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Understanding the Effects of Sexual Victimization on Substance Use Among American Indian Youth: Exploring the Moderating Effects of Cultural Identity

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Abstract: Extant literature consistently suggests that sexual victimization is linked to deleterious behavioral health consequences. This study utilized a general strain theory (GST) framework, integrated with an indigenist stress-coping paradigm (ISCP), to examine the relationship between sexual assault and alcohol and marijuana use among a sample of American Indian / Alaska Native (AI/AN) youth attending school on or near Indian reservations. Ordinary least squares (OLS) regression models were estimated to test the mediation and moderation hypotheses within GST. Special attention was paid to the role of AI/AN cultural identity as a moderator in the sexual assault – substance use relationship. Results indicate mixed support for hypotheses drawn from GST.

Keywords: sexual assault, substance use, American Indian, general strain theory

Introduction

Extant literature consistently suggests that sexual victimization during childhood/adolescence is associated with several deleterious mental and behavioral health outcomes including alcohol and substance use (Simpson & Miller, 2002; Tonmyr & Shields, 2017). While sexual victimization cuts across all demographic categories, segments of the population are disproportionately affected by sexual violence, including American Indian and Alaska Native (hereafter AI/AN) populations. In the United States, 27.5 % of AI/AN men and 56.1 % of AI women (Rosay, 2016) report experiencing sexual

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violence in his or her lifetime. Despite the prevalence of sexual victimization (Rosay, 2016), little is known about its effects among AI/AN youth or about protective factors that may work to buffer youth from the negative consequences associated with victimization.

Prior research (Eitle & Eitle, 2016; Eitle *et al.*, 2013) has suggested that Agnew's (1992) general strain theory (GST) may yield particular utility in examining the associations between experiences of strain and negative outcomes among AI/AN youth. While prior research (Eitle & Eitle, 2016; Eitle *et al.*, 2013) has found measures of strain to be associated with negative outcomes among AI/AN youth, there is little prior research that has examined the association between sexual victimization and negative outcomes among AI/AN youth. Furthermore, research examining culturally relevant factors that may condition the effects of sexual victimization on alcohol and marijuana use among AI/AN youth remains underdeveloped.

The current study has two primary aims. First, this study seeks to fill the empirical gaps in our knowledge concerning the effects of sexual victimization on alcohol and marijuana use among AI/AN youth. Second, this study aims to examine the operation of a novel and culturally relevant conditioning factor, AI/AN cultural identity, in the strain - delinquency relationship among AI/AN youth.

Literature Review

Theoretical Framework

Agnew's (1992) general strain theory (GST) emphasizes negative events and relationships with others as primary causal factors in the etiology of delinquency, positing that negative events generate negative emotions with which individuals must then cope, with delinquency being one possible coping strategy. While there are a multitude of potential strains, Agnew (2001) specified that strains most likely to lead to delinquent coping are those that are: (1) perceived as unjust; (2) high in magnitude; (3) associated with low levels of social control, and (4) those that create some pressure or incentive for criminal or delinquent coping (p. 326).

Within a GST paradigm, victimization has been specified as a criminogenic strain (Agnew, 2006). Previous studies have found that AI/AN individuals are at an increased risk of experiencing gendered violence (Rosay, 2016). Experiencing sexual violence, particularly in childhood or adolescence, has been linked to several deleterious short- and long-term consequences across several life domains (Schuyler & Catania, 2022), including negative emotional reactions like depression and anger (Sigfusdottir *et al.*, 2008), substance use (Carson *et al.*, 2009), and violent/aggressive behavior (Constantin & Boyett, 2021). The link between sexual victimization and negative emotions is

particularly important to understand considering that AI/AN youth have the highest suicide rates among racial and ethnic groups in the United States (Yoder *et al.*, 2006).

Research over the last two decades has generally supported the notion that strain is associated with negative outcomes ranging from delinquency to substance use (Agnew, 2006, 2013; Aseltine *et al.*, 2000; Brezina, 2018; Froggio, 2007; Hay & Evans, 2006; Lin *et al.*, 2011).

Studies specific to AI/AN youth have found associations between recent negative life events (e.g., death of a parent, victimization, and severe injury in the past year), criminal victimization, and heavy alcohol and marijuana use, along with an increased risk for involvement in general, violent, and property delinquency (Eitle & Eitle, 2016; Eitle *et al.*, 2013). More recently, Baek *et al.* (2018), found strain, conceptualized as family indifference, to be associated with assault, property destruction, and theft. Extending beyond strictly delinquent outcomes, Walls *et al.* (2007), found that caretaker rejection, coercive parenting, negative school attitudes, and perceived discrimination to be associated with suicidal ideation and suicide attempts in a sample of AI/AN youth residing in Canada and the Midwestern United States.

Negative Emotions and Mediation of the Strain - Delinquency Relationship

The relationship between strain and delinquency is posited to be mediated by negative emotions, namely anger (Agnew, 1992, 2006). Anger is conducive to delinquent coping because of its effects on cognition and decision-making processes (Agnew, 1992, 2006; Litvak *et al.*, 2010), lowering inhibitions, reducing rational thought, and energizing one for action (Agnew, 2006; Brezina, 1996; Broidy, 2001), suggesting a potential reduction in the ability to cope in a legal manner while also lessening the perceived costs associated with delinquent coping. However, due to its effects and mechanisms of action, anger may be more relevant to understanding externalizing behaviors like interpersonal violence and aggression (Agnew, 1990a, 2001, 2013), rather than internalizing behaviors like alcohol or substance use (Aseltine *et al.*, 2000; Broidy & Agnew, 1997; Moon *et al.*, 2009; Posick *et al.*, 2013).

While research has generally been more supportive of anger as a mediator in relationships between strain and violent and property offending (Hay & Evans, 2006; Jang & Johnson, 2003; Mazerolle & Piquero, 1997; Mazerolle *et al.*, 2003; Ganem, 2010; Moon, *et al.*, 2009), less support has been found for anger as a mediator between strain and drug use (Aseltine *et al.*, 2000; Hay & Evans, 2006; Mazerolle *et al.*, 2000). However, mediation of the strain - delinquency relationship through anger is not unequivocal, as other studies have found no evidence that anger mediates the pathway between strain and delinquent coping (Mazerolle & Piquero, 1997; Piquero & Sealock, 2004).

Research on the mediating role of anger with AI/AN samples has been just as equivocal. Supporting GST's mediation hypothesis, Baek *et al.* (2018) found that anger mediated the relationship between family indifference and delinquency, while Walls and colleagues (2007) found that anger mediated the links between coercive parenting, perceived discrimination, and suicidal thoughts. However, Eitle and Eitle (2016) found that anger did not mediate the link between negative life events and marijuana use among AI/AN youth.

While anger has gotten the majority of the theoretical and empirical attention (Agnew, 2006; Froggio, 2007), theoretical statements (Agnew, 2006), and prior research (Eitle *et al.*, 2013; Kaufman, 2009; Manasse & Ganem, 2010), suggest that other emotions, like depression, may also mediate the link between strain and delinquency, and that depression may be more likely to lead to internalizing acts of delinquency like alcohol and substance use (Aseltine *et al.*, 2000; Broidy & Agnew, 1997; Moon *et al.*, 2009; Posick *et al.*, 2013). Furthermore, depression, particularly in adolescents, has been associated with irritability and aggressiveness (Grisso, 2008), which may increase the likelihood of delinquency by predisposing an individual to react to strain with anger (Agnew, 2006).

As with anger, the role of depression as a mediator in the strain – delinquency relationship has produced equivocal results with AI/AN samples. In support of the mediation hypothesis, Eitle *et al.* (2013) found that depression mediated the link between recent negative life events (e.g., death of a parent, witnessed or experienced victimization) and heavy alcohol use among AI/AN youth, while Baek *et al.* (2018) found that depression mediated the relationship between family indifference and delinquency. Additional support for the role of depression as a mediator can be found in the work of Walls *et al.* (2007) who found that depression mediated the association between coercive parenting, perceived discrimination, and suicidal thoughts. Eitle *et al.* (2013) failed to find support for depression as a mediator between recent negative life events (e.g., death of a parent, witnessed or experienced victimization) and marijuana use.

Moderation of the Strain – Delinquency Relationship

Within GST (Agnew, 1992), there are personal and social resources that are theorized to both directly affect delinquent outcomes and also interact with strain to either decrease or increase the likelihood of delinquent coping. Protective factors that are theorized to directly and indirectly decrease the likelihood of responding to strain with delinquency include social support (Agnew, 2006; Nurullah, 2013; Thoits, 2010) and parental monitoring (Agnew, 2006) while factors that are theorized to directly increase the likelihood of responding to strain with delinquency include associations with delinquent peers (Agnew, 1992).

Overall, research on the moderating factors identified within a GST paradigm has produced mixed results. Some studies have found support for the hypothesized effects of personal and social resources (Agnew, 2006, 2013; Eitle & Turner, 2003; Hay & Evans, 2006; Paternoster & Mazerolle, 1994), while other studies have found little support for conditioning effects predicted by GST (Agnew, 2006, 2013; Aseltine *et al*., 2000). Still other studies have found evidence that moderating variables have the opposite effect of that predicted by GST (Aseltine *et al*. 2000; Paternoster & Mazerolle, 1994), or have an effect for some types of delinquency and not others (Mazerolle & Maahs, 2000).

Inconsistent results have also been observed when examining the moderating effects of personal and social resources among AI/AN youth. Eitle and Eitle (2016) found that a composite measure of social support weakened the link between recent negative life events and delinquency only when levels of social support were high. Under conditions of moderate social support, the link between negative life events and delinquency was strengthened. Similarly, Eitle *et al*., (2013) found that the effects of parental monitoring were dependent upon stress levels while alcohol and marijuana use were affected by substance using peers.

The inconsistent findings reviewed above may be attributed to the fact that "there are hundreds of coping strategies from which to choose" (Agnew, 2013, p. 660). Considering the abundance of coping strategies and the inconsistent findings outlined above, there have been renewed calls in the literature to examine additional personal and social resources that may moderate the relationship between strain and delinquent coping (Agnew, 2013; Jang & Johnson, 2004; Mazerolle & Maahs, 2000).

AI/AN Cultural Identity as a Protective Factor

One such personal and social resource that may moderate the strain – delinquency relationship is AI/AN cultural identity. While the construct of AI/AN cultural identity has been referred to and measured in different ways across studies (Herman-Stahl *et al*., 2003; Morris & Wood, 2010; Whitbeck *et al*., 2001), measurement instruments consistently tap into similar elements that generally assess "the degree to which individuals are embedded in their cultures" (Whitbeck *et al*., 2014, p. 33), suggesting shared aspects of cultural knowledge and participation, identification with culture, and attachment both to one's culture and to one's cultural group (Phinney, 1996).

While the incorporation of culturally specific moderators within a GST framework, is informed by prior research (Eitle & Eitle, 2016; Pavkov *et al*., 2010; Pérez, *et al*., 2008; Turanovic & Pratt, 2017), it is also informed by the indigenist stress-coping paradigm (ISCP) (Walters *et al*., 2002). The ISCP shares similarities with GST in terms of the recognition that negative experiences are associated with an increased risk

for negative outcomes. The ISCP diverges from GST in that it focuses specifically on AI/AN cultural strengths as potential protective factors against maladaptive outcomes in response to adverse experiences. Furthermore, the ISCP broadens the scope of inquiry to include the recognition of the ongoing effects of colonization, oppression, and historical trauma in the lives of contemporary AI/AN peoples.

Shared histories of colonization and oppression (Brave Heart & De Bruyn, 1998), worldviews that contrast with that of the dominant culture (Duran & Duran, 2002; Whitbeck *et al.*, 2001), combined with the isolation typical of many, but not all, Indian reservations (National Congress of American Indians, 2020), suggest that AI/AN youth likely grow up in the midst of historical and social environments that are qualitatively different from any other racial/ethnic group in the United States (Pridemore, 2004), and these social environments "differentially shape lives by influencing values, beliefs, and identities" (Whitbeck *et al.*, 2014, p. 7). Whitbeck *et al.* (2014) argue that these developmental contexts are so different that they must be considered when understanding the etiology of, and risk and protective factors for delinquency among AI/AN youth and adolescents.

Previous research suggests that identification with one's culture may have protective effects for AI/AN individuals. Wolsko *et al.*, (2007), found that enculturation "defined as a process where individuals learn about and identify with their ethnic minority culture" (p. 52) promoted greater levels of happiness, more frequent use of religious and spiritual coping, and less frequent use of drugs and alcohol among Yup'ik people of the Yukon-Kuskokwim Delta region. LaFromboise *et al.* (2006) found that increased enculturation (i.e., participation in traditional cultures, identification with AI/AN culture, and spiritual involvement) was positively associated with school involvement including positive attitudes towards school and academic achievement among AI/AN youth in the Upper Midwest. These results were consistent with an earlier study by Whitbeck *et al.* (2001) that also found enculturation to be positively linked to school attitudes and achievement. Similarly, Stumblingbear-Riddle and Romans (2012) reported similar results linking enculturation to school success amongst AI/AN youth in an urban setting in the Southwest.

In regards to alcohol use, Yu and Stiffman (2007) found that AI/AN cultural pride/spirituality reduced symptoms of alcohol abuse and dependence among AI/AN youth residing on reservations and in urban areas. Similar results were reported by Kulis *et al.* (2014) who found that AI/AN spirituality and religious involvement were protective against alcohol and polydrug use for urban AI/AN youth in the Southwest. Pu *et al.* (2013) found that an interest in learning about traditional culture indirectly protected AI/AN youth on a rural Midwestern reservation against violence through increased parental monitoring and self-efficacy to avoid violence.

Strongly identifying with and participating in traditional cultural activities has also been identified by AI/AN youth in qualitative studies as a buffer and source of strength against adverse experiences (McMahon *et al.*, 2013). Research has also found that increased identification with and involvement in AI/AN culture is protective against suicidal ideation in AI/AN youth residing on reservations in the Upper Midwest (Yoder *et al.*, 2006). Chandler and LaLonde (1998) found that cultural renewal efforts (e.g., self-government, control over traditional lands, education, the presence of cultural facilities) among tribes were associated with reduced rates of youth suicide among Canadian First Nations peoples, who share similar histories and social problems experienced by AI/AN peoples in the United States (Fast & Collin-Vézina, 2010).

A strong sense of AI/AN cultural identity may weaken the relationship between victimization and substance use for AI/AN youth. Increased identification with AI/AN culture may provide a value structure and meaning to life (Morris & Wood, 2010), prosocial role models who can provide social support and assist in the development of prosocial coping skills (Agnew, 1992), and provide a source of strong social bonds (Hirschi, 1969). However, research has also found that the protective effects of identification with AI/AN culture are not equivocal.

AI/AN Cultural Identity as a Risk Factor

Among a sample of non-reservation AI/AN youth in Oklahoma, Morris *et al.*, (2006) found that increased attachment to traditional culture was associated with tobacco, alcohol, marijuana, and other drug use. Again, utilizing a sample of AI/AN youth residing off reservations in Oklahoma, Morris and Wood (2010) found that increased traditionalism was associated with an increased likelihood of interpersonal and property delinquency and substance use. Furthermore, Whitbeck *et al.* (2002) found that involvement in traditional activities (e.g., attending pow-wows, speaking the traditional language, participating in traditional activities) was associated, albeit weakly, with gang involvement among AI/AN youth on reservations in the Upper Midwest. Wolsko *et al.* (2009) found smokeless tobacco use to be associated with greater enculturation in a Yup'ik lifestyle among Yup'ik people of the Yukon-Kuskokwim Delta region in Western Alaska.

Although speculative (Soto *et al.*, 2016), one way that increased cultural identification may be a risk factor for negative outcomes lies in the possibility that increased identification and participation in cultural activities may remind AI/AN youth of a painful historical past that may lead to substance use in order to cope with feelings of distress. Research suggests that reminders and thoughts of these losses may not be rare among AI/AN youth and that they may have deleterious effects. Whitbeck (2006) found that 10% to 25% of adolescents residing on reservations in the Upper Midwest

thought about historical losses at least daily, and that these thoughts were associated with depressive symptoms. In a study of AI/AN youth drawn from reservation and urban areas in California, Soto *et al.* (2015) found that 21% of adolescents reported thinking about historical trauma at least daily and that these thoughts were positively related to cigarette smoking.

A second area of speculation for the observed relationship between cultural identity and negative outcomes centers around the possibility that increased involvement in traditionalism leads to objective or subjectively perceived instances of discrimination against youth whom present as more "conspicuously AI/AN" than others (Whitbeck *et al.*, 2002). In a study of AI/AN high school students residing on a reservation in Northern Michigan, Harman (2017) found that increased cultural involvement was related to higher rates of perceived discrimination among youth. Furthermore, it is speculated that increased levels of traditionalism may be associated with strain via processes of acculturative stress (Eitle & Eitle, 2016; Morris & Wood, 2010), as AI/AN values and beliefs may conflict with those of the dominant society (Healey, 2013). Lynse and Levy (1997) speculated that AI/AN youth residing on or near reservations may face conflict when deciding between maintaining traditional cultural ways and pursuing success in the dominant culture that may necessitate leaving their communities (e.g., college, employment opportunities).

The Current Study

The purpose of this study is to build upon the work begun by scholars like Pérez *et al.*, (2008) of integrating culturally relevant moderators into GST. This integration may produce a more thorough and nuanced understanding of the ways in which exposure to strain, negative affect, and culturally relevant resources work to influence delinquent coping among AI/AN youth. Drawing from GST, I hypothesize that sexual victimization will be positively associated with alcohol and marijuana use in the last 30 days. Anger and depression will mediate the relationship between sexual victimization and alcohol and marijuana use in the last 30 days. Due to the equivocal findings regarding AI/AN cultural identity as a protective or risk factor, there is no hypothesis concerning the potential moderating effects of AI/AN cultural identity.

Method

The data for this study come from the Drug Use Among Young American Indians: Epidemiology and Prediction, 1993-2006 and 2009-2013 study (DUAYAIEP) and was obtained through the Inter-university Consortium for Political and Social Research (ICPSR) at the University of Michigan. The DUAYAIEP utilized a repeated cross-sectional design of 26,451 youth and adolescents who attended schools on or

near Indian reservations, with at least 20% of the student body identifying as AI/AN (Beauvais & Swaim, 2015). The sample was stratified by geographic region (i.e., Northwest, Northern Plains, Upper Great Lakes, Southeast + Texas, Southwest), so the number of respondents from each region approximated the proportion of AI/ANs comprising the general population of each region (Beauvais & Swaim, 2015; Snipp, 2005).

The DUAYAIEP is ideal for testing hypotheses drawn from GST with AI/AN youth, a population that is often neglected in sociological and criminological theory (Martín, 2012) and research (Morris & Wood, 2010). The existing data also allows for the measurement of sexual assault as a type of strain which has not been included in prior tests of GST with AI/AN samples (Baek *et al.*, 2018, Eitle & Eitle, 2016, Eitle *et al.*, 2013). Additionally, the DUAYAIEP includes the Orthogonal Cultural Identification Scale (OCIS) (Oetting & Beauvais, 1991). The inclusion of the OCIS allows for the examination of the conditioning effects of AI/AN cultural identification on substance use outcomes.

Sample

The sample for this study was drawn from the third wave (2009-2013) of the DUAYAIEP study. Only those respondents identifying as AI/AN only were included in the study. Cases with missing data were dropped from the dataset, resulting in a final listwise sample of N = 2,457. The listwise sample was nearly evenly split by gender with 48.7% of respondents identifying as male and 51.3% identifying as female, with an average age of 14.82 years (see Table 1).

Measures

Dependent Variables

There are two dependent variables of interest in this study: alcohol use and marijuana use. Use is conceptualized here as the frequency or rate of use during the last 30-days. A 30-day reference period was used because a shorter reference period is less susceptible to recall concerns (Johnson, 2014). Alcohol and marijuana use were each assessed with single item measures that asked respondents how often they had used alcohol or marijuana in the last 30 days. Response options for alcohol use were categorized on a five-point ordinal scale and included 1 = *Never,* 2 = *1 – 2 times,* 3 = *3 – 9 times,* 4 = *10 – 19 times,* and 5 = *20+ times* (recoded so 0 = *Never* to 4 = *20+ times*). Response choices for marijuana use were categorized on a six-point ordinal scale and included 1 = *Never,* 2 = *1 – 2 times,* 3 = *3 – 9 times,* 4 = *10 – 19 times,* 5 = *20+ times,* and 6 = *Several times every day* (recoded so 0 = *Never* to 5 = *Several times every day*).

The decision to focus on alcohol and marijuana use stems from high prevalence rates for AI/AN youth residing on or near reservations; rates which are often significantly higher than those of youth in the general population (Kulis *et al.*, 2002; Stanley *et al.*, 2014). While there is an extraordinary variation in cultures and in the prevalence and variations in use across tribes and regions, prior research has found that AI/AN youth generally begin using substances earlier and progress to more regular use more rapidly than their non-AI/AN counterparts (Beauvais, 1998; Cheadle & Whitbeck, 2011; Stanley *et al.*, 2014). Early initiation of alcohol and substance use has been linked to an increased risk for regular and sustained use (Cheadle & Whitbeck, 2011) and victimization (Turanovic *et al.*, 2015).

Independent Variable

The independent variable in this study, sexual assault, is a type of negative stimuli that has been identified by Agnew (1992, 2006) as one most likely to be criminogenic. Furthermore, sexual assault has been identified in feminist criminology (Chesney-Lind, 1989; Daly, 1992) and in gender and GST literature (Kaufman, 2009) as a risk factor for female delinquency, specifically in the form of internalizing behaviors such as alcohol and substance use as coping mechanisms in response to the strain of sexual assault (Simpson & Miller, 2002; Tonmyr & Shields, 2017). Respondents were asked to indicate if they had ever been sexually assaulted. Response options were categorized as a four-point ordinal item, and were recoded so they ranged from 0 to 3 and included 0 = *Never,* 1 = 1 – *2 times,* 2 = *3 – 5 times,* and 3 = *6+ times.* This variable was dichotomized where 0 = *Never*, 1 = *Any sexual assault.*

Mediating Variables

Anger ($\alpha = 0.89$) is a summated index consisting of six items. Respondents were asked to indicate their level of agreement with the following statements, "I am quick tempered," "I get mad," "I feel like hitting someone," "I lose my temper," "I am hotheaded," "I am angry." Response options were categorized on a four-point ordinal scale and included 1 = *No*, 2 = *Not much*, 3 = *Some*, and 4 = *A lot*. Response options were recoded so they ranged from 0 to 3. The summed index ranged from 0 to 18 and higher scores indicated higher levels of anger.

Depression ($\alpha = 0.92$) is a summated index consisting of seven items. Respondents were asked to indicate their level of agreement with the following statements, "I feel low," "I am unhappy," "I am lonely," "I feel bad," "I feel sad," "I am lonesome," "I am depressed." Response options were categorized on a four-point ordinal scale and included 1 = *No*, 2 = *Not much*, 3 = *Some*, and 4 = *A lot*. Response options were recoded

so they ranged from 0 to 3. The summed index ranged from 0 to 21 and higher scores indicated higher levels of depression.

The measures of negative affect in the DUAYAIEP are likely tapping into trait-based emotion rather than state-based emotion (Kaufman, 2009). Trait-based emotion refers to relatively stable emotional characteristics of individuals (Mazerolle *et al.*, 2003), while state-based emotions are more immediate, situational reactions to strain (Mazerolle *et al.*, 2003). Research suggests that individuals that are high in trait anger or depression are more likely to react to strain with anger or depression (Mazerolle & Piquero, 1997; Mazerolle *et al.*, 2003). Due to data limitations of the DUAYAIEP, trait-based measures of anger and depression are utilized here, as has been the case in prior tests of GST with general population (Kaufman, 2009; Stogner & Gibson, 2010) and AI/AN samples (Eitle & Eitle, 2016).

Moderating Variable

AI/AN cultural identity was measured using the Orthogonal Cultural Identification Scale (OCIS) (Oetting & Beauvis, 1991). The OCIS ($\alpha = 0.91$) is a summated index consisting of six items. Respondents were asked to indicate how much they and their family identified with American Indian culture ("How many special activities/traditions does your family have based on American Indian culture?" "Does your family live by or follow the American Indian way of life?" "Do you live by or follow the American Indian way of life?"), if they would continue to practice American Indian traditions and culture in adulthood ("When you are an adult, will you do special things together or have special traditions based on the American Indian way of life?"), if their family is successful in the American Indian way of life ("Is your family a success in the American Indian way of life?"), and if they see themselves being successful in the American Indian way of life in adulthood ("When you are an adult, will you be a success in the American Indian way of life?"). Response options were categorized on a four-point ordinal scale and included 1 = *A lot*, 2 = *Some*, 3 = *Not much*, and 4 = *None*. Response options were reverse coded and recoded so they ranged from 0 = *None* to 3 = *A lot*. The summated index ranged from 0 to 18 and higher scores indicated greater identification with AI/AN culture.

Control Variables

Control variables for this study include gender (0 = *male*; 1 = *female*), age (in years), age at which the respondent first got drunk or used marijuana (0 = *11 + years of age;* 1 = *10 years of age or below*), and family structure (0 = *other family structure*; 1 = *two parent family*; 1 = *one parent family*). According to Sittner and Hautala (2016), the structure of AI/AN families often differs from non-AI/AN families, with extended family playing

a more prominent role in youth socialization. For this reason, "other family structure" was used as the reference category. Descriptive statistics for study variables are included in Table 1.

Table 1: Descriptive Statistics at Wave 3

Variable	*Mean (SD)*	*Min*	*Max*	*Skew (SE)*	*Kurtosis (SE)*
Dependent Variables					
Alcohol Use	.37 (.72)	0	4	2.14 (.05)*	4.74 (.09)*
Marijuana Use	.95 (1.56)	0	5	1.55 (.05)*	1.09 (.09)*
Independent Variable					
Sexual Assault	.11 (.32)	0	1		
Mediators					
Anger	7.75 (4.88)	0	18	.353 (.05)*	-.792 (.09)*
Depression	6.54 (5.56)	0	21	.736 (.05)*	-.287 (.09)*
Moderators					
AI/AN Identity	12.02 (5.11)	0	18	-.779 (.05)*	-.217 (.09)
Controls					
Sex Female (1) Male (0)	 .51 .49				
Household Structure Two Parent (1) Single Parent (1) Other Living Arrangement (0)	 .38 .45 .16				
Age	14.82 (1.69)	11	21	.221 (.05)*	-.773 (.09)*
Early Marijuana Yes (1)	 .15				
No (0)	.85				
Early Alcohol					
Yes (1)	.05				
No (0)	.95				
Total	2457				

Note. * = $z \geq 1.96$

Analytic Strategy

Ordinary least squares (OLS) regression models were utilized to estimate the effects of sexual assault on alcohol and marijuana use in the last 30 days, along with the influence

of mediators (i.e., anger and depression), and the conditioning effects of AI/AN cultural identity on alcohol and marijuana use in the last 30 days. While it is recognized that ordered response models are a better option for detecting the non-linear effects of strain on delinquency, they are not ideal for detecting interaction effects (Ai & Norton, 2003; Thaxton and Agnew, 2017). Due to the fact that one aim of this study is to examine the conditioning effects of AI/AN cultural identity, a series of OLS regression models were estimated. For similar reasons, OLS models were estimated to facilitate the interpretation of mediation effects. Furthermore, there is support in the literature for using OLS for ordinal outcome variables possessing at least five categories (for instance, see Johnson & Creech, 1983; Liu & Agresti, 2005; Menard, 2002; Sullivan & Artino, 2013). Given the current study's use of five and six-point scales for its dependent variables, OLS is appropriate despite the categorical nature of the measures.

The following models are designed to: (1) examine the direct effects of sexual assault on substance use outcomes; (2) examine the mediating effects of anger and depression on the sexual assault - substance use relationship; (3) examine the conditioning effects, if any, of AI/AN cultural identification on substance use outcomes among AI/AN youth. With the exception of AI/AN cultural identity, one-tailed tests of significance are reported here (at the .001, .01 and .05 level) because the study hypotheses include assumptions about the direction of associations. Two-tailed tests of significance are reported for AI/AN cultural identity (at the .001, .01, and .05 level) because the study hypothesis is non-directional.

There are two sets of OLS models; one for alcohol use in the last 30 days (Table 4) and one for marijuana use in the last 30 days (Table 5). In order to test for mediation, sexual assault will be regressed on each substance use outcome. This is Model 1. Demographic controls will be included in Model 2. The moderating variable will be added in Model 3. Anger will be included in Model 4. Anger will be removed and depression will be added in Model 5. Model 6 is the full model, including all variables. If negative affect fully or partially mediates the strain - delinquency relationship, the effects of sexual assault on alcohol or marijuana use in the last 30 days, should be totally (full mediation) or partially (partial mediation) diminished when measures of anger and depression are controlled for in Models 4-6, while negative affect should remain significant (Hollist *et al*., 2009; Piquero & Sealock, 2004).

Results

Bivariate Results

A series of Pearson product-moment correlations (*r*) (Tables 2 and 3) were examined to determine the strength and significance of the relationships between variables in

the study. Unless otherwise noted, all correlation coefficients were significant the .01 level. As seen in the correlation matrices in Tables 2 and 3, sexual assault was positively associated with alcohol and marijuana use in the last 30 days, being female, anger, depression, and early initiation of marijuana use. Anger and depression were both positively associated with alcohol and marijuana use in the last 30 days. AI/AN cultural identity was positively associated with both alcohol and marijuana use in the last 30 days, albeit weakly.

Table 2: Pearson Product-Moment Correlations Among Variables – Marijuana

	MJ30	*SA*	*FEM*	*FAM2*	*FAM1*	*AGE*	*EMJ*	*AIID*	*ANG*	*DEP*
MJ30	1									
SA	.07**	1								
FEM	-.04**	.20**	1							
FAM2	-.09**	-.04	-.00	1						
FAM1	.04	-.01	.03	-.72	1					
AGE	.16**	.03	-.00	.00	-.01	1				
EMJ	.38**	.06**	-.08	-.07**	.01	-.07**	1			
AIID	.04*	-.02	.04	-.02*	.04*	.04*	.03	1		
ANG	.20**	.16**	.09	-.09**	.04*	.01	.17**	.04*	1	
DEP	.10**	.18**	.10	-.11**	.05**	-.03*	.10**	.02	.62**	1

**Correlation is significant at the 0.01 level (1-tailed)
*Correlation is significant at the 0.05 level (1-tailed)

Table 3: Pearson Product-Moment Correlations Among Variables – Alcohol

	ALC30	*SA*	*FEM*	*FAM2*	*FAM1*	*AGE*	*EALC*	*AIID*	*ANG*	*DEP*
ALC30	1									
SA	.09**	1								
FEM	.05**	.20**	1							
FAM2	-.06**	-.04	-.00	1						
FAM1	.02	-.01	.03	-.72**	1					
AGE	.14**	.03	-.00	.00	-.01	1				
EALC	.18**	.04	-.02	-.06	.02	-.06**	1			
AIID	.04*	-.02	.04*	-.02	.04*	-.01*	-.01	1		
ANG	.21**	.16**	.09**	-.09**	.04*	.01	.07	.04**	1	
DEP	.11**	.18**	.10**	-.11**	.05**	-.03	.04	.02*	.62	1

**Correlation is significant at the 0.01 level (1-tailed)
*Correlation is significant at the 0.05 level (1-tailed)

Multivariate Results

Alcohol Use in the Last 30 Days

In Model 1 (Table 4), sexual assault (b = .21; p < .001) was significantly associated with alcohol use in the last 30 days. In Model 2, with the addition of demographic controls, the main effect of sexual assault (b = .16; p < .001) on alcohol use in the last 30 days remains significant, although diminished. Model 3 is a baseline model including the measure of sexual assault, all controls, and AI/AN cultural identity. In Model 3, sexual assault (b = .16; p < .001) remained significantly associated with alcohol use in the last 30 days. AI/AN cultural identity was not significant in Model 3, or in any additional models.

Anger (b = .03; p < .001) was included in Model 4 and was significantly associated with alcohol use in the last 30 days. With the introduction of anger, the coefficient for sexual assault (b = .10, p < .05) remained significant, although diminished in strength and significance. This suggests partial mediation of the relationship between sexual assault and alcohol use in the last 30 days. In Model 5, depression was substituted for anger. Depression (b = .01; p < .001) was significantly associated with alcohol use in the last 30 days. With the introduction of depression, the coefficient for sexual assault (b = .13, p < .01) remained significant, although diminished in strength and significance. This suggests partial mediation of the relationship between sexual assault and alcohol use in the last 30 days.

Model 6 is the full model that includes all the variables. In the full model, sexual assault (b = .11, p < .05) remained a significant predictor of alcohol use in the last 30 days. Anger (b = .03, p < .001) remained significant in the full model as well. Although depression was a significant predictor of alcohol use in the last 30 days in Model 5, with the addition of both measures of negative affect, the coefficient for depression became negative and non-significant (b = -.00, p = *ns*). Model 6 explained 10% of the variation in alcohol use in the last 30 days.

In order to test for moderation of the sexual assault - alcohol use in the last 30 days relationship by AI/AN cultural identity, an interaction term was constructed (sexual assault x AI/AN cultural identity) and added to the full model. The interaction term was non-significant, suggesting no support for AI/AN cultural identification as a moderator in the relationship between sexual assault and alcohol use in the last 30 days.

Marijuana Use in the Last 30 Days

In Model 1 (Table 5), sexual assault (b = .35; p < .001) was significantly associated with marijuana use in the last 30 days. In Model 2, with the addition of demographic

Table 4: Sexual Assault Regressed on Alcohol Use in the Last 30 Days

Independent Variable	*Model 1*	*Model 2*	*Model 3*	*Model 4*	*Model 5*	*Model 6*	
Strain							
SA[a]	.21*** (.05)	.16*** (.05)	.16*** (.05)	.10* (.05)	.13** (.05)	.11* (.05)	
Controls							
FEMALE		.06* (.03)	.06* (.03)	.04 (.03)	.05 (.03)	.05 (.03)	
FAMTWO[b]		-.11** (.04)	-.11** (.04)	-.08* (.04)	-.09* (.04)	-.08* (.04)	
FAMSING[b]		-.06 (.04)	-.06 (.04)	-.05 (.04)	-.05 (.04)	-.05 (.04)	
AGE		.06*** (.01)	.06*** (.01)	.06*** (.01)	.06*** (.01)	.06*** (.01)	
EALC		.62*** (.07)	.62*** (.07)	.58*** (.07)	.61*** (.07)	.58*** (.07)	
Mediators							
ANG				.03*** (.02)		.03*** (.00)	
DEP					.01*** (.00)	-.00 (.00)	
Moderators							
AI/AN ID			.01 (.00)	.00 (.00)	.00 (.00)	.00 (.00)	
Interaction Term							
SA x AI/AN ID							.01 (.01)
Adj. R^2	.01	.06	.06	.10	.08	.10	

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

Note: Two-tailed tests of significance are reported for AI/AN cultural identity; one-tailed tests are reported for all other variables. The unstandardized coefficient for each variable is presented above the robust standard errors in parentheses. [a] Sexual assault was dichotomized for use in OLS regression (*0* = no assault; *1* = assault). [b] Other living arrangement is the reference category.

controls, the main effect of sexual assault (b = .20; p < .05) on marijuana use in the last 30 days remains significant, although diminished. Model 3 is a baseline model including the measure of sexual assault, all controls, and AI/AN cultural identity. In Model 3, sexual assault (b = .21; p < .05) remained significantly associated with marijuana use in the last 30 days. AI/AN cultural identity was not significant in Model 3, or in any additional models.

Anger (b = .04; p < .001) was included in Model 4 and was significantly associated with marijuana use in the last 30 days. With the introduction of anger, the coefficient for sexual assault (b = .12, p = *ns*) was non-significant, suggesting mediation of the relationship between sexual assault and marijuana use in the last 30 days. In Model 5, depression was substituted for anger. Depression (b = .02; p < .01) was significantly associated with marijuana use in the last 30 days. With the introduction of depression,

Table 5: Sexual Assault Regressed on Marijuana Use in the Last 30 Days

Independent Variable	*Model 1*	*Model 2*	*Model 3*	*Model 4*	*Model 5*	*Model 6*	
Strain							
SA[a]	.35*** (.10)	.20* (.09)	.21* (.09)	.12 (.09)	.16 (.09)	.13 (.09)	
Controls							
FEMALE		-.05 (.06)	-.05 (.06)	-.08 (.06)	-.07 (.06)	-.08 (.06)	
FAMTWO[b]		-.27*** (.08)	-.28*** (.08)	-.24** (.08)	-.25** (.08)	-.24** (.08)	
FAMSING[b]		-.09 (.08)	-.09 (.08)	-.08 (.08)	-.09 (.08)	-.08 (.08)	
AGE		.17*** (.02)	.17*** (.02)	.17*** (.02)	.17*** (.02)	.17*** (.02)	
EMJ		1.63*** (.08)	1.63*** (.08)	1.54*** (.07)	1.61*** (.08)	1.53*** (.08)	
Mediators							
ANG				.04*** (.01)		.05*** (.01)	
DEP					.02** (.01)	-.01 (.01)	
Moderators							
AI/AN ID			.01 (.01)	.01 (.01)	.01 (.01)	.01 (.01)	
Interaction Term							
SA x AI/AN ID							-.00 (.02)
Adj. R^2	.01	.18	.18	.20	.19	.20	

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

Note: Two-tailed tests of significance are reported for AI/AN cultural identity; one-tailed tests are reported for all other variables. The unstandardized coefficient for each variable is presented above the robust standard errors in parentheses. [a] Sexual assault was dichotomized for use in OLS regression (*0* = no assault; *1* = assault). [b] Other living arrangement is the reference category.

the coefficient for sexual assault (b = .16, p = *ns*) was non-significant, suggesting mediation of the relationship between sexual assault and marijuana use in the last 30 days.

Model 6 is the full model, which includes all variables. In the full model, sexual assault (b = .13, p = *ns*) was not a significant predictor of marijuana use in the last 30 days. Anger (b = .05, p < .001) remained significant in the full model. Although depression was a significant predictor of marijuana use in the last 30 days in Model 5, with the addition of both measures of negative affect, the coefficient for depression became negative and non-significant (b = -.01, p = *ns*), suggesting that the relationship between sexual assault and marijuana use is mediated by anger. Model 6 explained 20% of the variation in marijuana use in the last 30 days.

In order to test for moderation of the sexual assault - marijuana use in the last 30 days relationship by AI/AN cultural identity, an interaction term was constructed (sexual assault x AI/AN cultural identity) and added to the full model. The interaction term was non-significant when added to the full model (Model 6), suggesting no support for AI/AN cultural identification as a moderator in the relationship between sexual assault and marijuana use in the last 30 days.

Discussion

In terms the direct effects of sexual assault on alcohol and marijuana use in the last 30 days, results were mixed. In the full models, sexual assault was positively and significantly associated only with alcohol use in the last 30 days, while the relationship between sexual assault and marijuana use in the last 30 days was non-significant.

It is important to note that due to the study's cross-sectional design, it was not possible to establish causality. The use of alcohol or marijuana could occur in response to sexual assault as a coping mechanism (Agnew, 2006; Mulvey *et al.*, 2010) or the use of alcohol or marijuana could precede experiences of sexual assault (Ousey *et al.*, 2011; Turanovic & Pratt, 2013). Finally, it is also possible that the relationship between sexual assault and alcohol use in the last 30 days is spurious and both result from a fixed and stable trait such as low self-control (Gottfredson & Hirschi, 1990; Turanovic *et al.*, 2015; Ward *et al.*, 2015).

In terms of mediation of the sexual assault - substance use relationship by negative affect, the results vary by substance. In terms of alcohol use in the last 30 days, no evidence was found to support mediation of the sexual assault - alcohol use relationship through anger or depression. In terms of marijuana use in the last 30 days, when anger (Model 4) and depression (Model 5) were added in separate models, it appeared that both anger and depression mediated the relationship between sexual assault and marijuana use in the last 30 days, suggesting support for a core tenet of GST. However,

a more complicated picture of the role of negative affect emerges in the full marijuana use model (Model 6). In the full model, anger remained significantly associated with marijuana use in the last 30 days, while depression did not, suggesting that anger may have a more robust effect than depression when the two emotional states are experienced simultaneously.

While the mixed findings and lack of support for the mediating effects of anger or depression in the full alcohol use model and of depression in the full marijuana use model are contrary to hypotheses derived from GST, it is not necessarily surprising as other studies have come to similar conclusions (Aseltine *et al*., 2000; Eitle *et al*., 2013; Mazerolle *et al*., 2004; Mazerolle & Piquero, 1998; Piquero & Sealock, 2004; Stogner & Gibson, 2010; Walters & Espelage, 2017).

The lack of mediating effects in this study may be attributed to a couple of factors. First, GST makes a distinction between trait- and state-based negative emotions (Francis, 2014). Trait-based emotions refer to relatively stable individual emotional dispositions and temperaments, while state-based emotions refer to those emotions specifically occurring in reaction to strains or stressors (Agnew, 2006; Mazerolle *et al*., 2003). While individuals who are high in trait anger or depression may be predisposed to react to strain with negative affect (i.e., anger, depression) (Agnew, 2006; Mazerolle & Piquero, 1997) research that has examined both state- and trait-based measures of emotion has found more robust support for the mediating effects of state-based measures of anger than trait-based measures (Mazerolle *et al*., 2003; Moon *et al*., 2009). The measures of negative affect in the DUAYAIEP, are likely tapping into trait-rather than state-based emotions, and this may explain the mixed findings in this study.

Second, the negative effects of sexual assault likely operate through pathways (e.g., social control, social learning) other than those specified by GST (Agnew, 1992, 2006; Kaufman, 2009). Agnew (2006) has argued as much himself stating that while strain primarily increases the likelihood of delinquency through its effect on negative emotions, it may be that strain increases the likelihood of delinquency in other ways as well by weakening attachments to conventional others (Hirschi, 1969), and by fostering the social learning of crime through exposure to criminal models (Agnew, 2001, 2006; Akers, 1998). The data analyzed here did not allow for an examination of emotions other than anger and depression. However, considering that Agnew (2006) argues that different negative emotions may result in different types of delinquent coping responses, research that considers the role of additional negative emotions (e.g., anxiety and fear) should be extended to AI/AN youth when studying substance use within a GST framework (Daniels & Holtfreter, 2019). Furthermore, for the reasons outlined above, in addition to trait-based measures of emotion, future research would benefit from utilizing state-based measures of negative emotion when examining mediation

pathways within GST, as well as examining the effects of emotions in combination, rather than separately.

Contrary to the theorized role of social supports within GST (Agnew, 1992, 2006) and cultural identity within the ISCP (Walters *et al.*, 2002), no evidence was found that AI/AN cultural identity conditions the relationship between sexual assault and alcohol and marijuana use in the last 30 days. While this finding is disappointing, it is not entirely unexpected as some studies have found that cultural identification is not significantly related to negative outcomes like substance use, depression and suicidality, and other risky behaviors (e.g., sneaking out of the house, skipping school) (Baldwin, *et al.*, 2011; Harman, 2017, Herring, 1994).

The lack of support for AI/AN cultural identity as a significant conditioning factor was consistent with past research that has found non-significant relationships between AI/AN cultural identity and a variety of negative outcomes including substance use and depression (Bates *et al.*, 1997; Baldwin *et al.*, 2011; Harman, 2017; Herring, 1994). It should be noted that cultural identity is a developmental process (Phinney & Ong, 2007) and the importance that an individual attaches to their cultural identity is variable (Phinney & Alipuria, 1990). It is possible that AI/AN cultural identity is not--or not yet--a salient factor for youth in this study and may explain the non-significant findings.

Although it has been a practice in prior research (Morris & Wood, 2006) to use non-specific measures to assess the level of involvement in or identification with AI/AN culture, it is possible that respondents may not connect their identity or lifestyle with "the American Indian way of life", as it is worded in the Orthogonal Cultural Identification Scale (OCIS) (Oetting & Beauvais, 1991). It is important also to remember that the level of participation and the importance placed on traditional ways of life/cultural identity varies across heterogeneous tribal groups (Muckle, 2012) and points to the inherent difficulties in measuring a construct that is as dynamic and complex as cultural identity.

One further explanation for the lack of significant findings include the fact that many tests of hypotheses drawn from GST, like this study, are conducted using survey and cross-sectional data, making it difficult to detect interaction effects (Agnew, 2006, 2013). In recent years, Agnew (2013) has further argued that these inconsistent findings may be attributed in part to the complexity of the coping process and to the fact that "there are hundreds of coping strategies from which to choose" (p. 660).

Future research should continue to examine both the protective and risk factors associated with AI/AN cultural identity. Future research should continue to incorporate indigenist perspectives and worldviews, represented here by the ISCP (Walters *et al.*, 2002), into research that is specific to AI/AN peoples and communities. Future research

should also continue to contextualize and reiterate that the disparities present in too many AI/AN communities today are a result of the colonization process and not a result of inherent pathology or cultural inferiority (Duran & Duran, 1995; Wilmon-Haque & BigFoot, 2008; Whitbeck *et al*., 2014). Whenever possible, researchers should engage in community based participatory research (CBPR) that views AI/AN communities and tribal governments as stakeholders and partners in the research process (Norton & Manson, 1996).

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