Examination of Recreational and Spiritual Peyote Use Among American Indian Youth

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ABSTRACT. Objective: Some American Indians legally use hallucinogenic substances as part of religious and spiritual ceremonies. Research to date has either failed to differentiate spiritual versus recreational use or has categorized hallucinogen use in an “other drug” or “illegal drug” category. This approach could contribute to ineffectual models of prevention and treatment intervention and limit understanding of hallucinogen use in American Indian cultures. **Method:** This study is a secondary data analysis of an ongoing epidemiologic and etiologic investigation of substance use among American Indian youth ($N = 3,861$). Two Firth logistic regression models were run with (a) spiritual peyote use and (b) recreational peyote use as the dependent variables, and grade, sex, 30-day alcohol use, 30-day marijuana use, religiosity, religious affiliation, and cultural identity as predictors, as well as a grade by sex interaction

term. **Results:** Grade, sex, religious affiliation, and the interaction term did not predict either recreational or spiritual peyote use. Thirty-day alcohol and marijuana use predicted both spiritual and recreational peyote use, but the effects were stronger for predicting recreational use. Religiosity and cultural identity predicted spiritual but not recreational use, such that American Indian youth who identified as more religious and identified more strongly with their culture were more likely to report using peyote for spiritual purposes. **Conclusions:** Our results suggest that current self-reported use of alcohol and/or marijuana by American Indian youth indicates an increased likelihood of using peyote. In addition, use of Firth logistic regression models proved feasible for analyzing rare events like peyote use. (*J. Stud. Alcohol Drugs*, 80, 366–370, 2019)

HIGH RATES OF SUBSTANCE USE among American Indian (AI) youth have persisted for decades, with significantly greater AI use reported for most substances compared with same-aged peers in a nationally representative sample of reservation AI youth (Swaim & Stanley, 2018). Swaim and Stanley (2018) report that AI youth use hallucinogens at a higher rate, with 30-day risk ratios ranging from 7.3 for 8th graders to 4.0 for 12th graders. Yet, hallucinogen use, particularly the use of peyote, which can have cultural and religious implications for AIs, has received limited research attention and is often subsumed under broader headings, e.g., illicit drug use, combined with substances such as cocaine, Ecstasy, and methamphetamine (e.g., Tragesser et al., 2010). This characterization may be inaccurate for AIs who use hallucinogens both recreationally and ceremonially. This distinction is important because the purpose of use may determine whether long-term hallucinogen use has deleterious psychological or neurological effects, especially if religious or spiritual use does not include the use of other drugs (Halpern et al., 2005). The current study examines peyote as a stand-alone substance in order to contribute to an emergent understanding of culturally relevant substance use models for adolescents.

Native American peyote use

Native Americans have used peyote as a religious sacrament for thousands of years (Jones, 2007; Stewart, 1987). In the late 1800s, the modern-day Native American Church (NAC) was formed, a key part of which is the ingestion of peyote as a religious sacrament during all-night prayer ceremonies (Jones, 2007). In this context, peyote is not viewed as a drug, but rather as medicine for healing. The 1994 amendment to the American Indian Religious Freedom Act legalized the use of peyote for this purpose (Prue, 2014).

Peyote use is uncommon among the general population, with just 1%–2% of non-AI/Alaskan Native individuals reporting use in national samples from 1985 to 2010 (Prue, 2014). During that time, reporting among AI/Alaskan Natives rose substantially following legalization, leveling off to about 10%. However, greater AI use cannot be attributed solely to use by NAC members, because reasons for use were not obtained. AI peyote use within the context of sacramental ceremonies is for healing and religious purposes. However, more broadly, hallucinogens are used for a variety of reasons, including for spiritual or mystical experiences, for increasing self-knowledge, and for recreation (Móro et al., 2011; Müller & Schumann, 2011; Stasko et al., 2012).

Because research to date has not differentiated the user's intended purpose, there are few findings on which to choose predictors or hypothesize how relationships may differ depending on the purpose of use. The current study begins to address this gap by examining relationships between five predictors suggested by existing empirical literature—religi-

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osity, cultural identity, gender, and 30-day alcohol and marijuana use—and spiritual and recreational peyote use by AI reservation-based youth. In the sections below, we describe our rationale for evaluating spirituality, cultural identity, alcohol and marijuana use, and gender in this sample.

Spirituality and religion

Móro et al. (2011) found a positive correlation of intrinsic spirituality with the number of psychedelic drugs used, but not the number of nonpsychedelic drugs used. They hypothesized that a religious/spiritual attitude may protect against drug use if abstinence is valued, but it can also be consistent with drug use if there is a sacramental meaning for use. Although not differentiating by the type of use, Lerner and Lyvers (2006) found that, among Australian and Israeli adults, psychedelic users scored significantly higher on mystical beliefs and spirituality compared with nonpsychedelic illegal drug users. These findings are in contrast to findings of inverse relationships between religiosity and other substance use, not including hallucinogens (Kulis et al., 2012; Wallace et al., 2003).

Cultural identity

Few studies find significant relationships between AI cultural identity and substance use (Baldwin et al., 2011; Beauvais, 1998), although several have found protective relationships of ethnic pride and AI spiritual beliefs with substance use–related measures (Kulis et al., 2002, 2012). However, AI cultural identity may positively relate to peyote use, especially spiritual use, because of its religious significance.

Alcohol and marijuana use

Using national data from 1991 to 1994, Wilcox et al. (2002) found that youth who used marijuana had more opportunity to use hallucinogens, and once given the opportunity, were more likely to use them. Palamar et al. (2015) found that, among a national sample of 12th graders, using marijuana increased the likelihood of using hallucinogens other than lysergic acid diethylamide (LSD), whereas Martin et al. (1992) found that, for first-year students attending a private university, a small percentage of simultaneous two-drug users used hallucinogens with alcohol and with marijuana. Although no studies have examined peyote specifically, this evidence suggests that alcohol and/or marijuana users are more likely to use peyote.

Sex

In a national sample, 8th- and 10th-grade males and females did not differ in annual use of hallucinogens other

than LSD, but by 12th grade, males were twice as likely to use in the last year as females (Miech et al., 2018).

Method

Sample and recruitment

Data for this study are part of an ongoing epidemiologic study of substance use by AI youth living on or near reservations. Details of the study's sampling frame, school recruitment, and other procedures can be found in Swaim and Stanley (2018). All procedures were approved by the university institutional review board and appropriate school boards and tribal institutional review boards.

Participants

Students in 31 schools participated during the 2016–2017 academic year. The sample included the following regional distributions: Northeast 6.1%, Northwest 9.7%, Northern Plains 20.5%, Southeast 9.9%, Southwest 43.3%, and Upper Great Lakes 10.6%, with schools located in 12 states. Tribe and reservation identities are confidential. Participants in grades 7–12 identifying as AI only or as AI and another race were included in the analyses. Total participants were 3,861 (51% male, 49% female), with an average age of 14.86 years ($SD = 1.74$).

Measures

The Our Youth, Our Future (OYOF) survey (Swaim & Stanley, 2018) was administered online to students using Qualtrics software. No identifying information was collected.

One item measured spiritual peyote use (“How many times have you taken peyote for spiritual or cultural reasons only?”), with a 7-point response scale (1 = 0 times, 2 = 1–2 times, 3 = 3–5 times, 4 = 6–9 times, 5 = 10–19 times, 6 = 20–39 times, 7 = 40 or more times). Responses were dichotomized with one or more times equal to 1 and no times equal to 0. A similar item measured recreational peyote use (“How many times have you taken peyote to get high [NOT for spiritual or cultural reasons]?”), with responses also dichotomized.

Religiosity was measured with one item, “How important is religion in your life?” (1 = not important, 4 = very important). Religious affiliation was assessed with “What is your religious preference?” with the following options: 1 = Native American Church (NAC), 2 = Traditional Native American Spirituality (TNAS), 3 = Protestant (Baptist, Methodist, Presbyterian, etc.), 4 = Catholic, 5 = Mormon (Latter-Day Saints), 6 = other religion, 7 = none. This item was dichotomized such that 0 = NAC/TNAS and 1 = all other options. Cultural identity was measured using one item from the Orthogonal Cultural Identification Scale (Oetting & Beauvais,

1990–1991), “Do you live by or follow the American Indian way of life?” (1 = *no*, 2 = *not much*, 3 = *some*, 4 = *a lot*). Thirty-day alcohol use and 30-day marijuana use items were ordinal measures assessed on the same scale as peyote use. Sex was measured as 1 = *female* and 0 = *male*.

Analysis plan

Peyote use is uncommon, leading to analytic challenges. Using standard maximum likelihood logistic regression with highly unbalanced dependent variables can result in an underestimation of the probability of use and biased standard errors (King & Zeng, 2001). The analysis of rare events requires penalized likelihood models, with Firth logistic regression (FLR) being one method for logistic regression (Firth, 1993). FLR uses Firth’s bias reduction method—an ideal solution to the problem of separation in logistic regression to reduce bias (Heinze & Schemper, 2002). For this study, FLRs were conducted in R using the “logistf” package (Heinze & Ploner, 2016), with results interpreted the same as traditional logistic regressions. Two models were run with (a) spiritual peyote use and (b) recreational peyote use as dependent variables and grade, sex, 30-day alcohol use, 30-day marijuana use, religiosity, cultural identity, and affiliation with NAC or traditional spirituality, as well as a grade by sex interaction, as predictors.

Results

Participants reported significantly greater use of peyote for spiritual reasons (7%) compared with recreational reasons (2%), $\chi^2(1) = 112.30$, $p < .001$. In addition, spiritual peyote use peaked in grade 8 at 8%, whereas recreational use peaked in grade 11 at 3.9%. Thirty-three percent of those endorsing either spiritual or recreational use endorsed using for both reasons. Moreover, 66% of spiritual users used only for spiritual reasons compared with 32% who used for only recreational reasons. Of recreational users, 56.8% report using one to two times and 21.6% report using more than five times, whereas among spiritual users, 35.2% report using one to two times and 40% report using more than five times. Spiritual use also varied by region, with 9.7% of participants in the Southwest reporting spiritual use compared with less than 4% in other regions. Recreational use varied less by region—from 1.5% in the Northwest to 3.9% in the Southeast.

Regarding predictors, 22% endorsed past-month alcohol use, 30% endorsed past-month cannabis use, and 48% endorsed an affiliation with either the NAC or TNAS. The mean rating for cultural identity was 2.69 ($SD = 1.10$) and the mean rating for religious importance was 2.93 ($SD = 1.03$).

Odds ratios (ORs) and confidence intervals (CIs) for recreational and spiritual peyote use are presented in Table 1. Religiosity related positively to spiritual peyote use (OR =

TABLE 1. Firth regression results

Variable	Odds ratio	Lower CI	Upper CI
Spiritual use			
Grade	0.802	0.716	0.896
Sex	1.053	0.702	1.580
Alcohol use	1.194*	1.069	1.329
Cannabis use	1.207*	1.129	1.290
Religion importance	1.221*	1.054	1.420
Cultural identity	1.157*	1.023	1.312
NAC/TNAS	0.936	0.875	1.001
Grade × Sex	0.982	0.838	1.151
Recreational use			
Grade	0.890	0.692	1.142
Sex	1.640	0.617	4.491
Alcohol use	1.478*	1.279	1.702
Cannabis use	1.518*	1.352	1.710
Religion importance	0.990	0.755	1.301
Cultural identity	1.019	0.811	1.290
NAC/TNAS	0.999	0.878	1.134
Grade × Sex	0.930	0.674	1.283

Notes: CI = confidence interval; NAC/TNAS = Native American Church or Traditional Native American Spirituality affiliation versus affiliation with another religion or no religion.

* $p < .05$.

1.22, CI [1.05, 1.42]) but not recreational use (OR = 0.99, CI [0.80, 1.30]). Similarly, cultural identity related positively to spiritual (OR = 1.15, CI [1.02, 1.31]) but not recreational use (OR = 1.02, CI [0.81, 1.29]). Thus, AI youth who identified as more religious and/or identified more strongly with the AI way of life were more likely to report using peyote for spiritual purposes but not for recreational reasons.

Thirty-day alcohol use related to both spiritual (OR = 1.19, CI [1.07, 1.33]) and recreational peyote use (OR = 1.48, CI [1.28, 1.71]), as did 30-day marijuana use (spiritual use: OR = 1.21, CI [1.13, 1.29]; recreational use: OR = 1.52, CI [1.35, 1.71]). Effects were stronger for recreational use for both alcohol and marijuana. Sex was not associated with either recreational or spiritual peyote use. Grade, sex, and affiliation with NAC or TNAS were not related to either spiritual or recreational peyote use, and the grade by sex interaction was not significant in either model.

Discussion

The current study examined spiritual and recreational peyote use among AI youth from 31 schools on or near reservations. The percentage of recreational users was similar to that of the general population (1%–2%; Prue, 2014), whereas the percentage of spiritual users was closer to the adolescent and adult AI use of 10% reported by Prue (2014). In addition, most spiritual users only endorsed spiritual use.

The importance of religion was positively related to spiritual use but not significantly related to recreational use. This is partially consistent with previous findings that hallucinogen users score higher on spirituality compared with nonpsychedelic drug users (Lerner & Lyvers, 2006; Móró et al., 2011). Our study extends these results by finding a sig-

nificant relationship for spiritual use but not for recreational use. Nor did we find an inverse relationship between the importance of religion and recreational peyote use, as was found for other substances. Relatedly, there was no relationship between cultural identity and recreational peyote use, but there was a positive, although small, relationship for spiritual use. This is consistent with ceremonial peyote use that may be directly associated with living according to an AI way of life.

Another related question is about the concordance of spiritual and recreational peyote use and endorsing belonging to the NAC. A larger percentage of those endorsing spiritual peyote use also endorsed either belonging to the NAC (18%) or endorsed TNAS (47%) compared with those who endorsed recreational peyote use (17% NAC, 26% TNAS).

Our results also suggest that, consistent with other studies (Palamar et al., 2015; Wilcox et al., 2002), current use of alcohol and/or marijuana is positively associated with peyote use for either purpose. Whether these substances are used concurrently is not known. Within each type of use, ORs for alcohol and marijuana use are similar, suggesting similar relationships between their use and peyote use. However, ORs are larger for recreational peyote use as compared with spiritual use, suggesting a greater likelihood of recreational peyote use, as compared with spiritual use, for current marijuana/alcohol users.

Although peyote use within the NAC is legal, policies on the age for the first allowable use vary by church. For example, in 2003 a judge ruled that a 4-year-old could not take peyote with his father at the NAC but could begin peyote use when fully aware of its implications, emotionally and physically ready, and with parental permission (Chan, 2003). This may, in part, explain our finding that spiritual use peaks in 8th grade whereas recreational use peaks in 11th grade. Although adults who use peyote strictly for religious ceremonies do not appear to suffer negative consequences from such use (Halpern et al., 2005), there is no similar evidence for youth, whose brains are still developing. However, differentiating by purpose of use can provide context for clients' substance use behaviors and provide guidance for if, and how, to proceed with treatment.

In addition to providing insight into factors related to peyote use, this study used an analytic approach useful for researchers studying rare events. FLRs are an appropriate analytic strategy for modeling rare events (e.g., opiate use), and these models are easily implemented in R (Heinze & Ploner, 2016).

Study limitations include (a) a focus on a few of many possible predictors of peyote use among AI youth; (b) a cross-sectional survey design limiting interpretation to relationships among variables rather than causality; (c) a reliance on self-report data and single-item measures that are limited by memory, social desirability, and construct coverage (Carroll, 1995; Johnson & Golub, 2007); (d) Native

American way of life, NAC, and TNAS were not defined for respondents, and thus there could be confusion among respondents as to their meanings; and (e) the current study did not differentiate those using exclusively for recreational or spiritual reasons from those who use for both reasons. Little is known about what causes spiritual use to have protective factors. It is possible that those who use strictly for spiritual reasons use differently than those who use recreationally. This is a fledgling field of study, and our goal was to test factors suggested by prior research and to provide a framework for researchers continuing to study peyote use. Our study offers an initial glimpse into factors that might differentiate recreational from spiritual use, including cultural identity, religious importance, and alcohol and cannabis use.

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