.16) was also significantly different from zero (95% CI = 0.56, 1.15) and indicated that the number of standard drinks in the evening varied significantly from participant to participant (Level 2). The ICC for this model was .305;

30.5% of the total variability in evening standard drinks was accounted for by differences between participants, or alternatively, 69.5% of the variance was accounted for by variability in within-participant drinking.

Step 2: Fixed effect of time, random intercept. The intercept for this model was 0.37 (*SE* = 0.14) and was significantly different from zero, *p* = .009. It represents the average number of standard drinks in the evening on Day 0, the first day of the study. The fixed effect estimate of time was .009 (*SE* = .008), *p* = .263. This indicated that evening standard drinks did not change as a linear function of time, and suggests that an assessment reactivity effect was not present. The residual variance estimates were both significant (Table 25) and the residual ICC for this model was 0.306; after accounting for time, 30.6% of the total variability in evening standard drinks was at the Level 2 participant level. This value was very similar to the prior ICC in Step 1 and suggests that knowing the day of the assessment did not account for additional variance at the participant level.

Step 3: Fixed effect of time and discrimination, random intercept. The intercept for this model was 0.36 (*SE* = 0.14), and it was significantly different from zero, *p* = .011. This value represents the average number of standard drinks in the evening on Day 0 for participants who did not experience discrimination in the morning. The fixed estimate of time was .009 (.008) and was non-significant, *p* = .24, indicating no significant change in standard drinks by day. The fixed estimate of morning discrimination was -.208 (*SE* = .23) and also was non-significant, *p* = .375. The number of evening standard drinks did not differ based on whether a participant experienced discrimination in the morning. The Level 1 variance was 1.65 (*SE* = .08) and was significantly different from zero (95% *CI* =

1.50, 1.82), suggesting that significant variability in evening standard drinks from one day to another remained after accounting for time and morning discrimination. The Level 2 variance was 0.76 (*SE* = 0.16) and was significantly different from zero (*95% CI* = 0.51, 1.15). The residual ICC for this model was 0.315, or 31.5% of the variability at the Level 2 participant level.

Step 4: All Level 1 covariates added as fixed effects, random intercept. In this step morning standard drinks, enculturation total, most positive interaction, and negative interaction were added as Level 1 time-varying covariates. The intercept estimate in this model, 0.41 (*SE* = 0.13) was significant, *p* = .003, and represents the average number of standard drinks in the evening controlling for time, morning discrimination, morning drinks, past-day enculturation and most negative and positive interactions. The fixed effect of time was .005 (*SE* = .008) and was non-significant, *p* = .480. Similarly, the fixed effects of morning discrimination, past-day cultural involvement, and past-day most stressful and positive interactions were non-significant (see Table 25). At the day-level, these variables did not significantly predict evening standard drinks. The fixed effect of morning standard drinks was 0.65 (*SE* = 0.10) and was significantly different from zero, *p* < .001. For each additional standard drink in the morning, the expected change in evening standard drinks was 0.65.

The Level 1 variance was 1.58 (*SE* = .08) and was significantly different from zero (95% *CI* = 1.44, 1.76), suggesting that significant variability in evening standard drinks from one day to another remained after accounting for the fixed predictors. The Level 2 variance was 0.63 (*SE* = 0.14) and was significantly different from zero (*95% CI*

= 0.41, 0.96). The residual ICC for this model was 0.285, or 28.5% of the variance at the Level 2 participant level.

Step 5: Adding random effects for each Level 1 time-varying covariate. In this step, each of the six Level 1 predictors (time, morning discrimination, morning drinks, past-day enculturation, past-day most stressful interaction, past-day most positive interaction) was each individually changed to have both a fixed and random effect. Adding a random effect means that the slope, intercept, and relationship between the slope and intercept are allowed to vary by individual (Hox, 2002). While testing each predictor with a random effect, the other Level 1 time-varying covariates were retained in the model as fixed predictors. The random effects were estimable for only two of the six Level 1 predictors: morning standard drinks and time. When both variables were allowed to be random in a combined model, neither of the random effects fully converged. Because of this, time was allowed to be random while all either effects were kept fixed. Because enculturation, stress, and positive interactions were non-significant in this combined model, they were removed as predictors.

The final model for this step is displayed in Table 25. The intercept estimate was 0.39 (SE = .12) and was significantly different from zero, p = .002. Day of the study (time) was not a significant predictor of evening standard drinks, p = .37, nor was morning discrimination, p = .355. The fixed effect of morning standard drinks was 0.60 (SE = 0.10) and was significantly different from zero, p < .001. For each additional standard drink in the morning, the expected change in evening standard drinks was 0.60. The Level 1 residual variance was 1.56 (SE = .08) and was significantly different from zero (95% CI = 1.41, 1.74). The intercept variance was 0.45 (SE = .15) and was significantly different from zero (95% CI = .23, .86). In other words, on Day 0, there was significant between-participant variability in the number of evening standard drinks. The slope-intercept covariance was non-significant (95% CI = -.005, .025) and indicated that at the participant level (Level 2) knowing the number of evening standard drinks a participant had on the first day of the study did not provide information about how their evening drink changed during the study. The slope variance of .0006 (*SE* = .0009) was also significant (95% CI = .000024, .01) and indicated that the rate of change in standard drinks over time varied from participant to participant. Because the random effects of morning discrimination could not be estimated to determine if variability in its slope existed, it was not possible to test the moderating effects of variables such as the UAIIAS Actualization subscale or the Alcohol Effects Questionnaire Careless Unconcern subscale.

Step 6: Adding Level 2 predictors. In this step gender, UAIIAS, and the careless unconcern scale were added as Level 2 predictors of evening standard drinks. The fixed effects of time, morning discrimination, and morning drinks and the random effects of time were similar to previous models and are provided in Table 25. The fixed effects of gender, UAIIAS, and the careless unconcern scale were all non-significant, indicating that these variables were unrelated to evening standard drinks on Day 0 (see Table 25 for estimates and standard errors).

Does daytime discrimination predict evening cigarette use? The fixed and random estimates, standard errors, and significance levels of the models below are summarized in Table 26. The AIC and -2 log likelihood values are also included for each model.

Step 1: Null model, random intercept. The intercept for this model was 0.45 (*SE* = 0.16), which represents the average number of cigarettes in the evening. This intercept estimate was significant, *p* = .005, indicating that the overall average number of cigarettes in the evening was significantly different from zero. The Level 1 residual variance was 0.57 (*SE* = .03) and was significantly different from zero (95% CI = 0.51, 0.63). The intercept variance of 1.43 (*SE* = 0.27) was also significantly different from zero (95% CI = 0.99, 2.06) and indicated that the number of cigarettes in the evening varied significantly from participant to participant (Level 2). The ICC for this model was .715; 71.5% of the total variability in evening standard drinks was situated at the Level 2, participant level.

Step 2: Fixed effect of time, random intercept. The intercept for this model was 0.57 (*SE* = 0.16) and was significantly different from zero, *p* = .001. It represents the average number of cigarettes in the evening on Day 0. The fixed estimate of time was -.013 (*SE* = .005), *p* = .004. This means that the number of evening cigarettes changed as a linear function of time, which potentially indicates an assessment reactivity effect. From one day to the next, the number of evening cigarettes decreased by -.013.

The residual variance estimates were both significant (Table 26) and the residual ICC for this model was 0.72; after accounting for time, 72% of the total variability in evening cigarettes was at the Level 2 participant level. This value is very similar to the prior ICC in Step 1 and suggests that knowing the day of the assessment did not account for additional variance at the participant level.

Step 3: Fixed effect of time and discrimination, random intercept. The intercept for this model was 0.58 (*SE* = 0.16) and it was significantly different from zero, *p* = .001.

This value represents the average number of cigarettes in the evening on Day 0 for participants who did not experience discrimination in the morning. The fixed estimate of time was -.014 (*SE* = .005) and was significant, $p = .003$, indicating a significant decrease of -.014 cigarettes by day. The fixed estimate of morning discrimination was -.14 (*SE* = .14) and was non-significant, $p = .297$. The number of evening cigarettes did not differ based on whether a participant experienced discrimination in the morning. The Level 1 variance was 0.56 (*SE* = .03) and was significantly different from zero (95% *CI* = 0.51, 0.62), suggesting that significant variability in evening cigarettes from one day to another remained after accounting for time and morning discrimination. The Level 2 variance was 1.43 (*SE* = 0.27) and was significantly different from zero (*95% CI* = 0.99, 2.07). The residual ICC for this model was 0.719, or 71.9% of the variability at the Level 2 participant level.

Step 4: All Level 1 covariates added as fixed effects, random intercept. In this step morning cigarettes, enculturation total, positive interactions, and negative interactions were added as Level 1 time-varying covariates. The intercept estimate in this model, 0.54 (*SE* = 0.13) was significant, $p < .001$, and represents the average number of cigarettes in the evening controlling for time, morning discrimination, morning cigarettes, past-day enculturation and most negative and positive interactions. The fixed effect of time was -.007 (*SE* = .004) and was non-significant, $p = .083$. Similarly, the fixed effects of morning discrimination, past-day cultural involvement, and past-day stressful and positive interactions were non-significant (see Table 26). At the day-level, these variables did not significantly predict evening cigarettes. The fixed effect of morning cigarettes was

0.45 (*SE* = 0.03) and was significantly different from zero, $p < .001$. For each additional cigarette in the morning, the expected change in evening cigarettes was 0.45.

The Level 1 variance was 0.45 (*SE* = .02) and was significantly different from zero (95% *CI* = 0.41, 0.50), suggesting that significant variability in evening cigarettes from one day to another remained after accounting for the fixed predictors. The Level 2 variance was 0.86 (*SE* = 0.17) and was significantly different from zero (*95% CI* = 0.59, 1.26). The residual ICC for this model was 0.656, or 65.6% of the variance at the Level 2 participant level.

Step 5: Adding random effects for each Level 1 time-varying covariate. In this step, each of the six Level 1 predictors (time, morning discrimination, morning cigarettes, past-day enculturation, past-day most stressful interaction, past-day most positive interaction) was each individually changed to have both a fixed and random effect. While testing each predictor with a random effect, the other Level 1 time-varying covariates were retained in the model as fixed predictors. The random effects were estimable for three of the six Level 1 predictors: morning cigarettes, enculturation total, and time. Because most stressful and positive interactions were non-significant at the fixed and random levels, they were removed as predictors. When morning cigarettes, enculturation total, and time were allowed to be random in a combined model, neither of the random effects fully converged. Because of this, time was set as random while all either effects were kept fixed.

The final model for this step is displayed in Table 26. The intercept estimate was 0.52 (*SE* = .14) and was significantly different from zero, $p < .001$. Time was not a significant predictor of evening cigarettes, $p = .34$, nor was morning discrimination, $p =$

.41. The fixed effect of morning cigarettes was 0.42 (*SE* = 0.03) and was significantly different from zero, $p < .001$. For each additional cigarette in the morning, the expected change in evening cigarettes was 0.42.

The Level 1 residual variance was 0.42 (*SE* = .02) and was significantly different from zero (95% CI = 0.38, 0.47). The intercept variance was 1.07 (*SE* = 0.22) and was significantly different from zero (95% CI = 0.71, 1.61). In other words, on Day 0, there was significantly between-participant variability in the number of evening cigarettes. The slope-intercept covariance was non-significant (95% CI = -.02, .0006) and indicated that at the participant level (Level 2) the starting number of evening cigarettes on Day 0 did not covary with the change in evening cigarettes over time. The slope variance of .0008 (*SE* = .0003) was also significant (95% CI = .00033, .0018) and indicated that the rate of change in evening cigarettes over time varied from participant to participant. Because the random effects of morning discrimination could not be estimated to determine if variability in its slope existed, it was not possible to test the moderating effect of the UAIIAS Actualization subscale.

Step 6: Adding Level 2 predictors. In this step gender and the UAIIAS were added as Level 2 predictors of evening cigarette use. The fixed effects of time, morning discrimination, and morning cigarettes and the random effects of time were similar to previous models and are provided in Table 26. The fixed effects of gender and UAIIAS were non-significant, indicating that these variables were unrelated to number of evening cigarettes on Day 0 (see Table 26 for estimates and standard errors).

Does daytime discrimination predict evening marijuana use? The fixed and random estimates, standard errors, and significance levels of the models below are summarized in Table 27. The AIC and -2 log likelihood values are also included for each model.

Step 1: Null model, random intercept. The intercept for this model was 0.13 (*SE* = 0.04), which represents the average level of marijuana use in the evening. This intercept estimate was significant, $p = .002$, indicating that the overall average level of marijuana use in the evening was significantly different from zero. The Level 1 residual variance was 0.10 (*SE* = .005) and was significantly different from zero (95% CI = 0.09, 0.11). The intercept variance of 0.10 (*SE* = 0.02) was also significantly different from zero (95% CI = 0.07, 0.14) and indicated that the level of marijuana use in the evening varied significantly from participant to participant (Level 2). The ICC for this model was .50; 50% of the total variability in evening marijuana use was situated at the Level 2, participant level.

Step 2: Fixed effect of time, random intercept. The intercept for this model was 0.17 (*SE* = 0.05) and was significantly different from zero, $p < .001$. It represents the average level of marijuana use in the evening on Day 0. The fixed estimate of time was -.004 (*SE* = .002), $p = .035$. This indicated that evening level of marijuana use decreased as a linear function of time, suggesting potential assessment reactivity.

The residual variance estimates were both significant (Table 27) and the residual ICC for this model was 0.50; after accounting for time, 50% of the total variability in evening marijuana use was at the Level 2 participant level. This value is very similar to the prior ICC in Step 1 and suggests that knowing the day of the assessment did not account for additional variance at the participant level.

Step 3: Fixed effect of time and discrimination, random intercept. The intercept for this model was 0.17 (*SE* = 0.05) and it was significantly different from zero, $p < .001$. This value represents the average level of marijuana use in the evening on Day 0 for participants who did not experience discrimination in the morning. The fixed estimate of time was -.004 (.002) and was significant, $p = .044$, indicating significant decrease in level of evening marijuana use over time. The fixed estimate of morning discrimination was .04 (*SE* = .06) and was non-significant, $p = .468$. The level of evening marijuana use did not differ based on whether a participant experienced discrimination in the morning.

The Level 1 variance was 0.10 (*SE* = .005) and was significantly different from zero (95% *CI* = .09, .11), suggesting that significant variability in evening marijuana use from one day to another remained after accounting for time and morning discrimination. The Level 2 variance was 0.10 (*SE* = 0.005) and was significantly different from zero (*95% CI* = 0.09, 0.11). The residual ICC for this model was 0.50, or 50% of the variability at the Level 2 participant level.

Step 4: All Level 1 covariates added as fixed effects, random intercept. In this step morning marijuana use, enculturation total, positive interactions, and negative interactions were added as Level 1 time-varying covariates. The intercept estimate in this model, 0.15 (*SE* = 0.03) was significant, $p < .001$, and represents the average level of marijuana use in the evening controlling for time, morning discrimination, morning marijuana use, past-day enculturation and most negative and positive interactions. The fixed effect of time was -.002 (*SE* = .002) and was non-significant, $p = .204$. Similarly, the fixed effects of morning discrimination, past-day cultural involvement, and past-day most positive and stressful interactions were non-significant (see Table 27). Experiencing more or less of these variables on a given day was not related to evening marijuana use. The fixed effect of morning marijuana use was 0.63 (*SE* = 0.04) and was significantly different from zero, $p < .001$. For each stepped increase in morning marijuana use, the expected change in level of evening marijuana use was 0.63.

The Level 1 variance was 0.08 (*SE* = .004) and was significantly different from zero (95% CI = .07, .08), suggesting that significant variability in evening marijuana use from one day to another remained after accounting for the fixed predictors. The Level 2 variance was 0.04 (*SE* = 0.009) and was significantly different from zero (95% CI = 0.03, 0.06). The residual ICC for this model was 0.333, or 33.3% of the variance at the Level 2 participant level.

Step 5: Adding random effects for each Level 1 time-varying covariate. In this step, each of the six Level 1 predictors (time, morning discrimination, morning marijuana use, past-day enculturation, past-day most stressful interaction, past-day most positive interaction) were each individually changed to have a random effect in addition to a fixed effect. Adding a random effect means that the slope, intercept, and relationship between the slope and intercept are allowed to vary across participants. While testing each predictor with a random effect, the other Level 1 time-varying covariates were retained in the model as fixed predictors. The random effects were estimable for only four of the six Level 1 predictors: morning marijuana use, enculturation, most positive interaction, and time. When these variables were allowed to be random in a combined model, none of the random effects fully converged. Because of this, time was allowed to be random while all either effects were fixed (Hox, 2002). Because daily enculturation, and most positive and negative interactions were non-significant in this combined model, they were removed as predictors.

The final model for this step is displayed in Table 27. The intercept estimate was 0.15 (*SE* = .03) and was significantly different from zero, $p < .001$. Time was not a significant predictor of evening marijuana use, $p = .24$, nor was morning discrimination, $p = .785$. The fixed effect of morning marijuana use was 0.62 (*SE* = 0.04) and was significantly different from zero, $p < .001$. For each additional stepped increase in morning marijuana use, the expected change in evening marijuana use was 0.62. The Level 1 residual variance was 0.08 (*SE* = .004) and was significantly different from zero (95% CI = 0.07, 0.08). The intercept variance was 0.05 (*SE* = .01) and was significantly different from zero (95% CI = .03, .09). In other words, on Day 0, there was significant between-participant variability in the level of evening marijuana use. The slope-intercept covariance was non-significant (95% CI = -.002, .0003) and indicated that at the participant level (Level 2) the starting level of evening marijuana use on Day 0 did not covary with change in marijuana use over time. The slope variance of .00003 (*SE* = .00005) was also significant (95% CI = .000001, .001) and indicated that the rate of change in marijuana use over time varied from participant to participant. Because the random effects of morning discrimination could not be estimated to determine if variability in its slope existed, it was not possible to test the moderating effects of variables such as the UAIIAS Actualization subscale.

Step 6: Adding Level 2 predictors. In this step gender and the UAIIAS were added as Level 2 predictors of evening marijuana use. The fixed effects of time, morning discrimination, and morning marijuana use and the random effects of time were similar to previous models and are provided in Table 27. The random slope of time, however, did not converge. The fixed effect of gender was -0.13 (*SE* = .04) and was significantly different from zero, $p = .006$, indicating higher levels of marijuana use among males. The fixed effect of the UAIIAS Actualization subscale total was -.01 (*SE* = .003) and also was significantly different from zero, $p = .002$. For each 1-point increase on the 51-point scale, the level of evening marijuana use decreased by .01.

Part Two: Summary and Discussion

The goal of this portion of the study was to examine the prospective influence of daytime experiences of racial discrimination on evening substance use, as well as the moderating effects of cultural identity, positive and negative interpersonal interactions, and alcohol expectancies. The first primary hypothesis concerning the relationship between daytime discrimination and evening substance use was not supported. The presence of daytime discrimination did not predict number of evening cigarettes, standard drinks, or marijuana use level. The second primary hypothesis testing moderators of the relationship between daytime discrimination and evening substance use could not be tested because of statistical convergence issues. However, Native American cultural identity did predict lower evening marijuana use. In addition, daytime substance use was the strongest predictor of evening substance use for alcohol, marijuana, and cigarettes.

Discrimination. The experiences of discrimination described in the daily diaries occurred most frequently in stores, public settings, and the educational system. Rude treatment and being ignored were the most common experiences participants reported, akin to microaggressions identified in focus groups with Asian Americans of being “second class citizens” (Sue, Bucceri, Lin, Nadal, & Torino, 2007). These types of experiences resemble social rejection, defined in the social psychology literature as when "others have little desire to include you in their groups and relationships" (p. 256; DeWall & Bushman, 2011). Social rejection has been associated with increased aggression, negative emotions, cortisol levels, sensitivity to threat, and decreased impulse control and cognitive performance (DeWall & Bushman, 2011). However, acceptance from just one stranger can reduce such aggression (DeWall & Bushman, 2011), and intranasal oxytocin counteracted increases in cortisol experienced by undergraduates in response to participation in a social rejection laboratory interaction (Linnen, Ellenbogen, Cardoso, & Joober, 2012). Given the documented negative effects of social rejection and discrimination, it is important to find ways to reduce their prevalence and potency.

The frequency of racial discrimination reported in this study was somewhat less than that found by Ong and colleagues (2013) in a two-week daily diary study of Asian American college students in the Northeastern United States. Discrimination occurred on 6% of days in this study but 18% of days in the Ong study. In this study, 56% of participants endorsed at least one instance of discrimination, while 78% of participants endorsed at least one type of microaggression in the Ong study. One explanation for this discrepancy could be the reporting format: Ong and colleagues had participants complete a daily 20-item microaggressions checklist, while in the present study participants first identified whether they had experienced any discrimination they attributed to being Native American and then were asked to describe what happened. Even when questions are identical, self-report checklists lead to somewhat higher rates of symptom endorsement than interview assessments (Palmieri, Weathers, Difede, & King, 2007).

Furthermore, the checklist used by Ong and colleagues (2013) covered a broader range of possible discriminatory experiences than the qualitative question in this study. It included items that may not have happened directly to study participants, such as overhearing conversations or seeing microaggressions on television. In addition, Ong and colleagues asked participants to endorse microaggressions without needing to make a race-related attribution (e.g., “a White person failed to apologize for stepping on my foot or bumping into me” p. 190). The participants in the current study may have experienced microaggressions of this nature without reporting them. Future daily diary studies of microaggressions and discrimination should compare response rates using alternate methods of assessment. However, because these two samples are different in terms of race and geographic and cultural context, the difference in prevalence of discrimination may reflect a true underlying difference.

Participants in this study responded differently to discrimination than African American and Latino participants in a study in the greater Boston area (Krieger et al., 2005). In that cross-sectional survey, 43% of participants said they did something about discrimination they experienced, whereas only 14% of this sample said the same. In the Krieger study, 68% said they talked to someone about discrimination they had experienced, whereas only 51% of participants in this study said they did the same. Community Advisory Board members for the present study interpreted the tendency not to do anything in response to discrimination as reflecting a justified fear of retribution (especially in relation to educational scholarships, etc.), a desire not to “make waves,” and a sense of being out of place in an educational and urban environment away from their home tribal communities. For Native American college students far from home, having physical spaces and resource centers to process these experiences may be especially important for their college retention and ongoing health. It should be noted that these numbers only represented the 56% of daily diary participants who endorsed experiencing discrimination during the course of the study.

Substance use. Those with a stronger cultural identity had lower overall levels of marijuana use during the course of the daily diary study, but cultural identity was unrelated to alcohol or cigarette use. Oetting and colleagues (1998) argue that mixed findings on cultural identity and substance use may be complicated by membership in multiple subgroups beyond and within a single culture, and that cultural identity and substance use norms may vary from one setting to another.

Consistent with other work, men were more likely to use marijuana than women (Merline, O'Malley, Schulenberg, Bachman, & Johnston, 2004). Chronic and heavy marijuana use during college has been associated with a decreased likelihood of continuous college enrollment and higher unemployment six years post-college initiation (Arria et al., 2013). Given low rates of college retention and graduation among Native American males in particular, this is especially concerning. Specific intervention and prevention programs for Native American males who use marijuana at a problematic level may help to reduce this trend.

Daily recording of cigarette and marijuana use was associated with a decrease in use over the 21-day recording period. However, this main effect of time was only present when the effect of time was fixed, meaning that the initial intercept (starting point) and slope of change in use over time was set to be the same for all participants. When the intercept and slope were allowed to vary between participants, this effect was no longer significant. In an experimental study of assessment reactivity among individuals with alcohol use disorder receiving treatment (Clifford, Maisto, & David, 2007), those who were assessed on a monthly basis drank less at 12 months than those who had only been assessed at baseline and six months. However, in a 2-week daily monitoring study with college students, there was only a small, non-significant decrease in alcohol use (Hufford, Shields, Shiffman, Paty, & Balabanis, 2002). These authors hypothesized that assessment reactivity effects may require longer recording periods such as one to two months.

Consistent with the finding that high school marijuana, alcohol, and tobacco use predicted later use at age 35 (Merline et al., 2004), in this study, prior substance use was the best predictor of current use. However, in this case the time frame was very short – from daytime to evening. This speaks to the power of habit and a need to identify factors that lead to these patterns and also intervene to decrease problematic substance use among those for whom it is an issue. This relationship may have been especially strong from daytime to evening (as opposed to evening to next day) because fewer participants used substances during the day. Those who did may represent a group of heavier users.

Discrimination and substance use. The lack of a relationship between morning discrimination and evening substance use contradicts previous work documenting a positive correlation between the two variables. One explanation could be that discrimination and substance use did not occur frequently enough to test the relationship between the two. Only 26% of participants (n = 16) reported any morning discrimination *and* any evening substance use throughout the study. The remaining 74% (n = 45) did not endorse the predictor (morning discrimination), the outcome variable (evening substance use), or the combination of the two that would have allowed for the examination of this hypothesis. This may have also contributed to the inability to test cultural identity and other moderators of the relationship between daytime discrimination and evening substance use. In order to test for Level 2 moderators, it is necessary to have significant variability at the Level 1 predictor (daytime discrimination) level (Hox, 2002). Because the random slope of daytime discrimination did not converge, interaction effects could not be tested.

Strengths. This was the first daily diary study with Native American participants and completion rates were good, an average of 81% of all diaries. Daily measurement of discrimination, substance, and cultural involvement was a major strength of this study and contributes to the existing literature on racism and health as well as experiences of Native American college students. Utilizing daily diary assessments minimizes recall biases and allows for prospective hypothesis testing. In addition, multi-leveling models allow for the assessment of both within- and between-person variability and are designed to handle missing data.

These findings provided a novel depiction of discrimination, substance use, and cultural involvement over the course of three weeks. At the debriefing, participants reported that they found daily reflection on their experiences to be beneficial. Finally, the qualitative descriptions of discrimination allowed for the inclusion of experiences that may not have been included on existing self-report measures.

Limitations. Study limitations included a small sample size, including only a qualitative measure of discrimination, and decreased generalizability because of the regional sample of strictly college students. These findings may not generalize to rural Native American samples or to individuals of other racial and ethnic backgrounds. In addition, participants were chosen for the daily diary based on their endorsement of substance use and discrimination. The substance use and discrimination eligibility criteria may have been too broad – the CAGE-AID asked about lifetime substance-related problems and the “past-month substance use” requirement may have been too low of a threshold to recruit enough current substance users. Anecdotally, many participants in the daily diary talked about previous concerns with substance use that they had successfully resolved. Although a positive outcome, this led to fewer participants reporting current substance use that could be predicted in the daily diary study.

Future directions. Future daily diary studies examining the relationship between discrimination and substance could benefit from including only current substance users, similar to cross-sectional studies that only have included past-year drinkers (e.g., Yen et al., 1999), as opposed to the inclusion of both users and non-users in this study. Including quantitative in addition to qualitative measures of discrimination and measuring experiences of social rejection and discrimination across intersecting aspects of identity could more precisely quantify how social rejection in the form of discrimination may contribute to substance use. Incorporating both self-report and physiological measures such as cortisol level will refine our understanding of this area of research. In addition, replicating this study in other parts of the country where Native Americans are a smaller presence will add to our understanding of daily experiences of discrimination and the role of local context. Future studies should also consider how different responses to discrimination (e.g., acceptance versus action) may have different relationships to health and well-being.

Overall Discussion

The overarching goal of this study was to examine the day-to-day experiences of Native American college students in terms of racial discrimination, substance use, and cultural involvement. This was accomplished using a two-part design. The first part was a one-time cross-sectional survey completed by 347 Native American students at a community college and 4-year public university in the Southwestern United States. The second part was a 21-day intensive longitudinal daily diary study that was completed by a subset of 61 students who endorsed more frequent experiences of racial discrimination and substance use. In both studies, microaggressions, substance use, and cultural factors were measured. The primary hypothesis – that more frequent and bothersome microaggressions would be related to more substance use – was partially supported in the first part of the study but not in the second. In the first part of the study, the number of past-year microaggressions was positively related to using illicit drugs more than 100 times in one's life and a lifetime CAGE-AID score indicative of problematic substance use. However, number of past-year microaggressions and the degree to which participants were bothered by microaggressions were independently unrelated to past-month alcohol or drug use. In the second part of the study, the presence of morning discrimination did not predict increased evening standard drinks, cigarettes, or marijuana use. These findings suggest a need for greater theoretical clarity of the relationship between discrimination and substance use, as well as more precise measurement predictions and strategies.

The second major hypothesis was a test of the Indigenist Stress-Coping model (Walter et al., 2002), which predicts that the relationship between stressors (e.g., discrimination) and health risk behaviors (e.g., substance use) are attenuated in the presence of cultural buffers (e.g., strong cultural identity). This was not substantiated in the cross-sectional survey. The second study did not allow a test of this model because only 26% of participants reported daytime discrimination and evening substance use during the course of the study. In the multi-level models, the slope estimate of daytime discrimination would not converge, meaning that it was not possible to test the moderating role of cultural factors.

One interpretation of these findings is that the detrimental effect of discrimination remains constant across the spectrum of cultural identity. This represents a potential reconceptualization of the Indigenist Stress-Coping Model. Of note, participants who were more enculturated were bothered more by microaggressions, yet cultural identity was protective against past–month alcohol use and daily marijuana use, similar to findings in an upper Midwest sample (Stone et al., 2006; Whitbeck et al., 2004). Knowing one's tribal language and having a strong cultural identity encompassed some of these protective factors. Currie and colleagues (2011) likewise found that Aboriginal enculturation was associated with fewer alcohol problems among Aboriginal students in Canada, while Canadian acculturation was unrelated to alcohol problems. Enculturation was seen as a way to manage stress and connect with others. As one student in their study explained, "there is a smudging room on campus, so I smudge 3 times a week when I need to relax and get in touch with myself—when things get too hectic" (p. 739; Currie et al., 2011). Cultural identity appears to be protective against alcohol use, regardless of experiences of discrimination.

Several secondary findings emerged from this study and warrant further examination. First, the study provided strong evidence about the presence of and reaction to microaggressions. In the cross-sectional survey, 94% of students had experienced at least one microaggression in the past year. Experiencing more racial microaggressions has been associated with lower self-esteem in college students (Nadal, Wong, Griffin, Davidoff, & Sriken, 2014) as well as poorer physical health and more substance use among general population samples (Williams et al., 2008). In the daily diary study, race-based discrimination occurred on six percent of all diary days. However, this may be an underestimate of actual experiences of discrimination or discrimination may be more subtle than in decades past (Neville et al., 2013). For example, participants may have been unaware of or not recorded institutional-level discrimination, and participants may have experienced discrimination in relation to other aspects of their identity that were not a focus of this study. The Everyday Discrimination Scale-revised (Stucky et al., 2011), which was included in data collection but not a part of proposed analyses, does assess multiple aspects of identity that could lead to discrimination, and this can be examined further at a later date.

Almost 90% of the students in this study received As or Bs in their classes, yet common stereotypes hold that Native American students are not intelligent. These stereotypes surfaced in 6% of the qualitative entries in the daily diary study. Teacher expectancies regarding student performance, combined with students' internalized stereotypes about intellectual capacity, can have detrimental effects. Although the Rosenthal effect and other studies of self-fulfilling prophecies have generally found small effects for the influence of expectancies on performance, some studies suggest larger effect sizes for low socio-economic status and certain racial/ethnic minority groups (Jussim & Harber, 2005). Riley and Ungerleider (2012) found that teachers reviewing grades of 8th grade students in Canada were more likely to hold low expectations about Aboriginal students' academic capacity than for English as a second language (ESL) or non-Aboriginal, non-ESL students. Teachers made comments such as "they are doing very well for an Aboriginal student," which can be construed as a microaggression.

Reservation-based tribal members may assume that living in the city is equated with the loss of cultural identity and participation, but in both the cross-sectional survey and daily diary, high rates of cultural participation and identity were found. In the debriefing session, daily diary participants identified this as a finding they would like to share with tribal members on the reservation to let them know that they work hard to maintain their cultural ties. This is an example of the dual pressures Native American college students face while pursuing their educational goals. While loss of culture may happen to some degree while at school in the city, the participants in this study were still culturally involved and considered it an important part of their lives.

At the same time, some aspects of cultural involvement (knowing your tribe's language, affiliating with tribal religion and saying that it is important) were related to experiencing more past-year microaggressions. It is possible that more overtly identifying as Native American, "appearing" to be Native American, and participating in traditional activities may activate stereotype schemas in others and lead to higher rates of microaggressions. This was found to be the case in the daily diary study. Several microaggressions occurred because the participants "looked" more Native American when they wore turquoise earrings, traditional dress, or had long hair. This presents a double bind for Native American students – their identity is constantly questioned. When they "appear" more Native American, they activate stereotypes such as "you're lucky to be Indian” or “I am Indian too.” Yet when they do not wear what others see as traditional garb, they become invisible, are mistaken for other racial groups, and their “Nativeness” is called into question.

Strengths and Limitations

Specific methodological strengths and limitations of the cross-sectional survey and daily diary have been detailed in those sections of the paper above. As a whole, a major strength of this study was its’ empirical examination of an indigenous-developed model of the relationship between stressors, negative health outcomes, and the potential moderating role of cultural buffers among indigenous populations (the Indigenist Stress-Coping Model; Walters et al., 2002). The study included both cross-sectional and prospective methodologies to test hypotheses. Another major strength was the consideration of factors beyond the individual, such as discrimination, that may contribute to substance use, lending a broader public health view to this issue in a potentially less stigmatizing manner than exclusively focusing on individual deficits.

An additional strength of this study was its utilization of community-based participatory research, including an ongoing commitment to the community to which the participants belonged, a two-way exchange of knowledge and benefit, and sharing findings with community members (Wallerstein & Duran, 2006). While not an originally proposed part of the research, the early addition of a community-based participatory research model had profound effects on the research process. A community advisory board of Native American students, faculty, and staff met monthly over dinner at the principal investigator’s house during the active preparation and data collection phases of the study, and quarterly thereafter. Positive outcomes of this collaboration included the refinement and addition of questions to the surveys (e.g., tobacco use for ceremonial purposes), new connections with Native American campus organizations, assistance in recruiting participants, novel ideas for sharing the study findings (e.g., plenary at local conference including poetry, film, and traditional dance to portray the results), alternate interpretations of findings (e.g., response to discrimination as fear of retribution versus cultural interaction style), and opportunities for sharing the findings in multiple venues (e.g., presentation to senior administration at the community college to advocate for a Native American resource center based on study results highlighting a need for such a center). It also contributed to rapid recruitment of participants and their ongoing engagement in the daily diary study. A review of community-based participatory research studies found that such studies had more success at recruiting and retaining ethnic minority participants than did usual research paradigms (De Las Nueces, Hackler, DiGirolamo, & Hicks, 2012). Through the use of a community-based participatory research model, the richness and depth of the study and its relevance to the community was greatly increased.

One limitation of this study was that it specifically examined interpersonally mediated discrimination – what had occurred to the participants themselves. This may obscure the interconnected nature of existence and the influence of context on experience. For example, during the course of the study, several national discourses took place around race (e.g., a movement to change the name of a Washington DC football team, local violence toward Native American individuals). The study did not capture the effects on participants of seeing others close to them experience discrimination or hearing about or seeing instances of discrimination in the news. Future studies should consider a more multi-faceted assessment of discrimination that takes into account public events, those that occur to others in one's surroundings or social networks, as well as types of discrimination beyond microaggressions (e.g., loss of job). Finally, the study was conducted in the Southwest with a sample of students that tended to be more enculturated and represented a broader range of ages than usual college samples. Upper-level students were overrepresented. These findings may not generalize to Native Americans in other parts of the country, those who are not in school, and those who are less enculturated. Future research should be conducted with these groups. These findings also may not generalize to college students of other races and ethnicities.

Future Directions

Making alcohol prevention and treatment available for Native American college students while showcasing high rates of overall abstinence and dispelling stereotypes about Native American alcohol use is an important area for future work. Native American students who binge drink could benefit from intervention efforts. A large randomized controlled trial of Māori university students (Kypri et al., 2013) found that an online screening and brief intervention reduced alcohol use and intensity and academic problems at a five month follow-up compared to screening only among students drinking alcohol at hazardous levels.

Future work should further explore the relationship between stronger Native American cultural identity and decreased alcohol use found in this study and by others (Greenfield et al., 2015; Whitbeck et al., 2004). Longitudinal research could track shifts in cultural identity over time and its relation to substance use. Qualitative research would provide insight into how culture is related to abstinence and can be used as a coping mechanism (Gone & Looking, 2011).

This study focused specifically on the relationship between substance use and discrimination and did not consider potential mediators of this relationship. The literature on discrimination and substance use has identified variables such as anger, frustration, and depression as mediators of the relationship between discrimination and substance use (Gibbons et al., 2010; Whitbeck et al., 2001). A next logical step would be to test these mediators in a Native American sample, and additional data collected for this project will allow for such tests. When considering the interrelationships between discrimination, substance use, psychological distress, and culture, a moderated mediation model could add to the Indigenist Stress-Coping Model. The relationship between discrimination and substance use may be *mediated* by psychological distress, and the relationship between these three variables *moderated* by cultural variables (e.g., enculturation, identity).

Williams and colleagues (2008) have called for the inclusion of discrimination-related variables beyond interpersonally mediated discrimination that could affect health, such as air pollution and food access. These latter variables can be influenced by institutional discrimination, yet the effects of institutional discrimination are not always visible or clear at the individual level. In addition, research focusing on the intersectionality of various identities can help disentangle variability in the effects of interpersonally mediated discrimination. For example, potential retail assistant manager applicants were recommended for salaries that were $6,000 higher if they were gay black men as compared to heterosexual black men (Pedulla, 2014).

Finally, finding ways to address and reduce societal level discrimination is an important direction to improving community health. This will likely require creative, multi-level interventions that target both individual-level stereotypes about Native Americans and undertake community-level media campaigns and interventions. Community level factors, such as more green space, greater access to healthy food, more access to employment, and better housing have been associated with less substance use (Galea, Rudenstine, & Vlahov, 2005) and could also buffer the negative effects of discrimination. More accurate portrayals of Native American rates of abstinence and substance use from studies such as this can contribute to those efforts. At the individual level, therapeutic interventions such as mindfulness could counteract the negative effects of discrimination by decreasing cortisol levels (Jacobs et al., 2013). In addition, interventions to help individuals find new ways to respond to discrimination, evaluate whether discriminatory situations are worth the effort of responding to, and find allies are also needed.

Conclusions

This first large scale study of alcohol and drug use among Native American college students was also the first to implement daily assessment of microaggressions, cultural involvement, and substance use. Native Americans are underrepresented in the educational system (Larimore & McClellan, 2005) and factors such as ongoing microaggressions may contribute to higher rates of dropout. Importantly, these participants reported much lower rates of alcohol and tobacco use than did previous Native American college studies and national college surveys. This study also provided partial support for the positive association between discrimination and substance use.

While Native American cultural identity did not moderate the relationship between discrimination and substance use, it was negatively associated with substance use. Overall, this study provided a picture of Native American strength and resilience grounded in culture, despite ongoing stress due to microaggressions.

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Figure 1

Flow of Participants for Part One, Cross-Sectional Survey

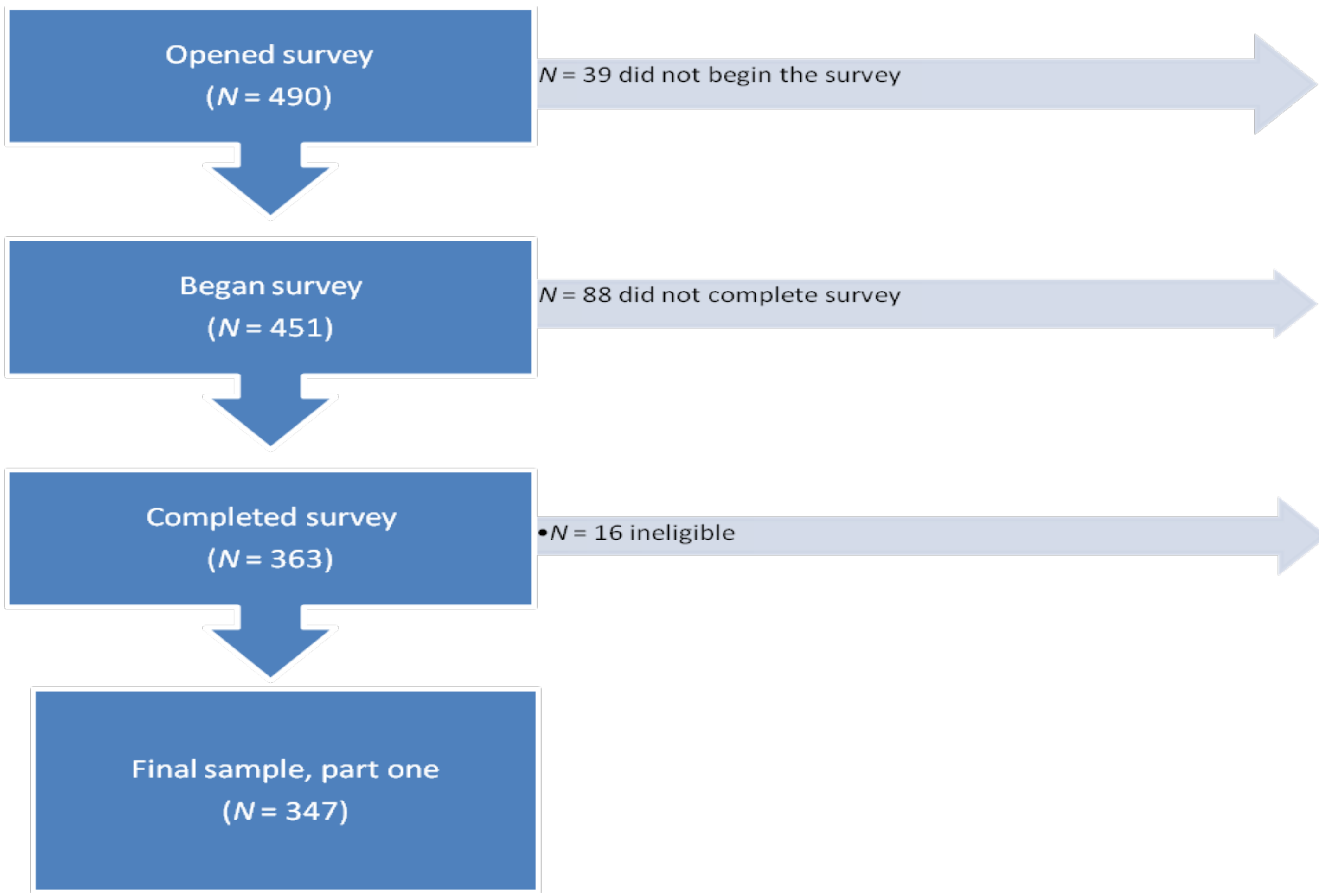

Figure 2

Percent of Participants Endorsing Each of 10 Items on the Microaggressions Scale

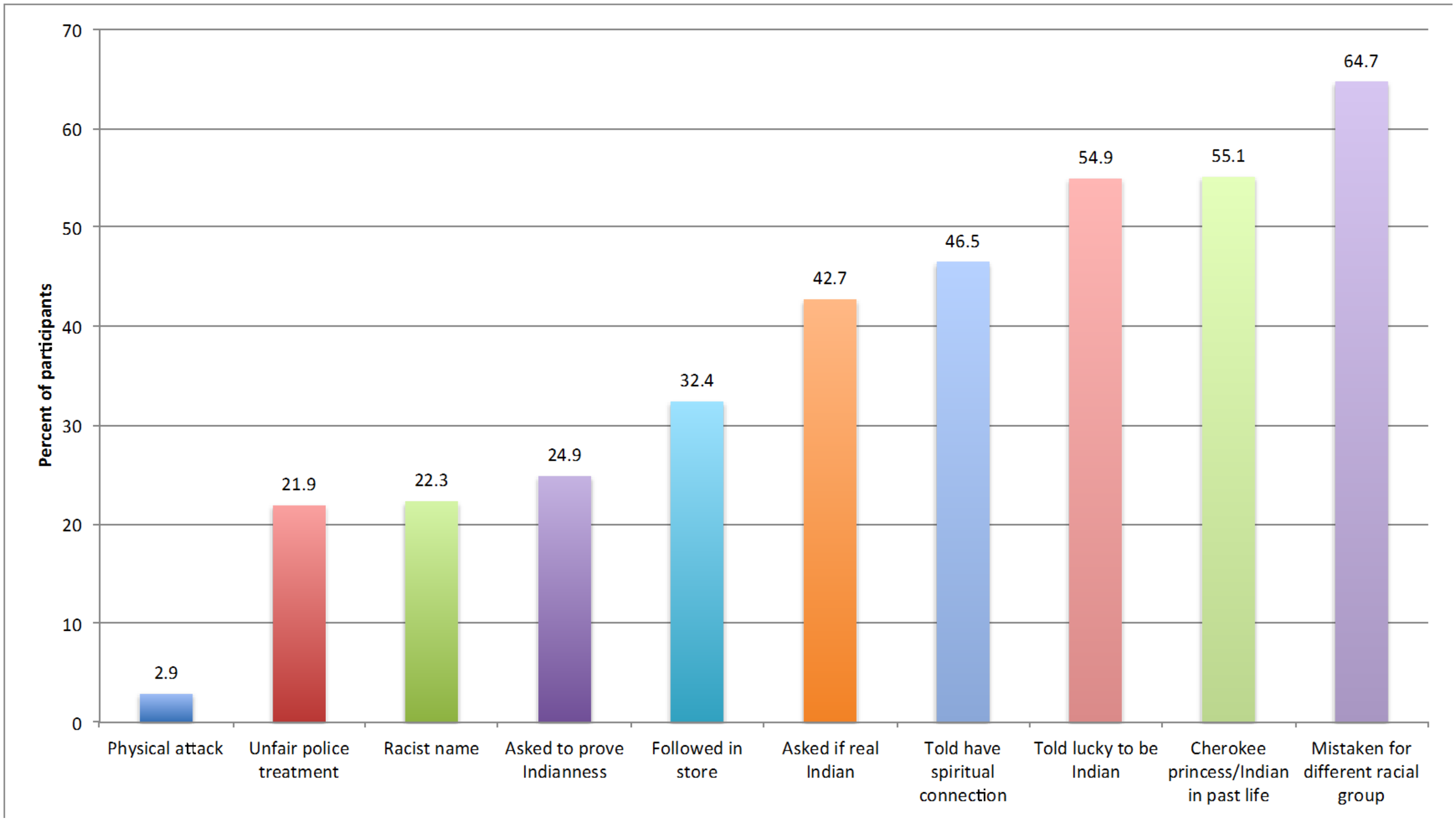

Table 1

Study Participant Descriptive Characteristics (N = 347), Split by School

	All Participants N = 347	Community College N = 237	Four-Year University N = 110
	Mean (SD)	*Mean (SD)*	*Mean (SD)*
Age (years)	28.45 (9.97)	30.03 (10.40)	25.03 (8.01)
Years working on current degree	2.39 (2.17)	2.15 (2.32)	2.90 (1.71)
Gender	*n* (%)	*n* (%)	*n* (%)
Female	227 (65.4%)	160 (67.5%)	67 (61.5%)
Male	119 (34.3%)	77 (32.5%)	42 (38.5%)
Member of Southwest Tribe			
Yes	313 (90.2%)	217 (91.6%)	96 (87.3%)
No	34 (9.8%)	20 (8.4%)	14 (12.7%)
School Status***			

Part-time	98 (28.3%)	87 (36.7%)	11 (10.1%)
Full-time	248 (71.7%)	150 (63.3%)	98 (89.9%)
First-generation student***			
Yes	245 (72.7%)	175 (76.4%)	70 (64.8%)
No	92 (27.3%)	54 (23.6%)	38 (35.2%)
Sexual Orientation*			
Lesbian, gay, bisexual	38 (11.1%)	20 (8.6%)	18 (16.4%)
Heterosexual	304 (88.9%)	212 (91.4%)	92 (83.6%)
Racial/ethnic Background***			
Only Native American	297 (85.6%)	214 (90.3%)	83 (75.5%)
Native American & Other	50 (14.4%)	23 (9.7%)	27 (24.5%)
Children***			
Yes	140 (40.3%)	117 (49.4%)	23 (20.9%)
No	207 (59.7%)	120 (50.6%)	87 (79.1%)
Usual Grades			

As or Bs	305 (87.9%)	206 (86.9%)	99 (90.0%)
Cs	39 (11.2%)	28 (11.8%)	11 (10.0%)
Ds or Fs	3 (0.9%)	3 (1.3%)	0 (0.0%)
Annual Household Income*			
< $5,000	90 (26.2%)	69 (29.2%)	21 (19.4%)
$5,000-$9,999	57 (16.6%)	40 (16.9%)	17 (15.7%)
$10,000-$29,999	104 (30.2%)	75 (31.8%)	29 (26.9%)
$30,000-$49,999	44 (12.8%)	28 (11.9%)	16 (14.8%)
$50,000+	49 (14.2%)	24 (10.2%)	25 (23.1%)
Employment Status**			
Not working, looking for a job	123 (35.5%)	98 (41.4%)	25 (22.9%)
Not working, not looking	81 (23.4%)	49 (20.7%)	32 (29.4%)
Working full-time	59 (17.1%)	42 (18.1%)	16 (14.7%)
Working part-time	83 (24.0%)	47 (19.8%)	36 (33.0%)
Health*			

Good, very good, or excellent	312 (89.9%)	207 (87.3%)	105 (95.5%)
Fair or poor	35 (10.1%)	30 (12.7%)	5 (4.5%)

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

Table 2

Average and Distribution of Bothered Ratings on the Microaggressions Scale

	Average		Distribution of Responses, % (*N*)				
Microaggressions Scale Item	*N*	*M* (*SD*)	Not at all	A little	Some	A lot	Extremely
Unfair treatment by the police	73	2.88 (1.08)	2.7 (2)	8.2 (6)	23.3 (17)	30.1 (22)	35.6 (26)
Hit, kicked, or physically attacked	10	2.80 (1.69)	20.0 (2)	0 (0)	20.0 (2)	0 (0)	60.0 (6)
Trailed or followed in a store	109	2.67 (1.31)	6.4 (7)	16.5 (18)	19.3 (21)	19.3 (21)	38.5 (42)
Called a racist name	77	2.18 (1.39)	14.3 (11)	19.5 (15)	26.0 (20)	14.3 (11)	26.0 (20)
Asked to prove Indianness/authenticity	86	2.06 (1.49)	22.1 (19)	14.0 (12)	26.7 (23)	10.5 (9)	26.7 (23)
Asked if you are a "real Indian"	148	1.97 (1.50)	24.3 (36)	16.9 (25)	19.6 (29)	16.2 (24)	23.0 (34)
Indian in past life/Cherokee princess grandmother	189	1.93 (1.56)	28.6 (54)	14.3 (27)	17.5 (33)	14.8 (28)	24.9 (47)
Told spiritual connection to Indians	161	1.39 (1.48)	44.1 (71)	12.4 (20)	17.4 (28)	12.4 (20)	13.7 (22)
Told "lucky" to be Indian	190	1.36 (1.53)	47.9 (91)	9.5 (18)	17.9 (34)	8.4 (16)	16.3 (31)
Mistaken as non-Native racial group	224	1.27 (1.35)	42.0 (94)	18.8 (42)	18.8 (42)	11.6 (26)	8.9 (20)

Table 3

Past 30 Days Alcohol Use for All Participants (N = 347) and Past-Month Drinkers (n = 150)

	Drinking Days				Binge Drinking Days				Drinks per Drinking Day			
	M	*SD*	Median	Range	*M*	*SD*	Median	Range	*M*	*SD*	Median	Range
All participants	1.93	3.66	0	0-30	0.84	2.41	0	0-30	1.86	3.26	0	0-30
Past-month drinkers	4.47	4.43	3	1-30	1.96	3.37	1	0-30	4.31	3.76	3	1-30

Table 4

Frequency of Past-Month and Lifetime Drug Use, N (%)

		Frequency of lifetime drug use			
	Past-month use	Never	1-10 times	11-99 times	100+ times
Marijuana	46 (13.6%)	104 (30.3%)	132 (38.5%)	51 (14.9%)	56 (16.3%)
Sedatives/sleeping pills	16 (4.7%)	261 (76.1%)	55 (16.0%)	18 (5.2%)	9 (2.6%)
Rx opioids, non-medical reasons	15 (4.4%)	265 (77.7%)	45 (13.2%)	18 (5.3%)	13 (3.8%)
Cocaine	6 (1.8%)	250 (73.1%)	54 (15.8%)	22 (6.4%)	16 (4.7%)
Rx stimulants, non-medical reasons	6 (1.8%)	312 (91.2%)	21 (6.1%)	8 (2.3%)	1 (0.3%)
Hallucinogens	5 (1.5%)	261 (76.8%)	58 (17.1%)	13 (3.8%)	8 (2.4%)
Heroin/opium	5 (1.5%)	314 (92.1%)	19 (5.6%)	6 (1.8%)	2 (0.6%)
Methamphetamines	3 (0.9%)	292 (85.4%)	25 (7.3%)	15 (4.4%)	10 (2.9%)
Inhalants	0 (0.0%)	303 (88.9%)	30 (8.8%)	6 (1.8%)	2 (0.6%)

Note. Rx = Prescription.

Table 5

Demographic Variables and their Associations with the Microaggressions Scale

	MAS Total	MAS Bothered
Gender (0 = male; 1 = female)	-.024	0.079
Age	-.128*	-.037
Health (0 = fair/poor; 1 = excellent/very good/good)	-.124*	-.059
Sexual orientation (0 = heterosexual; 1 = lesbian, gay, bisexual)	.053	.046
School (0 = community college)	-.023	.035
Usual grades (1-4; 4 = Mostly As)	.043	.012
Children (0 = no)	-.075	-.077
Income (0-4; 4 = $50,000+)	-.137*	-.057

Note. MAS Total = Microaggressions Scale Total; MAS Bothered = Microaggressions Scale Bothered.

*$p < .05$

Table 6

Demographic Variables and their Associations with Substance Use Variables

	DD	BDD	DPDD	Past-month drug use	Lifetime drug use >100x	CAGE-AID > 1
Gender (0 = male; 1 = female)	-.095	-.078	-.049	-.08	-.140*	-.215***
Age	.01	-.012	-.086	-.076	.184**	.22***
Health (0 = fair/poor; 1 = excellent/very good/good)	.009	.002	-.088	-.10	-.123*	-.155**
Sexual orientation (0 = hetero; 1 = lesbian, gay, bisexual)	-.007	-.028	.010	.057	.113*	.090
School (0 = community college)	-.014	-.041	.000	-.004	-.134*	-.150**
Usual grades (1-4; 4 = Mostly As)	-.098	-.144**	-.149**	-.065	.012	-.031
Children (0 = no)	-.001	-.015	-.046	-.046	.058	.086
Income (0-4; 4 = $50,000+)	.043	-.011	-.059	-.096	-.144**	-.119*

Note. DD = past-month drinking days; BDD = past-month binge drinking days; DPDD = past-month drinks per drinking day.
*$p < .05$, **$p < .01$, ***$p < .001$

Table 7

Demographic Variables and their Associations with Cultural Variables

	% NA	SW Tribe	Months Tribe	Language	Rugs	UAIIAS	Trad Spir	Imp Spir
Gender	-.005	.026	.038	.003	.239***	.078	.126*	.062
Age	.061	-.150**	-.047	.007	-.041	.082	-.075	.053
Health	-.074	-.014	-.067	-.094	.056	.118*	-.049	-.003
Sexual orientation	-.020	-.011	-.047	.005	-.022	.053	.029	-.017
School	-.202***	-.067	-.104	-.098	.048	-.133*	-.065	-.146**
Usual grades	-.122*	-.135*	-.141**	-.085	-.079	.082	-.089	-.093
Children	.131*	-.006	.029	.019	.017	.177**	.073	.096
Income	.013	-.132*	-.065	-.111*	-.063	-.063	-.079	-.170**

Note. % NA = percent Native American; SW Tribe = member of Southwest tribe; Months Tribe = months/year spent on home reservation or tribal lands; Rugs = know how to make traditional rugs, baskets, belts, or clothes; UAIIAS = Urban American Indian Identity Attitudes Scale, Actualization subscale; Trad Spir = endorse practicing traditional/tribal spirituality/religion; Imp Spir = importance of traditional spiritual values to way life is led. Demographics variables in this table are coded like Table 6.
*p < .05, **p < .01, ***p < .001

Table 8

Substance Use Variables and their Associations with the Microaggressions Scale

	MAS Total	MAS Bothered
Past-month drinking days	-.084	-.115*
Past-month binge drinking days	.014	-.039
Past-month drinks per drinking day	-.022	-.072
Past-month drug use	.104	-.005
Lifetime drug use > 100x	.134*	.098
CAGE-AID score > 1	.151**	.078

Note. MAS Total = Microaggressions Scale Total; MAS Bothered = Microaggressions Scale Bothered
**p* < .05, ***p* < .01

Table 9

Cultural Variables and their Associations with the Microaggressions Scale

	MAS Total	MAS Bothered
Percent Native American	-.007	.072
From Southwest Tribe	.064	-.046
Months per year on home reservation/tribal lands	.052	.173**
Speak tribe's language	.033	.042
Know how to make traditional rugs, baskets, belts, or clothes	.089	.077
UAIIAS	.063	.151**
Practice traditional/tribal spirituality or religion	.133*	.107*
Importance of traditional spiritual values	.125*	.092

Note. UAIIAS = Urban American Indian Identity Attitudes Scale, Actualization subscale; MAS Total = Microaggressions Scale Total; MAS Bothered = Microaggressions Scale Bothered.
$^*p < .05$, $^{**}p < .01$

Table 10

Cultural Variables and their Associations with Substance Use Variables

	% NA	SW Tribe	Months Tribe	Language	Rugs	UAIIAS	Trad Spir	Imp Spir
Past-month drinking days	-.029	-.025	.030	-.010	-.101	-.123*	-.047	-.121*
Past-month binge drinking days	-.014	.019	.098	.013	-.070	-.141**	-.031	.025
Past-month drinks per drinking day	-.009	-.073	.023	-.052	.026	-.110*	-.088	-.082
Past-month drug use	-.198***	-.271***	-.005	-.110*	-.048	-.103	-.051	-.056
Lifetime drug use > 100x	-.110	-.201***	-.048	-.127*	-.069	-.027	-.076	-.006
CAGE-AID score > 1	.039	-.084	.027	.017	-.107*	.017	-.038	.036

Note. % NA = percent Native American; SW Tribe = member of Southwest tribe; Months Tribe = months/year spent on home reservation or tribal lands; Rugs = know how to make traditional rugs, baskets, belts, or clothes; UAIIAS = Urban American Indian Identity Attitudes Scale, Actualization subscale; Trad Spir = endorse practicing traditional/tribal spirituality/religion; Imp Spir = importance of traditional spiritual values to way life is led.
*$p < .05$, **$p < .01$, ***$p < .001$

Table 11

Linear Regression Models Predicting Past-Month Alcohol Use from Microaggressions Scale Total and Cultural Identity

	Dependent Variable		
	Drinking days*	Binge drinking days	Drinks per drinking day
Intercept	2.02 (.26)***	.86 (.15)***	2.05 (.27)***
MAS Total	-.12 (.07)	-.01 (.04)	-.02 (.07)
UAIIAS	-.05 (.02)*	-.03 (.01)**	-.04 (.02)*
MAS Total x UAIIAS	-.01 (.01)	-.003 (.005)	-.01 (.01)
Age	-.004 (.02)	-.004 (.01)	-.02 (.02)
Gender (male = 0)	-.28 (.32)	-.18 (.19)	-.37 (.33)
Income	.10 (.12)	-.03 (.07)	-.09 (.12)

Note. MAS Total = Microaggressions Scale Total; UAIIAS = Urban American Indian Identity Attitudes Scale, Actualization subscale.
*p < .05. **p < .01. ***p < .001.

Table 12

Linear Regression Models Predicting Past-Month Alcohol Use from Microaggressions Scale Bothered and Cultural Identity

	Dependent Variable		
	Drinking days	Binge drinking days	Drinks per drinking day
Intercept	2.00 (.26)***	.86 (.15)***	2.05 (.27)***
MAS Bothered	-.21 (.13)	-.04 (.08)	-.09 (.13)
UAIIAS	-.04 (.02)*	-.03 (.01)**	-.04 (.02)*
MAS Bothered x UAIIAS	.01 (.02)	.001 (.01)	-.02 (.02)
Age	-.001 (.02)	-.004 (.01)	-.02 (.02)
Gender (male = 0)	-.27 (.32)	-.18 (.19)	-.33 (.33)
Income	.11 (.12)	-.03 (.07)	-.09 (.12)

Note. MAS Bothered = Microaggressions Scale Bothered; UAIIAS = Urban American Indian Identity Attitudes Scale, Actualization subscale. None of these overall models were significant.
*p < .05. **p < .01. ***p < .001.

Table 13

Nagelkerke Indices and -2 Log Likelihood Values for Logistic Regression Models, Microaggressions Total

	Past-month drug use		Drug use > 100 times		Positive CAGE-AID	
	-2 log likelihood	Nagelkerke Index	-2 log likelihood	Nagelkerke Index	-2 log likelihood	Nagelkerke Index
1. Intercept only	341.20		350.25		446.56	
2. Intercept, predictors, covariates	328.42*	.059	314.99***	.155	399.69***	.177
3. Intercept, predictors, covariates, interaction	327.84	.061	314.41	.158	399.40	.178

Note. Asterisks refer to chi-squared tests of the difference in -2 log likelihood from one model to the next.

*p < .05, **p < .01, ***p < .001

Table 14

Binary Logistic Regression Predicting Past-Month Drug Use from Microaggressions Total, Cultural Identity, and Covariates

	Odds Ratio (95% Confidence Interval)
Intercept	0.29
Microaggressions Total	1.10 (0.98, 1.24)
UAIIAS	0.97 (0.94, 1.00)
Gender (male=0)	0.69 (0.40, 1.20)
Age	0.99 (0.96, 1.02)
Income	0.85 (0.69, 1.05)

Note. UAIIAS = Urban American Indian Identity Attitudes Scale, Actualization subscale; none of the confidence intervals above were statistically significant.

Table 15

Nagelkerke Indices and -2 Log Likelihood Values for Logistic Regression Models, Microaggressions Bothered

	Past-month drug use		Drug use > 100 times		Positive CAGE-AID	
	-2 log likelihood	Nagelkerke Index	-2 log likelihood	Nagelkerke Index	-2 log likelihood	Nagelkerke Index
1. Intercept only	340.74		349.737		445.60	
2. Intercept, predictors, covariates	330.74	.046	316.59***	.147	403.90***	.159
3. Intercept, predictors, covariates, interaction	330.40	.048	315.48	.151	403.71	.160

Note. Asterisks refer to chi-squared tests of the difference in -2 log likelihood from one model to the next.
*$p < .05$, **$p < .01$, ***$p < .001$

Table 16

Binary Logistic Regression Predicting Drug Use > 100 times from Microaggressions Total, Cultural Identity, and Covariates

	Odds Ratio (95% Confidence Interval)
Intercept	0.36
Microaggressions Total	**1.17 (1.03, 1.31)**
UAIIAS	0.98 (0.95, 1.01)
Gender (male=0)	**0.49 (0.28, 0.86)**
Age	**1.06 (1.03, 1.09)**
Income	**0.72 (0.58, 0.90)**

Note. UAIIAS = Urban American Indian Identity Attitudes Scale, Actualization subscale; bolded confidence intervals do not include 1.

Table 17

Binary Logistic Regression Predicting Drug Use > 100 times from Microaggressions Bothered, Cultural Identity, and Covariates

	Odds Ratio (95% Confidence Interval)
Intercept	0.37
Microaggressions Bothered	**1.28 (1.01, 1.61)**
UAIIAS	0.98 (0.95, 1.01)
Gender (male=0)	**0.47 (0.27, 0.83)**
Age	**1.06 (1.03, 1.08)**
Income	**0.71 (0.57, 0.88)**

Note. UAIIAS = Urban American Indian Identity Attitudes Scale, Actualization subscale; bolded confidence intervals do not include 1.

Table 18

Binary Logistic Regression Predicting Positive CAGE-AID from Microaggressions Total, Cultural Identity, and Covariates

	Odds Ratio (95% Confidence Interval)
Intercept	1.04
Microaggressions Total	**1.16 (1.05, 1.30)**
UAIIAS	1.00 (0.97, 1.03)
Gender (male=0)	**0.37 (0.23, 0.61)**
Age	**1.06 (1.03, 1.09)**
Income	**0.79 (0.66, 0.95)**

Note. UAIIAS = Urban American Indian Identity Attitudes Scale, Actualization subscale; bolded confidence intervals do not include 1.

Table 19

Binary Logistic Regression Predicting Positive CAGE-AID from Microaggressions Bothered, Cultural Identity, and Covariates

	Odds Ratio (95% Confidence Interval)
Intercept	1.07
Microaggressions Bothered	1.19 (0.98, 1.46)
UAIIAS	1.00 (0.97, 1.03)
Gender (male=0)	**0.36 (0.22, 0.59)**
Age	**1.06 (1.03, 1.08)**
Income	**0.78 (0.65, 0.94)**

Note. UAIIAS = Urban American Indian Identity Attitudes Scale, Actualization subscale; bolded confidence intervals do not include 1.

Table 20

Frequency of Different Types of Racial Discrimination in the Daily Diary Study (N = 63)

Type	Frequency *n* (%)	Representative Example
Rudeness	17 (27.0%)	"I was working this morning around 10:30 am. This has happen [sic] numerous times, I'm pretty much use [sic] to it. I had asked a pair of elderly ladies if they were finding everything in this store OK. One lady replied "no, we cannot find anything", so I had then asked: "How might I be able to assist you in finding what your [sic] looking for?" While looking at me the other lady replied "NO! we'll be fine" and walked right by me, to my Caucasian Manager to ask for her assistance."
Invisibility	10 (15.9%)	"Went to buy a tablet for my son and the employee would not help us. He just kept talking to another customer in their language. We had to find someone else to help us."
Question identity	7 (11.1%)	"There was an offensive episode of South Park that was directly making fun of Natives; my boyfriend openly laughed. When I told him it was offensive he claimed that I wasn't really that native."
Staring	6 (9.5%)	"I am not sure if it counts as discrimination but yesterday was the American Indian student convocation. Many of us including me wore traditional dress. However, one man in particular made me uncomfortable because he kept staring at me and several other students."
Alcohol	6 (9.5%)	"Earlier this evening around 6PM, I went to a local bar with my roommates. I was ordering one (the first) beer and the bartender/waiter made the comment not to drink too much because he didn't like dealing with 'your (meaning my) people'."

Romanticized image	6 (9.5%)	"… a firefighter wanted my number because he thought 'I looked like Pocahontas'. It was amusing and flattering at the same time. To be completely honest, I did not mind at all since he was very cute and being a firefighter strikes more kudos points."
Thief	5 (7.9%)	"Was parked next to an individual who saw me coming and he waited by his car until his wife locked the door. He then looked at me with concern."
Benefits	4 (6.3%)	"As a Native American living in [large Southwest city] it can get hard especially being way from home from my family on the reservation. I was asked why I worked because I get a check every month. I said I was [Southwestern tribe] and that we don't get checks every month...the customer looked at me like I was lying it made me feel uncomfortable."
Intelligence	4 (6.3%)	"I notice [sic] one of my professors was helping other students in my math class and he said "I know some of you will be missing these easy steps" then he looked at me. I couldn't help to feel discriminated."

Table 21

Responses to Racial Discrimination in the Daily Diary Study (N = 63)

Response	Frequency *n* (%)	Representative Example
Ignored it	11 (17.4%)	"I just ignored it and pretended that I did not hear anything."
Sought social support	7 (11.1%)	"I talked about it with my boyfriend who is white…and I felt better knowing that my boyfriend understands me well enough to articulate my feelings on issues and my identity."
Said something back	6 (9.5%)	"I told the lady that Indians don't live in casinos. The tribal government owns them to generate revenue."
Polite	6 (9.5%)	"I simply smiled at the person and said 'hello.' The person in question did not acknowledge me."
Point out the discrimination	5 (7.9%)	"I called the store manager and reported the woman."
Brushed it off	5 (7.9%)	"I didn't take anything too hard I just brushed it off and kept working."
Active distraction	5 (7.9%)	"I listened to music and got off the bus and walked home."
Nothing	4 (6.3%)	"I didn't do anything this time, usually I would give the person a tone and be rude but I just left it alone."

Found an explanation	4 (6.3%)	"She's not from here and I would probably do the same thing if I had the chance in Japan."
Withheld financial support	3 (4.8%)	"We didn't leave her a tip."
Kept it inside	2 (3.2%)	"I just sat there and tried not to say something I would regret."
Prayer	2 (3.2%)	"I prayed for myself that anger wouldn't build up inside of me because of how he looked at me. I also prayed for him that he would eventually become a nicer person."
Family handled it	2 (3.2%)	"I had my spouse communicate mostly with the doctor. It was not my first experience with him."
Alcohol	1 (1.6%)	"I was frustrated yesterday, with everything…[so] that I basically got drunk."

Table 22

Where Discrimination Occurred in the Daily Diary Study (N = 63)

Setting	Frequency *n* (%)
Store	15 (23.8%)
Public place	15 (23.8%)
School	9 (14.3%)
Work	6 (9.5%)
Restaurant	6 (9.5%)
From friends or family	4 (6.3%)
Legal system	2 (3.2%)
Medical	2 (3.2%)
Not specified	4 (6.3%)

Table 23

Substance Use across Daily Diary Entries (N =1,039)

		None n (%)	Single use n (%)	Several n (%)	Steady/heavy use n (%)
Marijuana	Evening	944 (91.1)	51 (4.9)	36 (3.5)	5 (0.5)
	Daytime	980 (94.6)	36 (3.5)	14 (1.4)	6 (0.6)
Inhalants	Evening	1035 (99.9)	1 (0.1)	-	-
	Daytime	1037 (100)	-	-	-
Sedatives	Evening	1026 (98.9)	10 (1.0)	-	1 (0.1)
	Daytime	1034 (99.6)	4 (0.4)	-	-
Hallucinogens	Evening	1035 (99.9)	1 (0.1)	-	-
	Daytime	1037 (100.0)	-	-	-
Heroin/opium	Evening	1033 (99.8)	-	2 (0.2)	-
	Daytime	1033 (99.8)	-	2 (0.2)	-
Prescription opioids	Evening	1032 (99.6)	3 (0.3)	-	1 (0.1)
	Daytime	1028 (99.3)	6 (0.6)	-	1 (0.1)

Table 24

Frequency of Cultural Participation across the 1,039 Daily Diary Entries

Enculturation Scale Item	Diaries *n* (%)
Spent time with Native family or friends	690 (66.6%)
Spoke your Native language	492 (47.6%)
Said traditional prayers	216 (20.8%)
Spent time learning a Native language	171 (16.5%)
Spent time learning about Native culture and traditions	152 (14.7%)
You or someone around you burned sage, cedar, or sweetgrass	84 (8.1%)
Attended or participated in traditional activities (e.g., feast days, dances, drumming)	55 (5.3%)
Attended meeting of a Native organization (e.g., AISES)	42 (4.1%)
Traditional crafts (e.g., silverwork, pottery, beadwork, weaving)	38 (3.7%)
Attended or participated in pow wows or round dances	29 (2.8%)
Participated in traditional healing ceremonies	21 (2.0%)
Consulted with traditional healer	16 (1.5%)

Table 25

Multi-level Analyses Predicting Evening Standard Drinks from Daytime Discrimination

	Step 1	Step 2	Step 3	Step 4	**Step 5**	Step 6
	Random intercept	Fixed time	Fixed time, discrim.	All Level 1 fixed	**Random time**	Adding level 2 predictors
Fixed Effects						
Intercept	.45 (.12)***	.37 (.14)**	.36 (.14)*	.41 (.13)**	.39 (.12)**	.44 (.19)*
Time		.009 (.008)	.009 (.008)	.005 (.008)	.007 (.008)	.008 (.008)
Discrimination			-.21 (.23)	-.21 (.23)	-.21 (.23)	-.21 (.23)
Drinks				.65 (.10)***	.60 (.10)***	.59 (.10)***
Enculturation				-.04 (.03)		
Stress				-.02 (.04)		
Enjoyment				-.12 (.06)*		
Gender						-.09 (.23)
UAIIAS						-.004 (.02)

AEQ-CU						.10 (.07)
Random Effects						
Residual	1.73 (.09)*	1.72 (.09)*	1.65 (.08)*	1.59 (.08)*	1.56 (.08)*	1.56 (.08)*
Intercept[†]	0.76 (.16)*	0.76 (.16)*	.76 (.16)*	0.63 (.14)*	.45 (.15)*	.43 (.15)*
Int-Slope[†]					.01 (.008)	.008 (.008)
Slope[†]					.0006 (.001)*	.0006 (.001)*
Fit Indices						
-2LL	2974.65	2973.40	2933.68	2869.52	2887.975	2885.079
AIC	2980.65	2981.40	2943.68	2887.52	2903.975	2907.079

Note. Significance for variance components determined from 95% confidence interval, final model is indicated in bold. Discrimination = morning discrimination yes or no; Stress = past-day interpersonal stress; Enjoyment = past-day enjoyment of interpersonal interactions; UAIIAS = Urban American Indian Identity Attitudes Scale, Actualization subscale; AEQ-CU = Alcohol Expectancies Questionnaire Careless Unconcern; -2LL = -2 log likelihood; AIC = Akaike Information Criterion.

*p< .05, **p<.01, ***p<.001, [†] = random estimates of time for Steps 5 and 6

Table 26

Multi-level Analyses Predicting Evening Cigarettes from Daytime Discrimination

	Step 1	Step 2	Step 3	Step 4	**Step 5**	Step 6
	Random intercept	Fixed time	Fixed time, discrim.	All Level 1 fixed	**Random time**	Adding level 2 predictors
Fixed Effects						
Intercept	.45 (.16)**	.57 (.16)**	.58 (.16)**	.54 (.13)***	.52 (14)***	.82 (.21)***
Time		-.01 (.005)**	-.01 (.005)**	-.01 (.004)	-.005 (.005)	-.01 (.01)
Discrimination			-.14 (.14)	-.11 (.12)	-.10 (.12)	-.10 (.12)
Cigarettes				.45 (.03)***	.42 (.03)***	.43 (.03)***
Enculturation				-.009 (.02)		
Stress				-.02 (.02)		
Enjoyment				-.03 (.04)		
Gender						-.47 (.24)
UAIIAS						-.03 (.02)

Random Effects						
Residual	.57 (.03)*	.56 (.03)*	.56 (.03)*	.45 (.02)*	.42 (.02)*	.42 (.02)*
Intercept[†]	1.43 (.27)*	1.44 (.27)*	1.43 (.27)*	.86 (.17)*	1.07 (.22)*	1.11 (.24)*
Int-Slope[†]					-.01 (.006)	-.02 (.01)*
Slope[†]					.001 (.0003)*	.001 (.0003)*
Fit Indices						
-2LL	2135.53	2127.40	2123.57	1909.13	1903.95	1898.15
AIC	2141.53	2135.40	2133.57	1927.13	1919.95	1918.15

Note. Significance for variance components determined from 95% confidence interval, final model is indicated in bold. Discrimination = morning discrimination yes or no; Stress = past-day interpersonal stress; Enjoyment = past-day enjoyment of interpersonal interactions; UAIIAS = Urban American Indian Identity Attitudes Scale, Actualization subscale; -2LL = -2 log likelihood; AIC = Akaike Information Criterion.

*p< .05, **p<.01, ***p<.001, [†] = random estimates of time for Steps 5 and 6

Table 27

Multi-level Analyses Predicting Evening Marijuana Use from Daytime Discrimination

	Step 1	Step 2	Step 3	Step 4	Step 5	**Step 6**
	Random intercept	Fixed time	Fixed time, discrim.	All Level 1 fixed	Random time	**Adding level 2 predictors**
Fixed Effects						
Intercept	.13 (.04)**	.17 (.05)***	.17 (.05)***	.15 (.03)***	.15 (.03)***	.23 (.05)***
Time		-.004 (.002)*	-.004 (.002)*	-.002 (.002)	-.002 (.002)	-.002 (.002)
Discrimination			.04 (.06)	-.01 (.05)	-.01 (.05)	-.02 (.05)
Marijuana				.63 (.04)***	.62 (.04)***	.61 (.04)***
Enculturation				.004 (.007)		
Stress				-.004 (.009)		
Enjoyment				.001 (.01)		
Gender						-.13 (.04)**

UAIIAS						-.01 (.003)**
Random Effects						
Residual	.10 (.005)*	.10 (.005)*	.10 (.005)*	.08 (.004)*	.08 (.004)*	.07 (.004)*
Intercept†	.10 (.02)*	.10 (.02)*	.10 (.02)*	.04 (.009)*	.05 (.01)*	.06 (.01)*
Int-Slope†					-.0008 (.0006)	-.002 (.001)*
Slope†					.00003 (.0001)*	dnc
Fit Indices						
-2LL	600.74	596.82	596.53	348.65	341.53	331.04
AIC	606.74	604.28	606.53	366.65	357.53	351.04

Note. Significance for variance components determined from 95% confidence interval, final model is indicated in bold. Discrimination = morning discrimination yes or no; Stress = past-day interpersonal stress; Enjoyment = past-day enjoyment of interpersonal interactions; UAIIAS = Urban American Indian Identity Attitudes Scale, Actualization subscale; -2LL = -2 log likelihood; AIC = Akaike Information Criterion, dnc = did not converge.

*p< .05, **p<.01, ***p<.001, † = random estimates of time for Steps 5 and 6