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Childhood characteristics associated with stage of substance use of American Indians: Family background, traumatic experiences, and childhood behaviors

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Abstract

The purpose of this analysis is to examine childhood characteristics associated with stage of substance use in adulthood in two American Indian (AI) populations. Data were drawn from an epidemiologic study of two AI reservation populations for persons age 18–44 years (n=2070). We used descriptive and multivariate analysis to examine correlates of four mutually exclusive stages of substance use: lifetime abstinence (Stage 0), use of alcohol only (Stage 1A), use of marijuana/inhalants with or without alcohol (Stage 1B), and use of other illicit drugs with or without the previously listed substances (Stage 2). Problematic substance use by parents, younger age of first substance use, initiating substance use with a drug (with or without alcohol), and adolescent conduct problems were associated with higher stage substance use. Persons who experienced sexual abuse, witnessed family violence, or experienced other traumatic events before the age of 18 were more likely to be at Stage 1B than Stage 1A. These findings underscore the importance of providing effective interventions during childhood and adolescence to reduce the risk of substance use progression.

Keywords

American Indian; Substance use; Alcohol use; Stage Theory; Gateway Theory; Drug use initiation

1. Introduction

The burden of problematic substance use in American Indian (AI) communities is substantial. Studies document that AIs generally are more likely than their non-AI counterparts to develop alcohol use disorders (Beals, et al., 2005), to suffer from a variety alcohol-related physical health conditions (Indian Health Service, 2003), and to die from alcohol-related causes (Indian Health Service, 2003). Correlates of substance use problems emerging from community, school, and clinically-based studies include male gender (Novins & Barón, 2004), antisocial behaviors (Beauvais, 1996), peer substance use (Beauvais, 1992), and familial substance use as well as child traumatic experience (Libby et al., 2004).

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"Stage" or "Gateway Theory" provides a valuable framework for examining the correlates of substance use in a developmental framework. Originally developed by Kandel and colleagues (Kandel, 1975), this theory states that substance users' first use of substances follows this specific sequence: "legal" substances (e.g., alcohol); marijuana; other illicit drugs; cocaine; and crack. In this study, we examined childhood characteristics associated with stage of substance use for a large, community-based sample of AI adults using a version of Stage Theory modified to fit substance use patterns identified in a previous school-based study of AI adolescents (Novins & Barón, 2004; Novins, Beals, & Mitchell, 2001).

2. Methods

Data were drawn from the American Indian Service Utilization, Psychiatric Epidemiology, Risk and Protective Factors Project (AI-SUPERPFP, Beals, Manson, Mitchell, Spicer, & The AI-SUPERPFP Team, 2003), the first large-scale, population-based psychiatric epidemiologic study of AIs. The population of inference was enrolled members of two closely related Northern Plains tribes (NP) and a Southwestern tribe (SW) who lived on or within 20 miles of their reservations. In these analyses, we focused on those participants ages 18–44 years who had complete information regarding alcohol and drug use (the latter criteria resulted in the exclusion of 95 participants), resulting in a final sample size of 2,070.

All measures were derived from the AI-SUPERPFP lay interview (Beals, et al. 2003). Using reports of lifetime consumption of a substance six times or more during any one year for non-medical purposes, respondent *stage of substance use* was operationalized using four mutually exclusive, hierarchical stages: 2 Stage 0, lifetime abstinence; Stage 1A, alcohol use only; Stage 1B, marijuana and/or inhalant use with or without alcohol use; and Stage 2, other illicit drug use with or without the use of the previously listed substances. This stage classification was based on previous work by (Novins et al. 2001, 2004) concerning the sequence of substance use among AI adolescents and is a modification of Kandel's sequence (1975).

Potential correlates of stage of substance use included measures of family background, traumatic events, and antisocial and substance use behaviors (see Table 2 for full listing of these measures). For this study, traumatic experiences prior to age 18 included: *sexual abuse, other violent trauma, witnessing family violence, witnessing other traumatic event(s), non-interpersonal trauma, or someone close to the participant experienced such trauma*. A *conduct problem scale* was constructed from data for 12 negative and violent behaviors reported to occur while growing up (e.g., running away from home overnight more than once, committing a robbery, and sexually abusing someone). Based on the greater importance of conduct problems in earlier adolescence for predicting antisocial behavior in adulthood, behaviors that first occurred prior to age 15 were weighted twice that of those that first occurred at older ages. Substance use measures included the *age substance use was initiated* and *initiating substance use with a drug with or without alcohol*.

Multiple imputation procedures available in SAS were used to estimate missing values (Croy & Novins, 2005). We estimated binomial logistic regressions to evaluate associations between childhood characteristics and stage of substance use. Each regression modeled the probability of being in one stage as compared to another stage and was estimated in two steps. The first step included demographic, family background, and trauma variables (as these variables might influence other characteristics such as childhood behaviors). In the second step, we added conduct problems and substance use measures to these variables. Finally, chi-square analysis was used to examine the bivariate relationships between stage of substance use and measures of health (e.g. lifetime psychiatric diagnostic status and physical health) and legal problems.

3. Results

Table 1 displays the distribution of respondents across substance use categories and Table 2, the bivariate relationships between stage of substance use and correlates of use. Table 3 displays the results for the three multivariate logistic regressions that estimated associations between childhood characteristics and the hierarchical (adjacent) stages of substance use. In our final multivariate models, the odds of reporting Stage 1 substance use as compared to Stage 0 were significantly lower for SW females than males (odds ratio; OR = 0.39, $p<0.01$); no differences were observed between NP females and males. The odds of persons with a parental history of problematic substance use being in Stage 1A versus Stage 0 were 1.43 times those without such histories ($p<0.05$). NP respondents who reported parental problematic use were more likely to be in Stage 2 versus Stage 1B (OR = 1.51, $p<0.05$).

Strong positive associations between experiencing traumatic events and each stage of substance use were observed. Trauma related to sexual abuse nearly doubled the odds of Stage 1B versus Stage 1A substance use ($p<0.01$). Witnessing family violence increased the odds of Stage 1A versus Stage 0 use among persons in the NP (OR = 1.85, $p<0.01$) and of Stage 1B versus Stage 1A substance use in both tribes (OR = 1.56, $p<0.01$). Although there was a correlation between problematic substance use by a parent and trauma during childhood (persons with problematic substance use by a parent reported an average of 1.5 traumas experienced while persons who did not reported an average of 0.6 traumas, $p<0.05$), we did not identify an interaction between these two variables and stage of substance use.

In two of the three equations the relationship between adolescent conduct problems and stage of substance use was significant, with the odds ratios for higher stage substance use greater than two ($p<0.01$). A strong positive association was observed between the age substance was initiated and stage of substance use; for persons who initiated use by age 13 the OR for Stage 1B versus Stage 1A substance use was OR 2.85 ($p<0.01$). The OR of Stage 2 versus Stage 1B substance use for persons who initiated substance use with a drug with or without alcohol, rather than alcohol only, was 1.69 ($p<0.05$).

Stage of substance use was associated with health and legal problems. The percent of respondents with alcohol or drug dependence, with a mood or anxiety disorder, or convicted of a felony increased across stages. Table 4 provides information concerning the statistical significance of these relationships.

4. Discussion

A number of findings merit further comment. First, the results support previously reported findings from school-based studies concerning the strong relationship between initiating substance use at younger ages or with drugs rather than alcohol only and higher stage of substance use (Novins and Baron, 2004, Novins et al., 2001). Additionally, they confirm the importance of modifying stage theory to account for a risky pattern of substance use initiation among AIs: initiating use with marijuana and/or inhalants.

Second, our findings that parental history of problematic substance use and childhood traumatic events were independently associated with higher stage substance use underscores their importance as potential risk factors for substance use progression. Furthermore, because parental history of substance use and childhood trauma were correlated with each other, a finding that is consistent with other studies (Kessler, Davis, & Kendler, 1997); it is possible that these factors cluster within families, placing their children at even greater risk of substance use progression, and underscoring their potential relevance for intervention development. In contrast, family background characteristics such as parental divorce, death of a parent, and family separation showed minimal associations with stage of use. Thus parental problematic

substance use and traumatic experiences, rather than these other forms of stress and adversity, appear to be relatively more important predictors of higher stage substance use.

Third, cultural and historical factors may contribute to our understanding of the observed tribal differences. The SW tribe is considered to have larger and stronger social networks and lower cultural stress than the NP tribe due to relatively fewer changes in its culture, economy, and diet during the past 200 years. For example, the SW culture may provide more social support, structure, and expectations to conform. In addition, the percent of respondents who reported parental history of substance use problems, trauma, or childhood conduct problems was lower in the SW. Finally, the SW is a matrilineal society. The expectation to conform may be greater for females than males, which may partially explain the higher percent of lifetime abstainers among SW females.

Fourth, higher level substance use was associated with lifetime substance dependence, other adult psychiatric disorders, and poorer physical health and legal problems. Similar health consequences have been documented for high quantity, frequent AI drinkers (O'Connell, Novins, Beals, Croy, & The AI-SUPERPFP Team, 2006) and illustrate the need to address co-morbid disorders in referral and treatment programs. Such findings illustrate the health and societal costs associated with higher stage substance use, which may be partially averted with increased access to prevention and treatment services.

Important study limitations include our reliance on participant self-reports, a focus on AIs from two tribes residing on or near their reservations (thus the sample is not representative of the full diversity of the AI population), and the fact that we did not include tobacco use in our definition of stages of substance use (since AI-SUPERPFP questions concerning tobacco use were asked in a manner that differed from those of other substances).

These findings have important implications for substance use prevention and treatment programs for AIs. First, the noted tribal differences illustrate the cultural heterogeneity within AI populations should be addressed to improve program effectiveness. Second, the key correlates identified in this study may help inform the targeting of such interventions to AIs at greatest risk. For example, links between initiating substance use at a young age with stage of substance use in adulthood indicate opportunities exist for early identification of adolescents in need of prevention and treatment. Finally, AIs live in adverse environments that place them at high risk for exposure to trauma (Manson, Beals, Klein, & Croy, 2005). The associations between problematic substance use by parents and traumatic childhood events with subsequent substance use illustrate the importance of ensuring families, schools, service providers, and other community-based organizations provide mechanisms to cope with such adversities to limit the intergenerational transfer of substance use problems attributable to these important environmental factors.

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References

Beals J, Manson SM, Mitchell CM, Spicer P, The AI-SUPERPFP Team. Cultural specificity and comparison in psychiatric epidemiology: Walking the tightrope in American Indian research. Culture, Medicine and Psychiatry 2003;27:259–289.

Beals J, Novins DK, Whitesell NR, Spicer P, Mitchell CM, Manson SM, et al. Prevalence of mental disorders and utilization of mental health services in two American Indian reservation populations: Mental health disparities in a national context. American Journal of Psychiatry 2005;162(9):1723–1732. [PubMed: 16135633]

Beauvais F. Comparison of drug use rates for reservation Indian, non-reservation Indian and Anglo youth. American Indian and Alaska Native Mental Health Research 1992;5:13–31. [PubMed: 1420537]

Beauvais F. Trends in drug use among American Indian students and dropouts, 1975 to 1994. American Journal of Public Health 1996;86:1594–1599. [PubMed: 8916526]

Croy CD, Novins DK. Methods for addressing missing data in psychiatric and developmental research. Journal of the American Academy of Child and Adolescent Psychiatry 2005;44(12):1230–1240. [PubMed: 16292114]

Indian Health Service. Trends in Indian Health, 2000–2001. Washington, DC: U.S. Department of Health and Human Services, Indian Health Service; 2003.

Kandel D. Stages in adolescent involvement in drug use. Science 1975;190(4217):912–914. [PubMed: 1188374]

Kessler RC, Davis CG, Kendler KS. Childhood adversity and adult psychiatric disorder in the US National Comorbidity Survey. Psychological Medicine 1997;27:1101–1119. [PubMed: 9300515]

Libby AM, Orton HD, Novins DK, Spicer P, Buchwald D, Beals J, et al. Childhood physical and sexual abuse and subsequent alcohol and drug use disorders in two American-Indian tribes. Journal of Studies on Alcohol 2004;65:74–83. [PubMed: 15000506]

Manson SM, Beals J, Klein SA, Croy CD. Social epidemiology of trauma among 2 American Indian reservation populations. American Journal of Public Health 2005;95(5):851–859. [PubMed: 15855465]

Novins DK, Barón A. American Indian adolescent substance use: the hazards for substance use initiation and progression for adolescents aged 14 to 20. Journal of the American Academy of Child and Adolescent Psychiatry 2004;43:316–324. [PubMed: 15076265]

Novins DK, Beals J, Mitchell CM. Sequences of substance use among American Indian adolescents. Journal of the American Academy of Child and Adolescent Psychiatry 2001;40:1168–1174. [PubMed: 11589529]

O'Connell J, Novins DK, Beals J, Croy CD, The AI-SUPERPFP Team. The relationship between patterns of alcohol use and mental and physical health disorders in two American Indian populations. Addiction 2006;101:69–83. [PubMed: 16393193]

Table 1

Stage of substance use of AI-SUPERPFP respondents aged 18–44 years by gender and tribe.

	Prevalence of lifetime use									
	Stage 0: Lifetime abstainer		Stage 1A: Lifetime alcohol use (only)		Stage 1B: Lifetime marijuana and/or inhalant use		Stage 2: Lifetime use of other illicit drug(s)		Total	
	#	Column %	#	Column %	#	Column %	#	Column %	#	Column %
Males										
Northern Plains	127	55.64%	165	58.68%	150	57.50%	111	62.38%	553	58.33%
Southwest	105	44.36%	107	41.32%	105	42.50%	68	37.62%	385	41.67%
Total	232	100.00%	272	100.00%	255	100.00%	179	100.00%	938	100.00%
Row percent	25.17%		28.44%		26.73%		19.66%		100.00%	
Females										
Northern Plains	179	35.41%	178	55.72%	139	58.56%	95	75.22%	591	50.43%
Southwest	281	64.59%	128	44.28%	101	41.44%	31	24.78%	541	49.57%
Total	460	100.00%	306	100.00%	240	100.00%	126	100.00%	1132	100.00%
Row percent	40.64%		27.03%		21.20%		11.13%		100.00%	
Both genders										
Northern Plains	306	42.53%	343	57.13%	289	58.01%	206	67.56%	1144	54.09%
Southwest	386	57.47%	235	42.87%	206	41.99%	99	32.44%	926	45.91%
Total	692	100.00%	578	100.00%	495	100.00%	305	100.00%	2070	100.00%
Row percent	33.15%		27.67%		23.89%		15.28%		100.00%	

Stage of substance use: Respondents were assigned stage of substance use by lifetime reports of: abstinence, alcohol only, marijuana and/or inhalants with or without alcohol, and other illicit drug(s) with or without use of the previously listed substances. Other illicit drugs include cocaine, hallucinogens, non-ceremonial use of peyote, stimulants, heroin, sedatives, analgesics and tranquilizers.

Sample sizes are unweighted while the percents were calculated using survey weights to account for sampling and non-response.

Table 2

Characteristics of AI-SUPERPF respondents aged 18–44 years by stage of substance use.

	Stage 0: Lifetime abstainer			Stage 1A: Lifetime alcohol use (only)			Stage 1B: Lifetime marijuana and/or inhalant use			Stage 2: Lifetime use of other illicit drug(s)			Total
	%	Lower CI	Upper CI	%	Lower CI	Upper CI	%	Lower CI	Upper CI	%	Lower CI	Upper CI	%
Demographic characteristics [a]													
Northern Plains	42.53^{1A,1B,2}	38.79	46.27	57.13^{0,2}	53.03	61.23	58.01^{0}	53.59	62.43	67.56^{0,1A}	62.23	72.89	54.09
Female	64.78^{1A,1B,2}	61.18	68.38	52.33^{0,2}	48.21	56.45	48.10^{0}	43.64	52.56	40.31^{0,1A}	34.72	45.90	53.61
Age 18–24 years	29.86^{1A}	26.40	33.32	16.67^{0,1B,2}	13.59	19.75	31.45^{1A}	27.31	35.59	25.73^{1A}	20.76	30.71	25.96
Age 25–34 years	34.77	31.17	38.37	41.69	37.61	45.77	36.94	32.62	41.26	36.50	31.01	41.99	37.47
Education:completed < 12 years	37.01	32.11	41.91	35.94	30.58	41.30	36.56	30.76	42.35	33.80	26.43	41.18	36.11
Family background [b]													
Financial strain	16.83^{1B}	13.03	20.61	21.66	17.14	26.17	27.25^{0}	21.89	0.33	26.52	19.60	33.44	22.13
Changed schools more than 2 times	12.42^{1B,2}	9.07	15.77	18.02	13.74	22.29	21.35^{0}	16.40	0.26	23.00^{0}	22.95	23.05	17.72
Parents divorced	16.75^{2}	12.86	20.65	18.81^{2}	14.49	23.13	23.10	18.04	0.28	32.81^{0,1A}	25.51	40.10	21.29
Death of a parent	10.06	7.10	13.02	13.30	9.58	17.01	13.26	9.27	0.17	11.95	6.99	16.90	12.01
Separation from family	20.04^{1B,2}	16.00	24.08	27.55	22.59	32.50	29.90^{0}	24.37	0.35	35.59^{0}	27.98	43.19	26.85
Parent drug or alcohol problem	22.75^{1A,1B,2}	18.50	27.01	33.60^{0,2}	28.34	38.86	39.55^{0}	33.66	0.45	47.40^{0,1A}	39.54	55.25	33.54
Traumatic events by age 18 [c]													
Sexual abuse	5.52^{1B,2}	3.34	7.69	7.03	4.24	9.82	12.65^{0}	8.70	0.17	13.34^{0}	8.06	18.61	8.83
Other violent trauma	8.02^{1B,2}	5.35	10.69	13.89^{2}	10.07	17.70	20.16^{0}	15.34	0.25	27.36^{0,1A}	20.33	34.38	15.50
Witness family violence	19.54^{1A,1B,2}	15.56	23.52	28.77^{0,1B,2}	23.73	33.80	41.42^{0,1A}	35.46	0.47	46.68^{0,1A}	38.83	54.52	31.47
Witness other traumatic event	5.14^{1B,2}	3.00	7.27	8.90^{1B,2}	5.74	12.06	18.33^{0,1A}	13.68	0.23	23.23^{0,1A}	16.65	29.82	12.10
Non-interpersonal trauma	6.43^{1B,2}	4.04	8.83	9.46^{2}	6.25	12.67	15.82^{0}	11.47	0.20	22.06^{0,1A}	15.63	28.50	11.90
Someone close experienced such trauma	8.66^{1B,2}	5.93	11.38	14.91^{2}	11.02	18.80	18.80^{0}	14.12	0.23	0.29^{0,1A}	21.53	0.35	15.84
Behaviors [d]													
Conduct problem by age 18 [e]	0.13^{1A,1B,2}	0.11	0.16	0.22^{0,1B,2}	0.19	0.26	0.33^{0,1A,2}	0.28	0.37	0.48^{0,1A,1B}	0.42	0.55	0.26
Lifetime alcohol use	0.00	-	-	100.00	-	-	82.94^{2}	79.58	86.30	90.42^{1B}	87.08	93.76	61.31
Lifetime use of marijuana and/or inhalants	0.00	-	-	0.00	-	-	100.00	-	-	82.92	77.31	88.51	36.56
Substance use initiation by age 13	n/a[g]	-	-	12.51^{1B,2}	8.83	16.18	26.29^{1A}	22.35	30.23	33.65^{1A}	28.26	39.04	22.27
Substance use initiation 13–15 years old	n/a	-	-	30.19^{2}	25.1	35.3	38.75	34.39	43.11	42.88^{1A}	37.25	48.51	36.15
Substance use initiated with drug with or without alcohol	n/a	-	-	n/a	-	-	54.47	50.01	58.93	58.77	53.16	64.38	56.15

Stage of substance use: Respondents were assigned stage of substance use by lifetime reports of: abstinence, alcohol only, marijuana and/or inhalants with or without alcohol, and other illicit drug(s) with or without use of the previously listed substances. Other illicit drugs include cocaine, hallucinogens, non-ceremonial use of peyote, stimulants, heroin, sedatives, analgesics and tranquilizers.

^{0,1A,1B,2}Numeric superscripts are used to indicate significant differences ($p<0.01$) in a characteristic between two substance use stages. For example, 42.53% of persons in Stage 0 were in the Northern Plains tribe. The superscript "2" next to this percent indicates the Stage 0 percent for the Northern Plains tribe differs significantly from the percent of persons in the Northern Plains tribe in Stage 2. Conversely, the superscript "0" next to the percent of persons in the Northern Plains tribe in Stage 2 indicates this percent differs significantly from that reported for Stage 0.

[a] Note the reference groups for the socio-demographic characteristics are for tribe Southwest, for gender male, for age persons 35–44 years old, and for education completion of 12 or more years of schooling.

[b] Characteristics of family during respondents childhood.

[c] Other violent trauma includes physical abuse, being physically attacked or robbed, and being in direct combat experience in a war. Witnessing other traumatic events includes witnessing an accident or disaster where someone else was seriously injured or died or witnessing someone being abused or injured. Non-interpersonal traumatic experiences include a life-threatening accident or a natural disaster such as a flood or tornado.

[d] The denominators of the percents in the total column include persons in all stages for lifetime use of alcohol or lifetime use of marijuana and/or inhalents; persons in Stages 1A, 1B, and 2 for age substance use initiated; and persons in Stages 1B and 2 for substance use initiated with a drug with or without alcohol.

[e] Conduct problem scores range from 0 to 2 and the mean score by substance use category is provided.

[g] n/a=not applicable.

Table 3

Logistic regressions of stage substance use for AI-SUPERPFP respondent aged 18–44 years.

Step	Characteristics	Stage 1A versus 0: Lifetime alcohol use (only) compared to lifetime abstainer			Stage 1B versus 1A: Lifetime marijuana and inhalant use compared to lifetime alcohol use			Stage 2 versus 1B: Lifetime use of other illicit drug (s) compared to marijuana and inhalant use		
		OR	Lower CI	Upper CI	OR	Lower CI	Upper CI	OR	Lower CI	Upper CI
	Demographic characteristics [a]									
1	Northern Plains (NP)	-[b]			1.01	0.78	1.30	-[b]		
1	Female				0.75*	0.59	0.97	0.64**	0.47	0.86
	FemaleNP*	0.85	0.62	1.18						
	FemaleSouthwest (SW)*	0.39**	0.28	0.55						
1	Age 18–24 years	0.42**	0.31	0.58	2.64**	1.90	3.67	0.66*	0.45	0.95
1	Age 25–34years	0.99	0.77	1.29	1.20	0.91	1.58	0.81	0.58	1.13
1	Education: completed <2 years	0.86	0.68	1.10	1.02	0.79	1.33	0.80	0.59	1.09
	Family background [c]									
1	Financial strain	1.14	0.85	1.54	1.30	0.97	1.73	0.83	0.59	1.15
1	Changed schools more than 2 times	1.34	0.96	1.86	1.07	1.28	1.46	0.92	0.65	1.30
1	Parents divorced Death of a parent	0.99	0.71	1.38	1.04	0.76	1.44	1.36	0.96	1.91
1	Separation from family	1.11	0.82	1.50	0.93	0.69	1.26	1.11	0.80	1.54
1	Parent drug or alcohol problem	1.43*	1.08	1.90	1.05	0.75	1.38			
	Parent drug or alcohol problem*NP							1.51*	1.04	2.19
	Parent drug or alcohol problem*SW							0.68	0.40	1.14
	Traumatic events by age 18 [d]									
1	Sexual abuse	0.96	0.55	1.67	1.85**	1.16	2.96	0.96	0.60	1.56
1	Other violent trauma	1.42	0.92	2.20	1.09	0.75	1.57	1.30	0.89	1.90
1	Witness family violence				1.56**	1.18	2.07	1.05	0.76	1.47
	Family violenceNP*	1.85**	1.21	2.84						
	Family violenceSW*	1.05	0.70	1.59						
1	Witness other traumatic event	1.15	0.68	1.94	1.72**	1.15	2.57	1.03	0.70	1.51
1	Non-interpersonal trauma	1.05	0.66	1.69	1.38	0.93	2.05	1.20	0.82	1.76
1	Someone close experienced such trauma	1.74**	1.15	2.63	0.85	0.59	1.21	1.76**	1.21	2.56
	Behaviors [e]									
2	Conduct problem by age 18	2.94**	1.79	4.83	1.45	0.96	2.20	2.59**	1.69	3.98
2	Substance use initiation by age 13				2.85**	1.97	4.10	1.37	0.91	2.07
2	Substance use initiation 13–15 years old				1.79**	1.35	2.39	1.45*	1.01	2.10
	Lifetime alcohol use							1.47*	1.08	2.02
2	Substance use initiated with drug with or without alcohol							1.69*	1.05	2.74

Stage of substance use: Respondents were assigned stage of substance use by lifetime reports of: abstinence, alcohol only, marijuana and/or inhalants with or without alcohol, and other illicit drug(s) with or without use of the previously listed substances. Other illicit drugs include cocaine, hallucinogens, non-ceremonial use of peyote, stimulants, heroin, sedatives, analgesics and tranquilizers.

Adjusted odds ratios (ORs) and 95% confidence intervals (CI) are reported by step. For example, the OR for Northern Plains is from Step 1 and the OR for conduct problem from Step 2.

*,** indicates statistical significance at the 0.05 and 0.01 levels, respectively.

[a] Note the reference groups for the socio-demographic characteristics are for tribe Southwest, for gender male, for age persons 35–44 years old, and for education completion of 12 or more years of schooling.

[b] Significant interaction identified. See values reported below.

[c] Characteristics of family during respondents childhood.

[d] Other violent trauma includes physical abuse, being physically attacked or robbed, and being in direct combat experience in a war. Witnessing other traumatic events includes witnessing an accident or disaster where someone else was seriously injured or died or witnessing someone being abused or injured. Non-interpersonal traumatic experiences include a life-threatening accident or a natural disaster such as a flood or tornado.

[e] Substance use initiated with a drug, with or without alcohol, is compared to substance use initiation with alcohol only.

Table 4

The prevalence of lifetime DSM-IV psychiatric disorders, physical health conditions, and legal problems among AI-SUPERPF respondents aged 18–44 years by stage of substance use.

	Stage 0: Lifetime abstainer			Stage 1A: Lifetime alcohol use (only)			Stage 1B: Lifetime marijuana and/or inhalant use			Stage 2: Lifetime use of other illicit drug(s)			All respondents
	Average	Lower CI	Upper CI	Average	Lower CI	Upper CI	Average	Lower CI	Upper CI	Average	Lower CI	Upper CI	Average
Percent with lifetime DSM-IV psychiatric disorders													
Alcohol or drug dependence [a]	-	-	-	9.77[1B,2]	8.35	11.20	25.54[1A,2]	23.28	27.80	39.42[1A,1B]	31.72	47.12	14.99
Mood or anxiety disorder [b]	13.77[1B,2]	10.26	17.27	21.85[2]	17.25	26.45	25.97[1A]	20.65	31.29	34.65[0,1A]	27.13	42.18	22.11
Number of physical health conditions [c]	1.72[1A,2]	1.50	1.95	2.67[0]	1.99	2.54	2.26	1.94	2.58	2.75[0]	2.34	3.15	2.16
Percent with a lifetime felony conviction	3.48[1A,1B,2]	1.62	5.34	8.71[0]	5.60	11.83	11.88[0]	7.99	15.77	16.12[0]	10.38	21.86	8.87

Stage of substance use: Respondents were assigned stage of substance use by lifetime reports of: abstinence, alcohol only, marijuana and/or inhalants with or without alcohol, and other illicit drug(s) with or without use of the previously listed substances. Other illicit drugs include cocaine, hallucinogens, non-ceremonial use of peyote, stimulants, heroin, sedatives, analgesics and tranquilizers.

[0,1A,1B,2]Numeric superscripts are used to indicate significant differences ($p<0.01$) in a characteristic between two substance use stages. For example, the prevalence of alcohol or drug dependence among persons in Stage 1A was 9.77%. The superscript "2" next to this percent indicates the Stage 1A percent for alcohol or drug dependence differs significantly from the percent of persons with dependence in Stage 2. Conversely, the superscript "0" next to the percent of persons with alcohol or drug dependence in Stage 2 indicates this percent differs significantly from that reported for Stage 0.

[a]Drug dependence disorders include dependence on marijuana, inhalants cocaine, hallucinogens, non-ceremonial use of peyote, stimulants, heroin, sedatives, analgesics, and tranquilizers.

[b]The mood and anxiety disorders include major depressive, dysthymic, panic, generalized anxiety, and post traumatic stress disorder.

[c]Respondents self-reported the number of physical health conditions, both acute and chronic, diagnosed by a doctor during their lifetime. The number of reported conditions was summed.