



Patterns of substance use initiation among Indigenous adolescents[☆]



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HIGHLIGHTS

- When considering the sequencing of two substances, nicotine initiation was more likely to precede both alcohol and marijuana initiation.
- When considering the sequencing of two substances, alcohol initiation was far more likely to precede marijuana initiation than marijuana initiation was to precede alcohol initiation.
- More nuanced consideration of the sequencing of substance use initiation showed that, by far, the most common sequencing was nicotine and/or alcohol initiation prior to marijuana initiation.

ARTICLE INFO

Available online 21 January 2015

Keywords:

Indigenous adolescents
Substance use
Gateway substances

ABSTRACT

Background: The data for this study come from an eight-wave panel study of Indigenous (Canadian First Nations and American Indian) adolescents from three U.S. reservations and four Canadian reserves.

Objectives: Our objective was to investigate variations in patterns of substance use initiation from early adolescence through early adulthood using data collected annually for 8 years.

Method: At baseline the sample included 675 Indigenous adolescents (M age = 11.10, SD = .83; 50.3% girls). First, we calculated cumulative rates of substance use initiation by age. We then examined whether the cumulative initiation rates were moderated by gender using logistic regression analyses. Second, we calculated hazard rates for substance use initiation by age. Third, we focused on the ordering of two substances, paired two substances, and three substance initiation sequences.

Results: If one looks only at the cumulative rates of substance use initiation there appears to be support for a sequential progression of substance use during early adolescence. In contrast to the cumulative rates of substance use initiation, the hazard analyses showed a much more mixed, less progressive sequence. Among two substance pairings a nicotine to marijuana initiation sequence was most likely, followed by a nicotine to alcohol sequence. An alcohol to marijuana sequence was nearly twice as likely as a marijuana to alcohol sequence. Refined analyses to conform to those of many of the traditional gateway studies by introducing paired two substance orderings indicated that nicotine and/or alcohol prior to marijuana use was by far the most likely sequence. In two of the three most likely three substance sequences (nicotine to alcohol to marijuana and nicotine to marijuana to alcohol) nicotine was the first substance initiated.

Conclusion: This study refines the gateway hypothesis for Indigenous adolescents by providing an in-depth analysis of substance use initiation. The only evidence for a “gateway” substance that emerged in our analyses was for nicotine use which was likely to precede alcohol and marijuana use in both two-substance pairings and to a lesser extent in three-substance initiation sequences.

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1. Introduction

The concept of systematic developmental stages in the progression of substance use initiation (the gateway hypothesis) is now nearly four decades old (Hamburg, Kraemer, & Jahnke, 1975; Kandel, 1975). The hypothesized gateway sequence is from milder, commonly used, legal substances such as tobacco and alcohol (usually considered together), to more illicit drugs such as marijuana, hallucinogens and hard drugs (Kandel & Yamaguchi, 2002; Kandel, Yamaguchi, & Chen, 1992). The gateway hypothesis has been investigated across multiple

[☆] This research was funded by the National Institute on Drug Abuse (DA13580) and the National Institute of Mental Health (MH67281), and the National Institute of Alcohol Abuse and Alcoholism (AA020299), Les B. Whitbeck, Principal Investigator.

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ethnic and racial groups (Novins & Barón, 2004; Wu, Temple, Shokar, Nguyen-Oghalai, & Grady, 2010), cross-nationally (Degenhardt et al., 2008; Kandel & Yamaguchi, 1999; Luengo et al., 2008; Wells & McGee, 2008), and with animal studies (Ellgren, Spano, & Hurd, 2007; Higuera-Matas et al., 2008; Pistis et al., 2004). The evidence for specific patterns of progression has been inconsistent across social class, ethnicity, gender, race, and for serious drug users (Mackesy-Amity, Fendrich, & Goldstein, 1997; Vaughn, Wallace, Perron, Copeland, & Howard, 2008).

Recent studies of patterns of substance use initiation among American Indian adolescents (Novins & Barón, 2004; Novins, Beals, & Mitchell, 2001; Whitesell et al., 2012) have shown at best only mixed support for the gateway hypothesis. Building on this previous research, we revisited the hypothesis with an in-depth investigation of the actual distributions of substance use initiation and the variation in these sequences by gender. We investigated 1) cumulative rates of substance use initiation by age; 2) hazard rates for substance use initiation by age; 3) two substance orderings of initiation; 4) paired two substance orderings which encompass the traditional gateway hypothesis (e.g., legal substances such as nicotine/alcohol → illicit substances such as marijuana) (Kandel & Yamaguchi, 2002; Kandel et al., 1992); and 4) three substance orderings. This approach captures the substantial variation of substance initiation use patterns within a sample of Indigenous (American Indians and Canadian First Nations) adolescents as they progressed from age 8 to 16 years.

2. Patterns of Indigenous adolescent substance use initiation

Although epidemiologic evidence indicates substantial differences in drug and alcohol use across and within AIAN cultures (see Beals et al., 2005; May, 1994; Whitbeck, Hoyt, Johnson, & Chen, 2006), there is consensus that Indigenous adolescents tend to experiment with substances very early and progress to regular use more rapidly than do non-Indigenous adolescents (Bachman et al., 1991; Beauvais, 1998; Blum, Harmon, Harris, Bergeisen, & Resnick, 1992). We now have decades of evidence that Indigenous young people are likely engage in early onset tobacco use (Forster, Brokenleg, Rhodes, Lamont, & Poupart, 2008; Substance Abuse and Mental Health Services Administration (SAMSHA), 2003; Whitbeck, Yu, McChargue, & Crawford, 2009), alcohol use (Cheadle & Whitbeck, 2011; May, 1994; Miller, Beauvais, Burnside, & Jumper-Thurman, 2008), marijuana use (Cheadle & Sittner Hartshorn, 2012; Novins & Mitchell, 1998; Whitesell et al., 2007), and other drug use (SAMSHA, 2010). Such early use fosters movement from easily accessible legal substances (e.g., tobacco, alcohol) to those less available and often illegal (e.g., marijuana, hallucinogens, hard drugs).

Studies on patterns of substance abuse initiation among Indigenous adolescents have shown little support for the traditional gateway hypothesis. Using retrospective data, Novins et al. (2001) found that among 1562 American Indian high school students from four rural communities in the West, those who had used three or more substances had a pattern of substance use that was inconsistent with gateway theories of initiation. In a subsequent longitudinal study, Novins and Barón (2004) reported that progression patterns varied by American Indian community and by season of the year. In general, the adolescents who initiated substance use with marijuana and inhalants were more likely to progress to other illicit drugs than were those whose first substance use was alcohol only. More recently, Whitesell et al. (2012) reported that the risk for tobacco and marijuana use preceded the risk for alcohol use among 450 Northern Plains adolescents who were surveyed over four years.

The research reported here extends this previous work on substance use initiation patterns in several ways. First, it investigates sequential patterns of substance use onset in an Indigenous culture outside the Northern Plains. Second, we employed multiple analytic approaches to evaluate variations in potential sequences that may be methodological

artifacts (i.e. cumulative rates of use vs. hazard analyses). Third, we investigated two sequences, paired two sequence, and three-sequence initiation patterns. Finally, we compared the sequence patterns for adolescent males and females. The result is the most comprehensive presentation to date of various patterns of substance use initiation among Indigenous adolescents.

3. Method

3.1. Study design and participants

The study from which the data were drawn was designed in partnership with three U.S. reservations and four Canadian First Nations reserves. The reservations/reserves share a common cultural tradition and language with minor regional variations in dialects. As part of confidentiality agreements the names of the cultural group and participating reservations/reserves are not provided. At each site advisory boards appointed by tribal councils were responsible for advising the research team on questionnaire development and supervising study personnel. At each wave, participants completed in-person interviews at their homes. All interviews were completed in English. The interviewers, as well as the onsite coordinators, all were approved by tribal advisory boards and were either enrolled tribal members or, in a very few cases, non-member spouses of enrollees. Interviewers were trained before each wave concerning methodological guidelines of personal interviewing and protection of human subjects.

Prior to the first wave of data collection each participating reservation/reserve provided us with a list of all families with tribally-enrolled children aged 10–12 years who lived on or proximate (within 50 miles) to the reservation/reserve. An attempt to contact all families was made in order to achieve a representative sample of the communities. Families were formally recruited for the study through personal interviewer visits, during which the families were presented with a culturally traditional gift and an overview of the project. For those families who agreed to participate (79.4%), both the target adolescent and at least one adult caretaker were interviewed once per year over an eight-year period, beginning in 2002. For each wave of the study participating families were given \$40 for each participant (i.e., adolescent and caregiver or caregivers) as compensation. The study was approved onsite by tribally appointed advisory boards and conducted in compliance with the institutional review board at the University of Nebraska-Lincoln.

At Wave 1 the sample included 675 adolescents (M age = 11.10, SD = .83; 50.3% girls), of which 94.7% completed Wave 2 (50.1% girls), 92.9% completed Wave 3 (49.8% girls), 87.3% completed Wave 4 (50.8% girls), 89.8% completed Wave 5 (50.8% girls), 87.7% completed Wave 6 (50.3% girls), 84.4% completed Wave 7 (51.1% girls), and 77.6% completed Wave 8 (52.9% girls).

3.2. Age of substance use initiation measures

At each wave, participants were first asked whether or not they had ever (1) smoked a cigarette, (2) drank beer, wine, or other alcoholic beverages, and (3) smoked marijuana. Participants who indicated that they had tried a given substance were then asked to indicate the age at which they had first tried that substance. We created an *age of initiation* variable for each of the substances separately. Values were based on the age of first use reported during the wave that participants first reported having used a given substance. We used all available data; thus, if a participant dropped out of the study at Wave 5, we included his or her data from Waves 1–4 in our calculations. The number of participants who initiated each of the substances at each age is reported in Table 1.

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