SOCIAL NORMS OF ALCOHOL USE AMONG

AMERICAN INDIAN COLLEGE STUDENTS

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Abstract: American Indian (AI) peoples are at higher risk for alcohol use disorder and related health consequences compared to the general population. Descriptive and injunctive norms have been found to be a significant risk factor for high-risk drinking, especially among college students. However, this research has rarely been extended to the AI college student population. The current study aimed to analyze descriptive and injunctive reference groups, or groups from which to draw normative information. The current study further investigated ethnic identity, or strength of one's ties to their AI culture, as a moderator between norms and actual drinking patterns. Undergraduate AI students ($N = 356$) from a Southern Plains university completed an online survey assessing drinking patterns, descriptive norms (best male/female friend, typical male/female college student, typical AI male/female college student), injunctive norms (typical male/female college student, typical AI male/female college student), and ethnic identity. Repeated ANOVAs revealed that, compared to actual drinking levels, students overestimated all descriptive norm reference groups except for best female friend. Compared to actual injunctive norms, students further overestimated all injunctive norm groups except for AI female norms. Notably, students estimated lower drinking levels for AI-specific groups than typical student groups. Negative binomial regressions revealed descriptive AI male and best male friend reference groups significantly predicted actual drinking patterns for men, while only best female friend norms predicted actual drinking patterns for women. Lastly, ethnic identity was unrelated to drinking and did not serve as a significant moderator between norms and drinking. Findings may be used to inform brief norms-based interventions, as AI-specific reference groups may have a bigger impact on reducing drinking among men, but not women. Further research on the role of ethnic identity on drinking is warranted. Results suggest the use of different reference groups for AI men and women in brief, norms-based alcohol interventions.

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CHAPTER I

INTRODUCTION

Though American Indian (AI) peoples only make up 1.7% of the U.S. population

with 574 federally recognized tribes, health disparities related to alcohol use between AI

individuals and the general population remain (Bureau of American Indian Affairs, 2019;

U.S. Census Bureau, 2010). A recent national survey reported the highest rates of alcohol

use disorder among AI individuals in both the 18-25 (12.9%) and 12-17 (3.2%) age

groups compared to all other racial and ethnic groups in the same age groups (SAMHSA,

2020). AI youth ages 12-17 have also been found to have the highest rates of heavy

alcohol use (i.e., 5 or more binge drinking episodes per month; 1.4%) compared to the

general population of that age range (0.8%), which is concerning given evidence that

heavy drinking in youth and young adulthood can often lead to problematic drinking

throughout adulthood (SAMHSA, 2020; McCambridge et al., 2011).

Importantly, research has also demonstrated several examples of resiliency in

drinking behavior among AI peoples, such as higher rates of abstinence. For example, the

percentage of people who reported any alcohol use in the past month was found to be

higher in the general population (54.3%) than among AI young adults (44.7%;

SAMHSA, 2020). Another national survey among AI college students revealed up to

60% of AI students reported past-month drinking compared to 68.7% of non-Hispanic White students (NHW; Fish et al., 2017). In an AI sample of college students in the Southwest, a study found only 43% reported drinking any amount of alcohol, and 27% reported binge drinking in the past month, which was lower than the reported 34.3% of young adults 18-25 from the general population that engaged in past-month binge drinking (Greenfield et al., 2018; SAMHSA, 2020). Additionally, AI students in the Midwest have been found to drink less than half as much as NHW students (Looby, Luger, & Guartos, 2017), and Alaska Native/AI individuals from northern U.S. states have reported 4 binge drinking episodes per month, similar to NHW individuals (Skewes & Blume, 2015). Of those who do drink, there appear to be higher rates of alcohol use disorder among AI individuals than the general population. Overall, however, there appear to be higher rates of abstinence among AI peoples than the general population. These results should be highlighted given the historical context of colonization and cultural erasure of AI peoples that contribute to potent risk factors of problematic drinking, such as racism and trauma (for a review, see Lopez et al., 2021). Research should continue to target problematic drinking among AI peoples by targeting risk factors and highlighting protective factors.

One risk factor for problematic drinking, especially among college students, are normative misperceptions of alcohol use. According to social normative theory, normative misperceptions of descriptive norms (i.e., the frequency and amount at which peers drink) and injunctive norms (i.e., peer approval of drinking) lead students to drink in higher amounts to follow what they believe are normal college student drinking levels (Perkins, 2002). Indeed, studies have shown that overestimation of descriptive norms is linked to higher levels of personal drinking, while overestimation of injunctive norms is linked to more

positive attitudes about drinking (Lac & Donaldson, 2018). A wealth of literature has supported the claim that lowering perceived norms reduces subsequent patterns of drinking (Scott-Sheldon, Carey, Elliott, Garey, & Carey, 2014). Notably, there has been little extension of drinking norms research to the AI college student population.

Research on descriptive and injunctive norms must be conducted in the context of relevant reference groups, or groups of individuals from which to draw normative information (Borsari & Carey, 2007). The use of more relevant and specific reference groups increases the likelihood that normative misperceptions will be more salient to participants (Larimer et al., 2009; Tajfel & Turner, 1991). For example, previous research has indicated that more proximal reference groups, such as close friends or same-sex drinking norms, better predict personal drinking than more distal reference groups, such as typical student norms (Colins & Spelman, 2013; Lac & Donaldson, 2018). Though certain reference groups such as same-sex groups reliably predict drinking patterns (Borsari & Carey, 2003), the literature on same-race/ethnicity norms has yielded mixed results. Studies have indicated that, while both "typical student" and same-race/ethnicity norms were positively associated with more drinking, typical student norms had a greater impact on predicting drinks per week than same-race/ethnicity norms in an Asian American sample (Stappenbeck, Quinn, Wetherill, & Fromme, 2012; LaBrie et al., 2011). Typical student norms have also outperformed same-race/ethnicity norms as predictors of personal alcohol use among Black/African American (Martin, Groth, Buckner, Gale, & Kramer, 2013) and Hispanic/Latinx (LaBrie, Atkins, Neighbors, Mirza, & Larimer, 2012; Stappenbeck et al., 2012) students.

To date, only two studies have analyzed same-race drinking norms among AI college students. Larimer and colleagues (2019) studied descriptive norms among AI students from tribal colleges/universities and found that participants overestimated typical AI drinking, and that this overestimation was positively correlated with self-reported drinking levels. Hagler, Pearson, Venner, & Greenfield (2017) compared typical student, typical AI student, typical NHW student, and best friend norms as predictors of personal drinking among AI and NHW students from a large, Southwestern university. Results suggested that all reference groups significantly predicted drinking, but same-race AI norms did not predict drinking over and above typical student norms.

Researchers have posited different reasons that same-race norms may not be more predictive of drinking. One involves the strength of ethnic identity, or the degree to which participants identify with their ethnicity or culture (Weinreich, 2008; Martin et al., 2013). For AI peoples, strong ethnic identity could take the form of speaking one's native language, increased time spent in spiritual activities and ceremonies, and regularly participating in traditional holidays, meals, and trips (Ubraeva et al., 2017). Previous research has demonstrated that perceived, same-race/ethnicity norms more strongly predict personal drinking levels among those who strongly (as opposed to weakly) identify with their race or ethnicity (Neighbors et al., 2010). This is consistent with current theories addressing conformity to in-group norms (e.g., Social Identity Theory; Terry & Hogg, 1996). Another reason may be that students who do not identify as NHW may not perceive alcohol as central to their typical college experience (Martin et al., 2013). This hypothesis may be at play among AI students, as research has already demonstrated that AI students drink at lower rates than NHW students (e.g., Looby et al., 2017). As greater cultural involvement and

identification among AI people has been found to be related to less alcohol consumption (Greenfield, et al., 2018), it is plausible that stronger AI ethnic identity may be an important protective factor against risky drinking patterns and misperceived social norms.

The purpose of the current study, therefore, is to assess and analyze descriptive and injunctive norms for AI college students in relation to both "typical student" and AI student reference groups. While Hagler and colleagues (2017) and Larimer and colleagues (2019) provided the first steps in filling the social norms gap among AI college students, extension of this work is needed for AI students in other regions. First, it was hypothesized that participants would overestimate descriptive and injunctive norms for both typical student and AI student reference groups compared to actual norms. Based on previous research, it was further hypothesized that overestimated perceived norms for typical student reference groups would be significantly more related to one's own drinking than perceived norms for AI student reference groups. Finally, it was hypothesized that ethnic identity would moderate the relationship between descriptive and injunctive norms and personal drinking patterns such that the relationship between norm perceptions and drinking will be stronger among those with *lower* ethnic identity, providing evidence for ethnic identity as an important protective factor between perceived norms and personal drinking.

CHAPTER II

METHODOLOGY

Participant Selection and Procedures

A sample of undergraduate students was recruited from a large, public, Southern Plains university. Eligible participants were 18 years or older and self-identified as American Indian or Alaska Native. An a priori power analysis was conducted to determine sample size. With $\alpha = .01$, $1-\beta = .80$, and $f^2 = .1$, the target sample size was 175 participants. To account for missing data and dishonest or inaccurate responding, we aimed to recruit at least 210 participants.

The study consisted of one anonymous survey completed remotely online in one sitting. Students were recruited via mass emails, flyers, and online social media posts with a link to the survey. Participants provided informed consent and were entered into a raffle for the chance to win one of six $50 gift cards or one of four $100 VISA electronic gift cards after completing the survey. All procedures were approved by the university's Institutional Review Board. Data were collected from March to December 2020.

Measures

Demographics. Participants completed demographic measures including age, gender, race/ethnicity, current living arrangements, Greek system involvement, and marital/dating status.

Alcohol use and consequences. Participants completed the Daily Drinking Questionnaire (Collins, Parks, & Marlatt, 1985), a self-report measure that assesses the typical number of drinks per day in a typical week. Responses were summed to create a total drinks per week (DPW) score. In addition, participants responded to the Brief Young Adult Alcohol Consequences Questionnaire (BYAACQ; Kahler, Strong, & Read, 2005). The BYAACQ is a 24-item self-report measure assessing the number of unique alcohol-related consequences experienced in the last month. Participants responded either "yes" or "no" to items such as, "While drinking, I have said or done embarrassing things." Scores range from 0 to 24, with higher numbers indicating more consequences experienced ($\alpha = .90$). Participants were asked to estimate their DPW and BYAACQ experiences during the time before the university set social distancing restrictions due to the COVID-19 pandemic (i.e., before March 2020).

Normative perceptions. Both perceived descriptive and injunctive norms were measured using the Drinking Norms Rating Form (Baer et al., 1991; Krieger et al., 2016), which is formatted similarly to the Daily Drinking Questionnaire. For descriptive norms, participants entered the estimated number of drinks consumed for each day in a typical week for 6 reference groups: best male/female friend, typical male/female student, and AI male/female student. Drinks per day were summed to create an estimated descriptive DPW score for each of these 6 groups. For injunctive norms, participants entered the

maximum number of drinks that they believed 4 groups (typical male/female student and AI male/female student) would consider an *acceptable* number of drinks to have for each day in a typical week. These numbers were summed to create an injunctive DPW score for each injunctive norm reference group. Participants were again asked to estimate these values before March 2020.

Ethnic Identity. Participants completed the Scale of Ethnic Experience (SEE; Malcarne et al., 2006) as a measure of cultural identification. The SEE is a 32-item self-report measure with 4 subscales: Ethnic Identity, which assesses ethnic pride and involvement in cultural practices (e.g., "I believe that it is important to take part in holidays that celebrate my ethnic group"); Perceived Discrimination, which assesses perceptions of how one's own ethnic group has been treated (e.g., "My ethnic group is often criticized in this country"); Mainstream Comfort, which assesses the degree to which an individual identifies as "typical" American (e.g., "I feel like I belong to mainstream American culture"); and Social Affiliation, which assesses the degree of comfort in social interactions with one's own ethnic group versus other ethnic groups (e.g., "I prefer my close friends to be from my own ethnic group"). Responses range from 1 (strongly disagree) to 5 (strongly agree). Items in each subscale were summed to create a total score, with high scores indicating greater ethnic identity, perceived discrimination, mainstream comfort, and social affiliation. Although the SEE is a measure of experiences for ethnic groups in general, it has been used in previous research with AI-specific samples (e.g., Tucker, Wingate, & O'Keefe, 2016). The Ethnic Identity subscale was used for analysis in the current study (α = .86).

Validity items. The infrequency scale and the virtue scale from the Elemental Psychopathy Assessment (EPA; Lynam et al., 2011) were used to detect dishonest or random responding. Items such as "I frequently forget my middle name" were embedded throughout the survey and were rated on a scale from 1 (strongly disagree) to 5 (strongly agree). Furthermore, participants were given the chance to admit to dishonest/random responding with one item, "Is there any reason we should not use your data?" Participants who select "yes" were provided a free response option where they indicated the reason for excluding their data. Participants were assured that they would still receive compensation regardless of their response.

Data Analytic Plan

Participants were excluded if they admitted dishonest or random responding or if they had more than 20% missing data. Participants who report 4 or more incorrect answers on the infrequency scale *or* 3 incorrect answers on the virtue scale were removed due to a high likelihood of dishonest or random responding (Lynam et al., 2011). Outliers from 35 participants on the Daily Drinking Questionnaire and all normative reference groups were replaced with values 3 standard deviations and 1 integer above the mean (Tabachnick & Fidell, 2007).

Descriptive statistics were used to analyze demographic characteristics of the sample. Differences in DPW and alcohol use problems were analyzed by age, gender, class standing, current university, and Greek system involvement using *t*-tests, correlations, and ANOVAs. Tribal affiliation self-reported by participants were kept anonymous (Norton & Manson, 1996). Correlations were conducted among the Daily

Drinking Questionnaire, the BYAACQ, ethnic identity, and normative reference groups to analyze patterns of drinking and norms within the sample.

Repeated measures ANOVAs were conducted to compare DPW with each normative reference group. Next, given the high frequency of zeros and count nature of the data, negative binomial regression models were conducted to determine the predictive value of descriptive and injunctive reference groups on actual DPW (citation from Hagler et al). Analyses were separated by gender to match participants to same-gender norms (Lewis & Neighbors, 2004). A Bonferroni correction was utilized to account for alpha inflation from 4 separate negative binomial regression analyses, yielding an alpha value of .01. Lastly, moderation analyses were utilized to measure ethnic identity as a moderator between normative reference groups and DPW. Bootstrap procedures were conducted using PROCESS model 1 from SPSS (Hayes, 2018) with 5,000 resamples. An alcohol-related consequences score using the BYAACQ was included as a covariate. Predictor variables (descriptive male/AI male norms; descriptive female/AI female norms; injunctive male/AI male norms; injunctive female/AI female norms) were analyzed separately, yielding 8 moderation analyses. To correct for alpha inflation following 8 moderation analyses, an alpha value of .006 was utilized to determine significance.

CHAPTER III

RESULTS

Sample Characteristics

A total of 584 participants enrolled in the study. Of those, 198 (34%) were removed for greater than 20% missing data. An additional six (1%) were removed for admitted for dishonest or random responding, and 24 (4%) were removed for flagged responses on validity scales. The final sample consisted of 356 participants who identified as American Indian. The majority (64.3%, $n = 229$) identified as female with a mean age of 22.25 ($SD = 5.76$). The sample spanned 38 tribal affiliations, though their names will remain anonymous. A full table of sample characteristics can be found in Table 1.

Descriptive statistics

Participants reported drinking a mean of 5.10 drinks per week ($SD = 7.27$), with a self-reported mean of experiencing 4.46 ($SD = 4.94$) unique alcohol-related consequences in the last month (e.g., hangover, vomiting). Additionally, 37.4% ($n = 133$) reported abstaining from drinking. Participants further reported an ethnic identity score of 41.31, indicating moderate levels of ethnic identity ($SD = 8.45$; possible range from 15 to 60).

Gender differences were found such that men ($M = 7.18$) drank significantly more per week than women ($M = 4.06$; t[347] = 3.90, $p < .001$). No differences emerged between men ($M = 5.08$) and women ($M = 4.16$) for alcohol-related consequences, t(343) = 1.65, $p = .11$. Lastly, marginal differences emerged between men ($M = 39.97$) and women ($M = 42.03$) such that women reported greater ethnic identity than men, t(343) = -2.14, $p = .05$. A correlation table including the means and standard deviations of DPW, alcohol-related consequences, age, ethnic identity, and all normative reference groups can be found on Table 2.

Repeated ANOVAs

The first of three repeated ANOVA analyses compared DPW with all descriptive norm reference groups (best male/female friend, typical male/female, and AI male/female). Significant differences emerged among the groups, $\lambda = .46$, F(6, 350) = 69.80, $p < .001$, $\eta_p^2 = .55$. Pairwise comparisons indicated DPW was significantly lower than all descriptive norm groups except for best female friend (see Figure 1). The second repeated ANOVA compared actual injunctive norms (i.e., the highest acceptable number of drinks in a typical week) with injunctive norm reference groups (typical male/female, AI male/female). Overall, significant differences emerged among the injunctive norm groups, $\lambda = .63$, F(4, 352) = 52.60, $p < .001$, $\eta_p^2 = .37$. Pairwise comparisons indicated that actual injunctive norms was significantly lower than all injunctive norm reference groups except for the AI female group (see Figure 2). Lastly, the third repeated ANOVA compared DPW with all injunctive groups, which revealed significant differences at the multivariate level, $\lambda = .48$, F(5, 351) = 77.11, $p < .001$, $\eta_p^2 = .52$. Pairwise comparisons

indicated DPW was significantly lower than all injunctive reference groups, including actual injunctive norms (see Figure 3).

Negative binomial regressions

Next, negative binomial regressions were conducted to evaluate the predictive value of descriptive and injunctive norms on actual DPW. Given that the normative groups are specified by gender, analyses were split between males and females (see Table 3). First, descriptive male normative reference groups (best male friend, typical male, and AI male) were entered as predictors of actual DPW among men. Of the three groups, the AI male group was most strongly and positively associated with DPW (B = .041, p = .003, RR = 1.042), followed by best male friend (B = .038 p = .005, RR = 1.039). Typical male norms appeared to have no effect on actual DPW (B = .01, p = .32, RR = 1.01). The next regression model analyzed typical male and AI male injunctive norms in predicting actual DPW among men. Only typical male injunctive norms positively predicted DPW (B = .054, p < .001, RR = 1.056), while AI male injunctive norms were not associated (B = -.013, p = .43, RR = .987).

Among women, a negative binomial regression model was conducted comparing best female friend, typical female, and AI female descriptive norm groups in predicting actual DPW. Results indicated that neither typical female (B = .022, p = .34, RR = 1.022) nor AI female reference groups (B = .018, p = .27, RR = 1.018) significantly predicted DPW. Only best female friend norms (B = .055, p < .001, RR = 1.057) was significantly associated with DPW. Finally, typical female and AI female injunctive norms were analyzed as predictors of DPW among women. Neither typical female (B = .009, p = .66, RR = 1.009) nor AI female (B = .025, p = .20, RR = 1.025) significantly predicted DPW.

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Bootstrapped moderation analyses

Eight separate bootstrapped moderation analyses were conducted to measure ethnic identity as a moderator between each normative reference group (descriptive male/AI male norms; descriptive female/AI female norms; injunctive male/AI male norms; injunctive female/AI female norms) and DPW, controlling for alcohol-related consequences experienced. Results are presented in table 4, as ethnic identity was not a significant moderator in any of the models.

CHAPTER IV

DISCUSSION

The current study was among the first to examine both descriptive and injunctive norms of alcohol use among AI college students, and the first to assess ethnic identity as a possible moderator between perceived norms and drinking behavior. The results of this research speak to the diversity of AI peoples and provide a better understanding of the role of ethnic identity and normative influences on drinking behavior in a population of AI peoples where this information was previously unknown. The implications of this study suggest several lines of future research to further expand on the current findings.

It was hypothesized that all normative reference groups would be significantly higher than actual drinking and approval levels. This hypothesis was mostly supported. All descriptive norm reference groups were significantly higher than actual drinking patterns except for best female friend, which is notable given that the sample primarily identified as female. These findings converge with previous research (e.g., Lac & Donaldson, 2018) demonstrating best friend norms, oftentimes the most proximal reference group, fit closest to one's personal drinking. Similarly, all injunctive norm reference groups were similarly overestimated compared to actual injunctive norms

except for the AI female group, which is again notable considering the majority of the sample identifies as AI women. Furthermore, estimated drinks per week were lower for AI student groups than typical student groups for both descriptive and injunctive norms. These findings are consistent with past research (Hagler et al., 2017; Larimer et al., 2019), which warrants attention given the potential for these results to combat negative stereotypes.

Next, it was hypothesized that typical student groups would be significantly more related to one's drinking than AI student groups, which was partially supported. Among men, the AI male descriptive norms reference group was the strongest predictor of actual DPW, followed by best male friend. Typical male norms were not significantly related to actual DPW, which is in contrast to previous research indicating same-race/ethnicity norms did not better predict drinking than typical student norms among AI students (Hagler et al., 2017) and other ethnically marginalized samples (Martin et al., 2013; LaBrie et al., 2011; LaBrie et al., 2012; Stappenbeck et al., 2012). These findings suggest AI male descriptive norms were particularly salient in this sample. On the other hand, the AI male *injunctive* norm reference group was unrelated to DPW, while the typical male injunctive norm group was significantly related. This finding speaks to a nuanced relationship between perceived norms, attitudes, and behavior towards drinking and may suggest that when it comes to attitudes or approval towards drinking, a more general (i.e., less proximal) influence may be sufficient. Of note, as the current sample was recruited from a majority White university, the findings related to injunctive norm reference groups may not replicate in a different educational setting, such as a Tribal college or university.

Among women, only best female friend descriptive norms significantly predicted actual DPW. This is in line with previous research in that best friend norms were particularly impactful in predicting one's drinking (Hagler et al., 2017; Lac & Donaldson, 2018). It appears only those in participants' social circles had any salience in drinking behavior, and could point to strong social motives for drinking among AI women in this sample (Foster, 2014). Additionally, neither typical female nor typical AI female student norms significantly predicted drinking among women, indicating there are other factors at play in the decision to drink. Overall, though drinking norms of typical student and AI student groups predicted drinking among AI men, this did not hold true for AI women.

Contrary to the stated hypothesis, ethnic identity was not a significant moderator in any of the drinking norm models. It was also not correlated with DPW. This is not consistent with research asserting a protective effect of strong ethnic identity against drinking (e.g., Tingey et al., 2016; Henson et al., 2017). One possibility for this non-significant result is that the Scale of Ethnic Experiences was not formally validated with an AI sample, making the psychometric properties of the SEE with this AI population unknown. Previous researchers have critiqued the definition and measurement of this construct, calling into question the reliability and validity of measures used to quantify ethnic identity for AI peoples (Whitesell et al., 2012). Future research should evaluate the psychometric quality of the SEE with several AI populations to evaluate the validity of this construct. However, it is also plausible that ethnic identity is simply unrelated to drinking in this sample, and research should look into other factors such as social support and community involvement.

Though this study advances the research in many ways, limitations should also be considered. For example, data were collected at one time point, so it is currently unknown how norm perceptions influence drinking at later periods. Additionally, participants were asked to report their drinking levels from before the COVID-19 pandemic, which was several months in the past for many participants. Estimates may therefore be inaccurate given the amount of time that has passed. However, the reported drinking percentage of 62.6% in this sample is similar to what has been reported in the past, such as 60% reported in Fish and colleagues (2017). As stated previously, ethnic identity was measured using the SEE, which has not been formally validated for AI populations. However, this scale has been used in past research with AI participants (Tucker et al., 2016). Lastly, though best friend norms were included as descriptive norm reference groups, they were not included as injunctive norm groups. Future research with injunctive norms should include best friend norms for a more comprehensive analysis.

The current study provides implications for future studies, namely studies evaluating personalized feedback interventions (PFIs) for AI students residing in the Southern Plains region of the U.S. For example, results suggest that same-race/ethnicity norms should be used in PFIs for men, as this reference group was the most significant predictor in drinking among men. However, if the PFI also addresses attitudes or approval towards drinking, it may frame this discussion using typical student norms. Further study is needed to better understand normative influences and other factors of drinking for AI college student women in this region. Future studies should also incorporate ethnic identity to better understand its role in drinking or abstaining, and to evaluate it as a possible component of brief, culturally tailored, PFIs.

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Table 1. Sample characteristics.

Variable	N (%) or M (SD)
Age	22.25 (5.76)
Gender	
Male	120 (33.7%)
Female	229 (64.3%)
Other	7 (2.0%)
Class standing	
Freshman	50 (14%)
Sophomore	73 (20.5%)
Junior	105 (29.5%)
Senior	115 (32.3%)
Graduate student	11 (3.1%)
Non-degree-seeking	2 (.6%)
Student status	
Full-time (12+ credits)	321 (90.2%)
Part-time	35 (9.8%)
Relationship status	
Single, not currently dating	125 (35.1%)
Casually dating, not in an exclusive relationship	35 (9.8%)
In an exclusive relationship	155 (43.5%)
Engaged	16 (4.5%)
Married	21 (5.9%)
Other	1 (.3%)
Greek affiliation	
Yes, currently	68 (19.1%)
Yes, previously but not currently	36 (10.1%)
No	250 (70.2%)
Current living arrangement	
Residence hall/dorm	64 (18.0%)
Fraternity/Sorority hall	14 (3.9%)
Off campus (apartment/house)	237 (66.6%)
With parents	35 (9.8%)
Other	5 (1.4%)
Sexual orientation	
Straight	301 (84.6%)
Gay	11 (3.1%)
Bisexual	32 (9.0%)
Other	12 (3.4%)

Table 2. Correlations.

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1.	**Age**	-														
2.	**DDQ**	-.05	-													
3.	**Actual IN**	-.08	.54**	-												
4.	**BYAACQ**	.03	.44**	.34**	-											
5.	**DN best male friend**	-.06	.48**	.29**	.26**	-										
6.	**DN best female friend**	.002	.38**	.32**	.29**	.50**	-									
7.	**DN typical male**	-.13*	.36**	.41**	.22**	.52**	.51**	-								
8.	**DN typical female**	-.06	.33**	.41**	.26**	.32**	.59**	.72**	-							
9.	**DN AI male**	.007	.39**	.38**	.33**	.39**	.47**	.57**	.55**	-						
10.	**DN AI female**	.02	.29**	.30**	.29**	.35**	.42**	.54**	.57**	.79**	-					
11.	**IN Typical male**	-.06	.39**	.53**	.23**	.36**	.37**	.60**	.53**	.51**	.49**	-				
12.	**IN Typical female**	-.10	.25**	.47**	.15**	.27**	.37**	.49**	.50**	.44**	.37**	.78**	-			
13.	**IN AI male**	-.06	.27**	.47**	.18**	.31**	.31**	.53**	.50**	.53**	.50**	.77**	.75**	-		
14.	**IN AI female**	-.02	.27**	.45**	.22**	.26**	.33**	.47**	.52**	.49**	.49**	.75**	.77**	.85**	-	
15.	**SEE ethnic identity**	-.03	.09	-.09	-.06	-.10	.02	-.05	.03	-.11*	-.08	-.07	-.09	-.04	-.03	-
M		22.25	5.10	10.87	4.46	9.51	6.33	15.58	9.56	10.98	8.70	18.15	12.36	13.93	11.25	41.31
SD		5.76	7.27	9.79	4.94	10.80	7.03	11.34	7.15	9.31	7.98	14.27	9.33	11.87	9.33	8.44

Note. DDQ = Daily Drinking Questionnaire. IN = Injunctive Norms. DN = Descriptive Norms. BYAACQ = Brief Young Adult Alcohol Consequences Questionnaire. SEE = Scale of Ethnic Experiences.

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

Table 3. Negative binomial regression models predicting actual descriptive norms from descriptive norm reference groups.

|	B	P	RR
Male DPW			
DN best male friend	**.038**	**.005**	**1.039**
DN typical male	.011	.324	1.011
DN AI male	**.041**	**.003**	**1.042**
Male DPW			
IN typical male	**.054**	**<.001**	**1.056**
IN AI male	-.013	.43	.987
Female DPW			
DN best female friend	**.055**	**.001**	**1.057**
DN typical female	.022	.336	1.022
DN AI female	.018	.272	1.018
Female DPW			
IN typical female	.009	.66	1.009
IN AI female	.025	.20	1.025

Note. DPW = Drinks Per Week. DN = Descriptive Norms. IN = Injunctive Norms. Bold indicates significance at $p < .01$.

Table 4. Bootstrapped moderation models with ethnic identity as a moderator.

|	B	SE	T	P	LLCI	ULCI
Male DPW						
DN typical male	.10	.23	.42	.67	-.35	.54
SEE ethnic identity	-.09	.12	-.79	.43	-.33	.14
DN typical male*SEE	.00	.01	.59	.55	-.01	.01
BYAACQ	.63	.14	4.50	**<.001**	.35	.90
Male DPW						
DN AI male	.40	.25	1.61	.11	-.09	.89
SEE ethnic identity	.05	.11	.44	.66	-.18	.28
DN AI male*SEE	-.00	.01	-.57	.57	-.02	.01
BYAACQ	.55	.15	3.80	**<.001**	.26	.84
Male DPW						
IN typical male	.33	.18	1.81	.07	-.03	.70
SEE ethnic identity	.06	.12	.49	.63	-.18	.30
IN typical male*SEE	-.00	.00	-.81	.42	-.01	.01
BYAACQ	.61	.14	4.33	**<.001**	.33	.88
Male DPW						
IN AI male	.53	.28	1.90	.06	-.02	1.09
SEE ethnic identity	.11	.12	.87	.39	-.14	.35
IN AI male*SEE	-.01	.01	-1.54	.12	-.02	.00
BYAACQ	.64	.15	4.35	**<.001**	.35	.93
Female DPW						
DN typical female	.20	.28	.72	.47	-.35	.76
SEE ethnic identity	-.02	.07	-.27	.79	-.17	.13
DN typical female*SEE	-.002	.01	-.25	.80	-.01	.01
BYAACQ	.52	.08	6.74	**<.001**	.37	.67
Female DPW						
DN AI female	.27	.29	.92	.36	-.31	.85
SEE ethnic identity	.01	.07	.15	.88	-.12	.15
DN AI female*SEE	-.01	.01	-.82	.41	-.02	.01
BYAACQ	.56	.08	7.22	**<.001**	.41	.71
Female DPW						
IN typical female	.15	.17	.87	.39	-.19	.49
SEE ethnic identity	-.01	.07	-.12	.90	-.14	.13
IN typical female*SEE	-.001	.00	-.28	.78	-.01	.01
BYAACQ	.55	.07	7.61	**<.001**	.41	.70
Female DPW						
IN AI female	.22	.20	1.07	.29	-.18	.62
SEE ethnic identity	.00	.07	.02	.98	-.13	.14
IN AI female*SEE	-.003	.00	-.60	.55	-.01	.01
BYAACQ	.54	.07	7.20	**<.001**	.39	.68

Note. DPW = Drinks Per Week. DN = Descriptive Norms. IN = Injunctive Norms. BYAACQ = Brief Young Adult Alcohol Consequences Questionnaire. SEE = Scale of Ethnic Experiences. Bold indicates significance at $p < .006$.

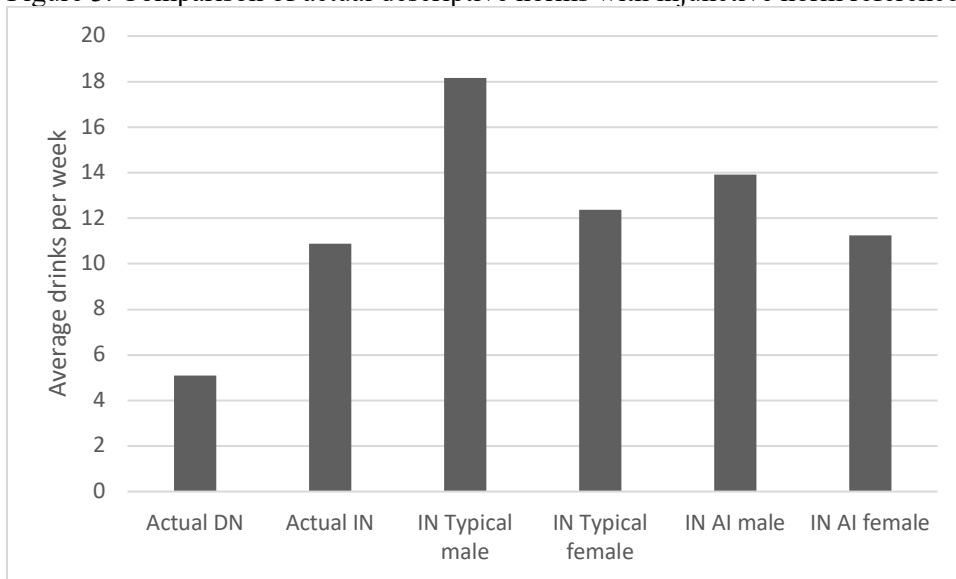Figure 1. Comparison of actual descriptive norms with descriptive norm reference groups.
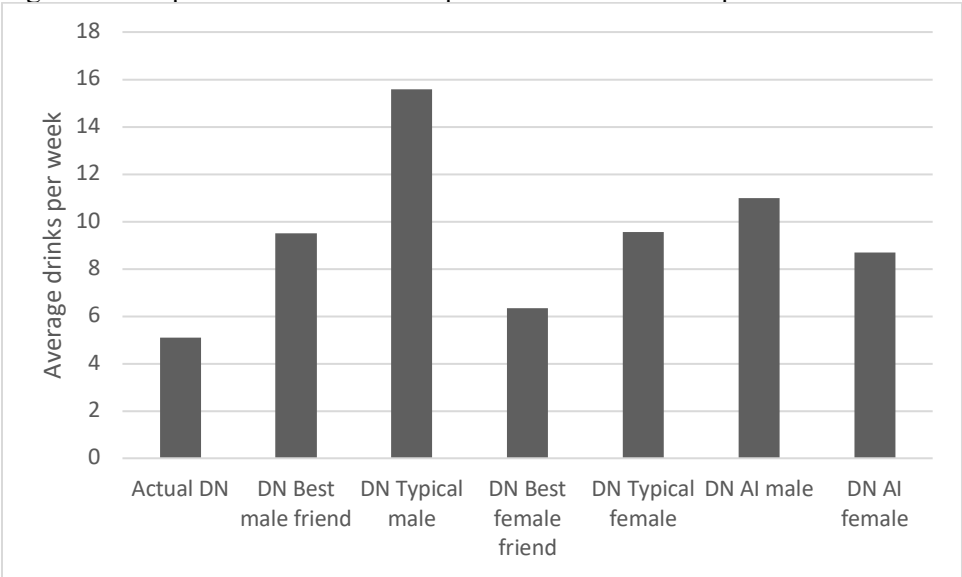
Note. DN = descriptive norms.

Figure 2. Comparison of actual injunctive norms with injunctive norm reference groups.
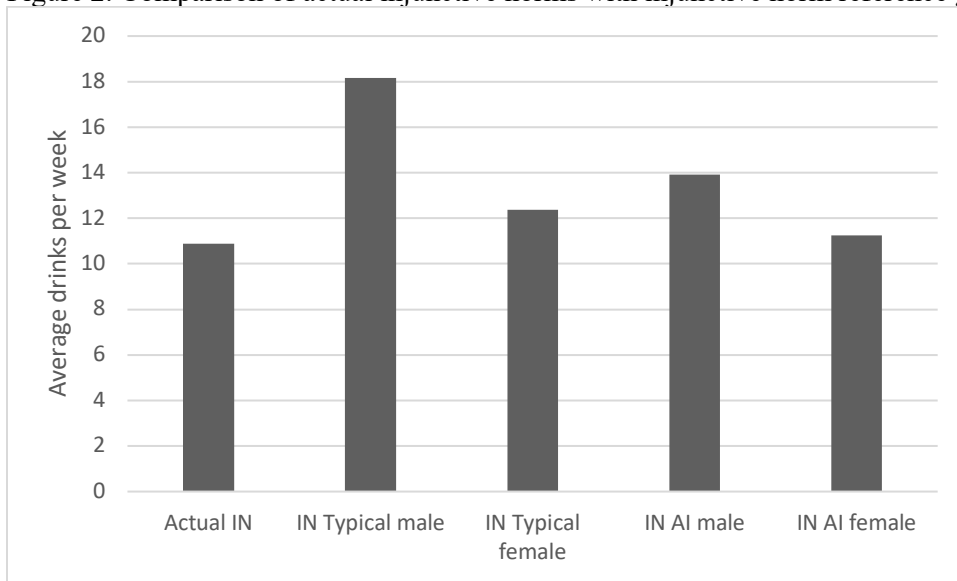
Note. IN = injunctive norms.

Figure 3. Comparison of actual descriptive norms with injunctive norm reference groups.

Note. DN = descriptive norms. IN = injunctive norms.

APPENDIX A: REVIEW OF THE LITERATURE

American Indians in the United States

American Indians (AIs), also known as Native Americans, Indigenous Americans, and Alaska Natives, represent about 1.7% of the U.S. population with 573 federally recognized tribes (Bureau of Indian Affairs, 2019; US Census Bureau, 2010). According to the U.S. census of 2010, American Indians are defined as individuals whose ancestral roots include the original peoples of North, Central, and South America (excluding Hawaii and the Pacific Islands), and who currently maintain tribal affiliation via blood quantum, or percentage of blood that comes from American Indian bloodlines (https://www.bia.gov/bia/ois/tgs/genealogy). Each tribe has unique cultural values, ceremonies, garments, and traditions. A high degree of heterogeneity is demonstrated among AI peoples (Ward & Ridolfo, 2011), resulting in a wide variety of cognitions, values, environments, and behaviors. One of these behaviors with high implications for psychological and physical health is alcohol use.

Historical context of alcohol use in AI communities.

European alcoholic drinks were first introduced to AIs during early settlement, in The 1500-1600s. Throughout this period, Ais had negative attitudes towards excess drinking and drunkenness (Coyhis and White, 2002). However, as contact with Europeans and White Americans grew more frequent, drinking to intoxication among AIs

became pervasive. There are several possible explanations for increased intoxication; for example, alcohol became a common item used for trade and commerce, leading to increased production and availability for AIs. Alcohol content within standard drinks also increased with the introduction of distillation, making intoxication more severe. Finally, and arguably most importantly, alcohol potentially became a form of coping with negative life events, as some tribes experienced a significant shift and disintegration of cultural values; rather than restricting alcohol for ceremonial purposes, alcohol became a central factor in social, political, and economic exploitation (Coyhis & white, 2002; Abbott, 1996).

By the 1800s, stereotypes of the "drunken Indian" and the "firewater myth" began to take hold of American culture. These myths perpetuated inaccurate beliefs, such as AI individuals having an unhealthy desire to drink, low tolerance for alcohol, and violence when intoxicated due to inferior genetic makeup (Coyhis & White, 2002; Abbott, 1996). Evidence suggests that these assumptions present no scientific credibility; in fact, preliminary evidence within AI community and college student samples points to the belief in these negative stereotypes as a potential risk factor for more problematic substance use (Gonzalez & Skewes, 2016; Gonzalez, Bravo, & Crouch, 2019). Nevertheless, belief in the "firewater myth" played a major role in U.S. lawmakers banning the sale of alcohol to all AI tribes and reservations, a law that took effect from 1832 to as recently as 1953 (Abbott, 1996).

Current alcohol use among American Indians

Currently, as sovereign nations, AI tribes may locally elect to ban the sale or possession of alcohol with zero tolerance policies (Whitesell et al., 2012). For Alaska

Natives and Indigenous peoples in Nunavut, alcohol bans are associated with lower

problematic alcohol use and alcohol-related violence (Wood, 2011; Wood &

Gruenewald, 2006). Judging by these preliminary studies, alcohol bans within

reservations may be beneficial in preventing high-risk drinking. However, the decision to

ban alcohol for other tribes remains controversial, as the influence of alcohol bans on

drinking patterns is still generally inconclusive (Whitesell et al., 2012).

Recent studies have reported significantly higher rates of alcohol use disorder (AUD)

in AI adults (26.9%) than Non-Hispanic Whites (NHWs; 9.85%) and more binge

drinking rates among AIs (20.43%) than NHWs (9.79%), but prevalence of any level of

drinking is similar across ethnicities (Chen, Slater, Castle, & Grant, 2016). Binge

drinking is linked to a number of short-term negative consequences such as alcohol-

impaired driving, death due to alcohol-impaired driving, unintended physical injury,

death due to unintentional physical injury, and death due to intentional physical injury

(i.e., suicide); furthermore, significant increases in alcohol-related overdoses and

hospitalizations have been recorded since 2005 (Hingson, Zha, & Smyth, 2017).

American Indians suffer from these consequences at disproportionally higher rates than

the general population. One study investigated national mortality rates of NHWs and

Alaska, East, Northern/Southern Plains, Pacific Coast, and Southwest AI regions for

which alcohol was a contributing factor. Results indicated major health disparities

between AIs and NHWs; leading causes of death for AIs were alcohol-related motor

vehicle crashes, poisonings, homicide, suicide, liver disease, and alcohol dependence.

Breaking these results down by region, AIs from the Northern Plains had the highest

relative risk of alcohol-related mortality (Landen, Roeber, Naimi, Nielsen, & Sewell,

2014). Reducing binge drinking, especially among AIs, may help prevent many of these negative health outcomes.

Binge drinking also has been linked to long-term implications of health, increasing risk of conditions such as type 2 diabetes, cardiovascular disease, and several forms of cancer (Shield, Parry, & Rehm, 2013). Nationally, the prevalence of type 2 diabetes is highest among AIs and is twice the prevalence rates of NHWs (15.1% and 7.4%, respectively; CDC, 2017). Tann, Yabiku, Okamoto, and Yanow (2007) conducted a national study among NHWs, Blacks, Hispanics, and AIs over 18 and revealed that AIs, more than any other ethnic group, were at high risk for experiencing AUD and diabetes simultaneously. Additionally, nation-wide studies have consistently reported higher rates of stroke, heart attack, and coronary heart disease among AIs than NHWs since the late 1980s (Hutchinson & Shin, 2014). Lastly, studies have shown higher rates of liver cancer for AIs than NHWs, a form of cancer that is directly linked to heavy drinking (Espey et al., 2007). In fact, a prospective study by Costentin and colleagues (2018) revealed patients with liver cancer caused specifically by alcohol had overall worse liver functioning and survival statistics than patients with non-alcohol related liver cancer. Taken together, decreasing alcohol consumption plays a protective role in preventing diabetes, heart disease, cancer, and other health risks among those for whom alcohol use is a significant contributor. Given the extant literature, it appears AIs are among the highest at risk for negative, alcohol-related health outcomes.

Comorbid psychiatric disorders are highly prevalent among individuals with alcohol use disorder in the general population (Lyne, O'Donoghue, Clancy, & O'Gara, 2011). These findings extend to the AI population as well. A population study compared

rates of comorbid PTSD and AUD among AIs and NHWs (Emerson, Moore, & Caetano, 2017). The sample consisted of nearly 20,000 participants, the majority (97%) NHW. Researchers found that PTSD and AUD were highly correlated, especially among male AIs. In this study (keeping in mind the small portion of AIs in the sample), 9.5% of male AIs were burdened with comorbid PTSD and AUD compared to 4.5% of AI women, 1.1% of NHW men, and 1.8% of NHW women. Suicide is another public health concern related to alcohol use among AIs. Researchers examining a reservation-based Apache adolescent sample (N = 71) found 91% of all adolescents who reported past suicide attempts endorsed a history of risky alcohol use (Cwik et al., 2015). Consistent with this literature, a study conducted on 84 AI college students in the Midwest demonstrated a positive association between alcohol use and suicidality, especially if students believed they were a burden on others (Cole et al., 2019). This clearly indicates that some AIs may be vulnerable to experiencing comorbid psychiatric conditions as well.

One study analyzing a national sample of 701 AI/ANs reported a high percentage of comorbidity between AUD and nicotine dependence (67.6%; Moghaddam, Dickerson, Yoon, & Westermeyer, 2014). Gilder, Stouffer, Lau, and Ehlers (2016) investigated nearly 2,000 AIs from several rural reservations in Southern California regarding multiple substance use disorders (SUDs). Findings revealed the vast majority of AIs with multiple SUDs (94%) reported alcohol as at least one of those abused substances. Taken together, these findings strongly suggest that alcohol is positively associated with the presence of other psychological problems, drug use, and health issues. Though these findings were correlational in nature, findings were impactful enough that researchers call

for routine screening of alcohol use among AI patients while assessing for other conditions in medical settings.

Unfortunately, AIs also experience higher rates of incarceration for alcohol-related consequences (e.g., DUIs, homicide) than NHWs (Kunitz et al., 2002). Researchers have been aware of this disparity for decades (Jensen, Strauss, & Harris, 1977; Walker, 1981). One study interviewed 45 AIs in the Southwest U.S. who were in remission from alcohol dependence. Of the 45 participants, 41 had experienced incarceration for alcohol-related incidents, with the first incarceration as young as 8 years of age (Fieldstein, Venner, & May, 2006). Participants in this sample reported more experience with incarceration than with alcohol use treatment. Furthermore, among those who received treatment, medical hospitalization was reported to be the most common form of treatment. (Fieldstein, Venner, & May, 2006). It is clear that AIs are overrepresented in the justice system, spending more time in incarceration rather than getting much needed substance use treatment and care, further contributing to the disparity between AI and non-AI prevalence of AUD.

Despite these stark disparities, AI youth and young adults use alcohol in similarly high rates compared to NHWs. According to the National Longitudinal Study of Adolescent Health, 56.2% of AIs and 66.5% of biracial NHW/AIs reported ever using alcohol in their lifetime, similar to 60.6% of NHWs and 61% of Hispanics. Compared with 46.6% of Blacks and 46.7% of Asians, AI youth and young adults report among the highest prevalence of lifetime alcohol use (Clark, Nguyen, & Kropko, 2013). AIs also display concerning patterns of high-risk drinking, with adolescents and young adults ages 12-20 reporting the highest rates of binge drinking (13.9%) after NHW adolescents

(16.8%; SAMHSA, 2014). Binge drinking in youth and young adulthood has the potential to grow into long-term disordered drinking throughout adulthood (Crosnoe, Kendig, & Benner, 2017). Taken together, these findings show that overall prevalence of drinking among AIs are similar to other ethnic groups, but among those who do drink, higher rates of binge and heavy drinking are more prominent among AIs than other ethnic minorities. Though these rates are based on national studies, a deeper look into regional and tribal populations is needed for a comprehensive understanding of drinking within the AI population, as these general statistics may not hold within any given community (Ward & Ridolfo, 2011).

Risk factors of problematic drinking

Research has extensively investigated risk factors of alcohol misuse and abuse among AIs. Some of these include aggressive and impulsive behavior, perceived racial discrimination, poor family relationships, and unstable family structure (e.g., absent father, divorced parents; Tingey et al., 2016; Les Whitbeck et al., 2004). As a result of racial stereotypes and prejudices (i.e., the "firewater" myth), genetic vulnerability to alcohol abuse was previously thought to be a risk factor. Enoch and Albaugh (2017) shed light on the validity of this belief and provided a review of genetic research among AI individuals to determine the role of genetics as a risk factor for developing substance abuse and addiction. They claim that researchers are often limited by small sample sizes as well as mistrust between tribal leaders and the scientific community, leading to a reluctance of IRB approval for genetic research. Extant research suggests that genetic risk factors for AUD are no more impactful for AIs than they are for the general population (Enoch & Albaugh, 2017). Similar percentages of heritability for AUD exist between AIs

(40%) and the general population (50%). According to the authors, genetic literature suggests that ethanol metabolizing enzymes have no impact on the development of problematic drinking among AIs (as is the case for East Asians; Enoch & Albaugh, 2017). It seems, then, that the distinguishing factors of risky alcohol use patterns among AIs compared to the general population are environmental, psychological, and social.

A unique factor related alcohol use among AIs is historical trauma or historical loss, defined as a large-scale trauma against an entire race, ethnicity, or culture, the psychopathological effects of which are passed down to future generations of that culture (Cromer, Gray, Vasquez, & Freyd, 2018). In the 1800s, AIs suffered unimaginable losses of life, culture, and land as a result of genocidal American policies (Heart, Chase, Elkins, & Altschul, 2011). AI tribes were forced to cease cultural practices of medicine and spirituality, and children were taken away from their homes and into boarding schools to be educated according to European-American standards (Szlemko, Wook, & Thurman, 2006). This culture-wide trauma has been passed down through generations and is still evident today. Evidence suggests that some AIs think about their culture's historical loss almost every day, which is associated with higher vulnerability to negative affect and substance use to cope with negative affect, making historical trauma a significant risk factor of problematic alcohol use (Enoch & Albaugh, 2017; Whitbeck, Chen, Hoyt, & Adams, 2004). Though results linking boarding school attendance and AUD are mixed, evidence points to boarding school attendance as a predictor of other drug use and psychiatric conditions (Enoch & Albaugh, 2017).

Another mode of transmitting trauma through the generations is through adverse childhood experiences (ACEs), which is particularly high in some AI communities

(Brockie, Dana-Sacco, Wallen, Wilcox, & Campbell, 2015). A study by Koss and colleagues (2003) examined over 1,000 AIs from 7 different tribes in Arizona, Oklahoma, Tennessee, Oregon, and Minnesota, and found the most common forms of ACEs were physical neglect and physical abuse, both of which were experienced by over 40% of the sample. In this study, endorsing 3 categories of ACEs was associated with a 4-fold increased risk of AUD among men, while endorsing 4 or more categories of ACEs was associated with a 7-fold increase among women. In fact, women seem to be at a heightened disadvantage in some settings. One study took a sample of AI women in primary care facilities and revealed that rates of past child maltreatment against these women were staggeringly high, reaching up to 76% (Duran et al., 2004). As predicted, severity of child maltreatment was positively associated with lifetime PTSD and substance use disorders. Taken together, finding suggest that ACEs are a strong predictor of adult-onset AUD among AIs. Further efforts are needed to prevent and treat childhood traumatic experiences, as treatment and prevention of ACEs may minimize risk factors of problematic alcohol use.

Protective factors against problematic drinking

While much past research has focused on risk factors, researchers have more recently begun to focus on protective factors for AIs, as a greater understanding of protective factors is essential for preventing high-risk drinking. Henson, Trujillo, and Teufel-Shone (2017) reviewed literature highlighting exposure to protective factors of substance abuse and mental health. The authors found that future aspirations, such as planning for college and having the motivation to succeed, are negatively associated with substance abuse. Regular school attendance and positive attitudes towards education were

identified as significantly protective. Furthermore, physical and emotional health as well as having positive self-image and self-efficacy provided a buffer against unhealthy substance use. Interpersonally, having strong, positive relationships to family and friends – connecting to a variety of adult role models and striving to become role models for others – is a significant protective factor for AI adolescents and young adults. Similarly, having opportunities for participation in extracurricular activities and hobbies was important for overall health promotion (Henson et al., 2017).

Importantly, cultural identification and enculturation to AI way of life are consistently linked to overall better health. Enculturation is defined as the integration of meaningful cultural aspects to one' lifestyle and could take the form of speaking one's native language, increased time spent in religious activities and ceremonies, and participating in traditional holidays, meals, and trips (Urbaeva, Booth, & Wei, 2017). Similarly, cultural identification is the strength with which individuals identify with AI cultural practices (Weinreich, 2008). Several studies have found stronger cultural ties to be negatively correlated with alcohol use among AIs (e.g., Tingey et al., 2016; Henson et al., 2017; Beebe, Vesely, Oman, Tolma, Aspy, & Rodine, 2008; Whitbeck et al., 2004). Researchers propose positive family modeling and interaction as mechanisms for this relationship, as these constructs are fostered by actively practicing their traditional values (Ubraeva et al., 2017). Though enculturation and cultural identity can be predictors of reduced substance use, the definitions and measurements of these constructs are inconsistent, calling into question the reliability and validity of measures used to quantify enculturation/cultural identity for AIs (Whitesell et al., 2012). Thus, more research is

needed before it can be soundly asserted that enculturation is a protective factor against alcohol use.

Existence of culturally-sensitive treatments

Compared to the general population, ethnic minority groups, including AIs, have less access to substance abuse treatment (Zemore et al., 2018). Among existing treatment programs, there is often a disconnect between standard, evidence-based treatments (EBTs) and cultural sensitivity towards AI practices and values. For example, Walsh and Baldwin (2015) conducted a systematic review on substance abuse prevention programs in AI communities, which revealed that many of these programs do not discuss how theory and evidence-based principles are integrated with culturally-appropriate values. This makes it difficult to move towards appropriate substance abuse treatment for AIs that is both grounded in evidence and inclusive of traditional values. Moreover, the majority of clinicians within AI treatment facilities are not of AI heritage, which is concerning given that treatment outcomes tend to improve when clients and counselors share the same cultural background (Rieckmann, Moore, Croy, Novins, & Aarons, 2016). Indeed, several studies find that AI patients prefer healthcare providers and counselors who are also AI (O'Keefe, Cwik, Haroz, & Barlow, 2019). According to Rieckmann and colleagues, AI clients commonly seek treatment from both traditional healers as well as Western EBTs, furthering the need to combine EBTs with culturally-competent counselors and techniques.

Though this literature is not expansive, research demonstrates that AI community members may be more comfortable with treatments that integrate spirituality and traditional customs (Vaeth et al., 2017). One study interviewed clinicians and

administrators from 192 substance abuse treatment programs that serve AI communities across the country and found these programs generally integrate culture by emphasizing family, community, and respect for clients, while having an open-door policy for clients to increase access (Legha & Novins, 2012). Traditional activities such as sweat lodges, drumming, and powwows may be included in certain treatment programs. However, there may be limited financial and environmental resources to consistently implement these activities, and the heterogeneity across AI communities makes it difficult to provide a "standard" culturally-appropriate EBT (Legha & Novins, 2012).

Taken from the same sample as Legha and Novins (2012), Novins, Croy, Moore, and Rieckmann (2016) investigated knowledge, attitudes, and implementation of EBTs by clinicians and administrators of substance use treatment programs in AI communities. Treatment programs were located largely in rural areas (74%), and about half (51%) were provided through Indian Health Service facilities. Novins and colleagues found that CBT, Motivational Interviewing (MI), and response prevention therapy were the treatments most frequently implemented. Although knowledge of EBTs was common, the authors identified MI and relapse prevention therapy as thought to be culturally appropriate. Research teams have already begun to integrate MI with cultural practices among AI youth for alcohol and substance use with promising results (Dickerson, Brown, Johnson, Schweigman, & D'Amico, 2015). Furthermore, most clinicians agreed that access to psychiatric medication was limited among patients suffering from psychiatric comorbidities, and patients may even prefer traditional, nonmedical services to formal, medical services (Novins et al., 2016; Walls, Johnson, Whitbeck, & Hoyt, 2006). From this research, authors agree that extension of access to EBTs and medication is warranted.

Theories of behavior change

The process of behavior change, particularly with the promotion of health-behaviors, is complex and has been studied for decades. Consequently, researchers have proposed several behavior change models in an attempt to predict and control health-related behaviors. Examples include the health belief model, which explains behavior change through perceived severity and susceptibility of negative health outcomes (Janz & Becker, 1984); the trans-theoretical model, which conceptualizes readiness for change as a journey through a series of stages (DiClemente & Prochaska, 1998; Prochaska & Velicer, 1997); and the theory of planned behavior, which recognizes that the intention to change a behavior often leads to actual behavior change, and that stronger intentions increase the likelihood of subsequent behavior change (Ajzen, 1991). These theories primarily focus on intrapersonal factors such as intentions to change and perceived susceptibility of harm; however, none describe social or interpersonal factors as the primary driver of behavior change.

Social normative influences on drinking

One model in particular, called the social norms approach (Perkins, 2002), asserts that peer attitudes and behaviors are among the most influential factors in college student drinking. Those who have social circles that drink heavily are more likely to drink heavily themselves (Perkins, 2002). In addition, this model is grounded in the notion that the majority of college students are mistaken in their over-estimation of how much and how often other college students drink (i.e., descriptive norms) as well as the extent to how acceptable it is for students to drink (i.e., injunctive norms). Therefore, heavy-drinking students may drink in part because they believe that this pattern of drinking is

the norm for all college students, when actual rates of drinking may be much lower. By correcting these normative misperceptions, students may be more willing to reduce problematic drinking after realizing that heavy drinking is, in fact, not the norm.

Several years of research in primarily NHW samples consistently affirm that college students overestimate descriptive and injunctive norms (Borsari & Carey, 2003). The stronger the overestimation, the heavier the drinking (e.g., Foster Neighbors, & Krieger, 2015; Pearson & Hustad, 2014). Though both descriptive and injunctive norms relate to more problematic drinking, research suggests that injunctive norms have a stronger relationship with positive attitudes towards alcohol, while descriptive norms have a stronger relationship with drinking behavior (Lac & Donaldson, 2018). Taken together, this research has strong implications for brief alcohol use interventions such as personalized feedback interventions (PFIs), which aim to correct social normative misperceptions to reduce risky drinking. PFIs are effective, low-cost interventions that can be administered online or in person (Cadigan et al., 2015). Most PFIs rely only on descriptive norms as the main component of intervention (Miller, Leffingwell, Claborn, Meier, Walters, & Neighbors, 2013). Given the potential benefits of adjusting attitudes toward alcohol use, researchers have called for the inclusion of injunctive norms in PFIs (Pedersen et al., 2017). The findings for injunctive norms have been mixed; some studies that include injunctive norms have seen significant results in reducing drinking behavior (e.g., Ridout & Campbell, 2014).

One randomized trial compared PFIs with and without an injunctive norms component among 176 racially (46% White, 16% Asian/Pacific Islander, 14% Black, 4% multiethnic, 20% other) and ethnically (42% Latinx) diverse college students in a large,

southern university (Steers et al., 2016). Interestingly, but unfortunately, the PFI condition with injunctive norms did not result in a reduction in drinking over and above the PFI with descriptive norms only. Steers and colleagues (2016) posit this may be due to a rise in defensiveness when their positive attitudes towards drinking are questioned. Use of injunctive norms, then, may require extra sessions or an in-depth component of prevention strategies to decrease defensiveness (Steers et al., 2016).

The importance of reference groups

When conducting research on descriptive and injunctive norms, it is important to take into account relevant reference groups. A reference group is a group of people from which to draw normative information (Borsari & Carey, 2003). In this early meta-analysis, Borsari and Carey found that use of more distal reference groups (e.g., typical student) was associated with stronger normative misperceptions than using more proximal groups (e.g., close friends). This suggests that students may have a more accurate estimation of close friends' drinking patterns than those of typical students, and that perhaps using more proximal reference groups as an anchor for intervention may result in greater reduction of alcohol consumption.

The reasoning for using more proximal reference groups is supported by Social Identity Theory (Tajfel & Turner, 2004), which states that our identity is formed in part by the groups with which we regularly interact. The more we identify with a certain group, the stronger the influence this group will have over our behavior. For example, research shows that stronger ethnic identification and pride is protective against depressive symptoms among a sample of college student non-White immigrants (Thibeault, Stein, & Nelson-Gray, 2018), indicating the importance of in-group

identification for maintaining positive behavior, thoughts, and emotions. Translating this theory to college student drinking, using a proximal reference group (as opposed to a distal group) will raise the likelihood that students will identify strongly with that group, thereby increasing the salience of the social norms approach to intervention to reduce alcohol consumption. Several studies have added evidence to this assertion (e.g., Rimal & Real, 2005; Reed, Lange, Ketchie, & Clapp, 2007). One study investigated social identity in more depth, analyzing identity in 4 components: perceived importance of the group, commitment to the group, superiority over other groups, and deference to the group's leaders (Rinker & Neighbors, 2014). In this study, perceived importance, commitment, and deference moderated the association between descriptive norms and drinking behavior such that stronger identity through these components strengthened the relation between descriptive norms and drinking. Perceived superiority over other groups did not significantly change this relationship. Taken together, reference groups are important factors in understanding the mechanisms of social normative influence on drinking, and the ways in which one identifies with a group can have important implications for research and intervention.

The majority of the literature examining reference groups has focused on close friends, typical students, typical same-sex students, and parents or family members as referents among primarily NHW samples, with little attention to ethnic minority samples. A seminal study by Neighbors and colleagues (2008) compared descriptive and injunctive norms for typical student, typical same-sex student, friend, and parent reference groups. Interestingly, findings suggested that descriptive norms for distal referents, in this case typical and same-sex students, were strongly related to one's own

drinking for descriptive norms, while distal reference groups for injunctive norms were negatively associated with drinking. However, injunctive norms for proximal groups such as close friends were still positively associated with alcohol intake. The findings were largely replicated by Lac and Donaldson (2018), who investigated parent, friend, and typical student norms using a longitudinal study design. Authors found that injunctive norms for typical students actually decreased intake, whereas injunctive norms among close friend and parent referents increased positive attitudes towards alcohol and increased consumption. Overall results indicated that distal norms (i.e., typical student) had less influence over alcohol attitudes and behavior than proximal norms (Lac & Donaldson, 2018). Another study used closest friend, a person whose opinion the participant valued the most, closest family member, and typical student as reference groups. As expected, descriptive and injunctive norms for closest friend was the strongest predictor of personal drinking, followed closely by a person whose opinion that mattered most. In this study, typical student descriptive norms were negatively associated with drinking patterns, yielding mixed results with general findings in the literature. In sum, it appears that close friend descriptive norms are the most reliable predictor of personal drinking in NHW samples. Norm perceptions become increasingly more inaccurate with more distal reference groups. Additionally, because injunctive norms vary widely with drinking patterns, it is recommended that proximal groups be used when including injunctive norms in alcohol use interventions (Neighbors et al., 2008).

Racial reference groups among ethnic minorities

Racial and ethnic reference groups have been studied in the social drinking norms literature, though significantly less extensively than convenience samples of college

students, which are typically majority NHW. Larimer et al. (2009) conducted a study with first-year undergraduates (n = 1,276) from a northwestern university, the majority of which were female (58%). Participants identified as primarily NHW (54%) and Asian (31%), while only 1% were AI. The authors measured ethnicity in broad terms (e.g., "typical student of the same ethnicity" as the participant). This study tested same-race/ethnicity norms along with same-sex and typical student norms. The results indicated that all reference groups were estimated to drink at higher rates than one's own, and that reference groups should be tailored to include a degree of specificity beyond typical students (e.g., typical *and* same-sex student). Though the authors did not specify any particular race or ethnicity, this study showed promising results for using same race/ethnicity as a valid and useful reference group.

As a next step, Larimer and colleagues (2011) studied race/ethnicity reference groups specifically among Asian American college students. The authors measured descriptive norms using typical student, typical same-sex student, typical Asian student, and typical Greek life student reference groups in a sample of Asian American students. As expected, students overestimated norms for all groups; however, estimated norms were more inaccurate for distal groups (e.g., typical students) than they were for proximal groups (e.g., typical Asian students). Here, same-race/ethnicity norms were positively related to personal drinking patterns, further supporting race/ethnicity as an important factor to include in the norms literature (Larimer et al., 2011).

LaBrie and colleagues (2012) then compared normative influences between Hispanics and NHWs. The sample consisted of primarily NHWs (81.4% NHWs versus 18.6% Hispanics) from 2 west coast universities. Interestingly, and unexpectedly, the

association between personal drinking and same-race/ethnicity normative perceptions was weaker among Hispanics than NHWs. Typical student norms actually predicted drinking better than did same-race/ethnicity norms for Hispanics. Researchers posit that drinking may not be as central to Hispanic college student culture as it is for NHW students, and that stronger identification with Hispanic ethnicity may serve as a protective factor of hazardous drinking (LaBrie et al., 2012). However, this explanation is purely speculative and requires further research. Other researchers have replicated these results longitudinally. For example, one study investigated the role of drinking norms during the switch from high school to college in an ethnically diverse sample (N = 2,247; 54% NHW, 18% Asian, 15% Hispanic or Latinx, 11% other; Stappenbeck, Quinn, Wetherill, & Fromme, 2010). Surprisingly, they found that drinking norms more accurately predicted personal alcohol use for NHW students than for Asians and Hispanics. According to the authors, these results suggest that alcohol use may not be thought of as a crucial aspect of the college student environment for ethnic minority students in the same way that it may be for NHW students.

Martin et al. (2013) sought to replicate these results in Black college students. This study compared typical student, same-gender student, same-gender White student, and same-gender Black student reference groups in a sample of 130 Black students. As in the study by LaBrie and colleagues (2012), Martin et al. (2013) demonstrated that perceived descriptive norms were higher for NHW student norms than Black student norms. Additionally, the typical student reference group was the only significant predictor of personal alcohol use. The authors discussed that same-race/ethnicity norms may be influential only to the extent that the individual identifies drinking as part of their college

student experience. An interesting question raised by this study is how Black students view the typical college student. Previous research in a predominantly NHW student sample found that most individuals perceive the "typical college student" as NHW and male (Lewis & Neighbors, 2006). It may be that students in different settings, such as a historically Black university, assign different qualities to their perception of the typical student, thus providing a possible explanation as to why typical student norms significantly predict personal drinking while typical Black student norms do not. It would likely be beneficial to investigate how the "typical student" is perceived among ethnically diverse samples. Lastly, the authors suggest investigating injunctive norms in addition to descriptive norms, as injunctive norms may be more salient in this population.

Drinking among AI college students

Much research has examined drinking rates among AI college students, as college students in general are a highly-studied population for alcohol use. Many studies document drinking patterns by college, city, or region. For example, one study by Greenfield and colleagues (2018) examined a sample of 347 AI college students from a large Southwest city and revealed that 43% of student used alcohol in the past month, and a smaller percentage (27%) reported binge drinking. The rates observed in this study were relatively low given that about 38% of students in general binge drink (Center for Behavioral Health Statistics and Quality, 2016). These numbers may increase when looking at national surveys; an analysis of the American College Health Association, which included over 2,000 AI students, found that up to 60% of AIs reported past-month drinking (Fish et al., 2017). Another study comparing 43 AIs and 87 NWHs in the Midwest found that AIs drank less than half as much as NWHs (Looby, Luger, &

Guartos, 2017). On the other hand, a sample of 298 Northern U.S. college students (68.3% NHW, 14.1% AI, 17.5% other) reported similar binge drinking rates across ethnicities, about 4 episodes per month (Skewes & Blume, 2015). As this literature suggests, there can be varied results across regions and tribes. It may therefore be beneficial to increase research within individual regions, as national studies often mask the variability found among these separate communities.

Currently, only two studies to date analyzed descriptive norms for drinking among AI college students. Larimer and colleagues (2019) studied descriptive norms among AI students enrolled in tribal college and universities, which are college/university institutions that serve primarily AI students (United States Department of Education, 2016). Larimer and colleagues found AI students overestimate descriptive norms for AI drinking, consistent with research on NHW samples, and greater misperceived norms were positively associated with personal drinking levels. Hagler, Pearson, Venner, and Greenfield (2017) used typical student, typical AI student, typical White student, and best friend as the descriptive reference groups and compared the strength of these norms between 147 AIs and 246 NHWs from a large Southwest university. Overall, norms for best friends were the lowest regardless of ethnicity. Though there were no other significant differences broken down by race, all norm groups were associated with personal drinking. In this study, same-race/ethnicity norms were not particularly more helpful than typical student norms, but using them may be beneficial among AIs in order to diminish false stereotypes about AI drinking patterns and could facilitate ethnic awareness and pride.

To summarize, findings have been mixed regarding the added utility of same-race/ethnicity norms over typical student norms. It appears as though this level of specificity could be useful for some ethnic groups (e.g., Asian students; Larimer et al., 2011), but not for others (e.g., Black students; Martin et al., 2013). Authors agree that differences in the strength of cultural identification provide a plausible explanation behind results that are inconsistent with the principles of social identity theory. Nevertheless, research is still limited in this area and requires a more in-depth investigation as to how and why certain normative perceptions matter for AIs in particular. While Hagler et al. (2017) and Larimer et al. (2019) furthered important research in an underserved and underrepresented population, they did not investigate the role of injunctive norms in AI drinking. Furthermore, students in these samples were located in a specific city in the Southwestern United States and in tribal colleges and universities, which limits generalizability to other AI populations. As it is known that drinking patterns vary widely across the country (Ward & Ridolfo, 2011), this research needs to be extended to include other AI student populations and include injunctive norms as a potential factor in risky drinking. Moreover, studies that investigate drinking norms in ethnically diverse populations continually fail to assess the strength of cultural identification, which may hold important information as to the underlying reason for the varied results often presented in this literature.

Aims and hypotheses of the current study

The current study aims to examine descriptive and injunctive norms of AI college students using typical student and AI student reference groups. It is hypothesized that students will overestimate descriptive and injunctive drinking norms for both typical

student and AI student groups. Considering the previous mixed findings in this literature, it is further hypothesized that AI student norms will not be significantly related to personal drinking *over and above* typical student norms. Finally, it is hypothesized that AI ethnic identity will moderate the relationship between norms and personal alcohol use such that greater same-race/ethnicity norms will be more strongly associated with alcohol use levels among those with lower ethnic identity.

APPENDIX B: INSTITUTIONAL REVIEW BOARD APPROVAL FORM

Date: 03/24/2020

Application Number: IRB-20-127

Proposal Title: Social norms of alcohol use among American Indians

Principal Investigator: Susie Lopez

Co-Investigator(s):

Faculty Adviser: Thad Leffingwell

Project Coordinator:

Research Assistant(s): Delaney Dunn, Emily Birkel

Processed as: Exempt
Exempt Category:

Status Recommended by Reviewer(s): Approved

The IRB application referenced above has been approved. It is the judgment of the reviewers that therights and welfare of individuals who may be asked to participate in this study will be respected, and thatthe research will be conducted in a manner consistent with the IRB requirements as outlined in 45CFR46.

This study meets criteria in the Revised Common Rule, as well as, one or more of the circumstances for which continuing review is not required. As Principal Investigator of this research, you will be required to submit a status report to the IRB triennially.
The final versions of any recruitment, consent and assent documents bearing the IRB approval stamp are available for download from IRBManager. These are the versions that must be used during the study.

As Principal Investigator, it is your responsibility to do the following:

1. Conduct this study exactly as it has been approved. Any modifications to the research protocol must be approved by the IRB. Protocol modifications requiring approval may

include changes to the title, PI, adviser, other research personnel, funding status or sponsor, subject population composition or size, recruitment, inclusion/exclusion criteria, research site, research procedures and consent/assent process or forms.

2. Submit a request for continuation if the study extends beyond the approval period. This continuation must receive IRB review and approval before the research can continue.

3. Report any unanticipated and/or adverse events to the IRB Office promptly.

4. Notify the IRB office when your research project is complete or when you are no longer affiliated with Oklahoma State University.

Please note that approved protocols are subject to monitoring by the IRB and that the IRB office has the authority to inspect research records associated with this protocol at any time. If you have questions about the IRB procedures or need any assistance from the Board, please contact the IRB Office at 405-744-3377 or irb@okstate.edu.

VITA

Susanna Victoria Lopez

Candidate for the Degree of

Doctor of Philosophy

Dissertation: SOCIAL NORMS OF ALCOHOL USE AMONG AMERICAN INDIAN
COLLEGE STUDENTS

Major Field: Psychology

Biographical:

Education:

Completed the requirements for the Doctor of Philosophy in Psychology at
Oklahoma State University, Stillwater, Oklahoma in July, 2022.

Completed the requirements for the Master of Science in psychology at
Oklahoma State University, Stillwater, Oklahoma in 2018.

Completed the requirements for the Bachelor of Science in your major at the
University of Arizona, Tucson, AZ in 2016.

Experience:
2020 – present   Trainee, Native Children's Research Exchange (NCRE)
                    Scholars program
Spring 2021   Research Assistant, REACH Lab
2016 – present   Graduate Student, Tobacco, Health, and Drinking Lab

Professional Memberships:
Association for Behavioral and Cognitive Therapies
        Addictive Behaviors Special Interest Group (SIG)
        Native American Issues in Behavioral Therapy and Research SIG
Psychology Graduate Student Association, Oklahoma State University;
Psychology Diversified Students Program, Oklahoma State University
Psi Chi, The International Honor Society of Psychology