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EDITORIAL

Recent years have seen the slow, but gradual accumulation of large scale studies of alcohol use and abuse among Native communities. Indeed, many of the authors represented in the present volume are responsible for this progress. However, most of the work to date has been of a cross-sectional nature, constituting important, yet limited perspectives on this phenomena. The constraints imposed by such forms of inquiry frustrate answers to questions about the relative contribution of risk and protective factors over time, about key transitional periods, and about subsequent developmental pathways. Insights of this nature ultimately are needed to inform the content, timing, duration, and sequence of preventive interventions across the life span.

Over the years, frequent conversations with Drs. Dale Walker and Pat Silk-Walker impressed upon me the careful thought that had been invested in their longitudinal study of alcohol use and abuse among a large sample of urban Indians, with special emphasis on the mother/child dyad. As we talked, there was little doubt in my mind that the empirical findings of this work would find its way into a variety of professional and public forums. However, many of the issues that we discussed at greatest length had to do with the opportunities for and challenges of conducting longitudinal research in this special population. Those issues touched upon matters of science — e.g., sampling, recruitment, retention, analysis, participant confidentiality — as well as local benefit — e.g., community participation, feedback, and programmatic application. The lessons learned about these matters seemed much less likely to be published. Most professional journals, today, are interested only in what they consider to be the “meat” or substance of a study; the “doing” of research often is considered outside of this domain. Ironically, with respect to longitudinal work in particular, thoughtful reflection on the latter is precisely what is now needed. Thus, Walker et al.'s offer to author a manuscript along these lines, employing their current experience as the central speaking point, was fortuitous: an offer I quickly accepted.

In the pages that follow, then, the reader is treated to a sophisticated presentation of research methods employed in a longitudinal fashion and comments by other investigators who have shared similar struggles. The result is a wonderful discussion of ideas, approaches, and priorities that is sure to instruct all of us. This exchange adds in important ways to the dialogue surrounding the potential and the pitfalls of studying the human condition over time.

Spero M. Manson, Ph.D.
EDITOR-IN-CHIEF

**ALCOHOL ABUSE IN URBAN INDIAN
ADOLESCENTS AND WOMEN:
A LONGITUDINAL STUDY FOR ASSESSMENT AND
RISK EVALUATION**

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Abstract: Empirical studies of American Indian health and mental health have focused primarily on reservation samples or small cross-sectional school-based or treatment samples. Few studies have addressed these issues among urban American Indian populations. This paper introduces an ongoing ten-year prospective longitudinal study of alcohol abuse, drug abuse, and mental health status in a community sample of urban American Indian adolescents and women. The study uses structured interviews and diagnostic assessments to identify risk factors for, and measure prevalence of, alcohol abuse, drug abuse, and psychopathology in 523 Indian youth and 276 Indian women. Study aims, rationale, research design, methods, sample characteristics, assessment instruments, and substance use prevalence are described, and methodological issues related to conducting longitudinal research are discussed.

There is great diversity among American Indian¹ people in tribal membership, cultural identity, preservation of traditions, and living circumstances. The United States currently recognizes 317 "Indian entities" in the 48 contiguous states, and 226 "Native entities" in Alaska (Bureau of Indian Affairs, 1993). Numerous other tribes, bands, and Native villages are not formally recognized by the government. Awareness of, and sensitivity to, the cultural diversity of Indian tribes is critical to developing effective responses to health care needs in Indian communities. This is particularly true in the case of substance use and related health outcomes, since there are important tribal differences in substance use attitudes and behavior (Weibel-Orlando, 1985; May, 1992; Mail & Johnson, 1993). Empirical studies of Indian health and mental health to date have focused primarily on reservation samples or small cross-sectional school-based or treatment

samples. Although 56% of Indians nationally live in urban areas of 2,500 or more people (U.S. Department of Commerce, 1992a), few researchers have addressed these issues among urban Indian populations. This paper introduces an ongoing ten-year prospective longitudinal study of alcohol abuse, drug abuse, and mental health status in a community sample of urban American Indian adolescents and women.

While recognizing tribal variation in substance use practices and consequences, it is nonetheless clear that alcohol and substance abuse are serious health problems for many Indian communities. The age-adjusted mortality rate due to alcohol dependence syndrome, alcoholic psychosis, and alcoholic cirrhosis among Indians served by the Indian Health Service (IHS) is 5.3 times the rate for the U.S. general population, and does not include deaths from accidents, suicide, or homicide, which are often alcohol-related (Indian Health Service, 1993). The alcoholism mortality rate for young Indians between 25 and 34 years of age is 10.2 times greater than the comparable rate for this age group in the general population. National surveys of adolescents consistently find that American Indians have higher rates of alcohol use than any other ethnic group (Bachman, Wallace, O'Malley, Johnston, Kurth, & Neighbors, 1991; Beauvais, 1992a).

Discussing alcohol research on racial and ethnic minorities, the NIAAA Seventh Report to Congress noted, "Further research is needed, both to characterize the problems that may be specific to each group and to provide a basis for culturally appropriate means of addressing these problems" (National Institute on Alcohol Abuse and Alcoholism, 1990, p. 32). Similarly, the Institute of Medicine (1990) recently concluded that "Basic issues concerning the prevalence of problem drinking and patterns of treatment for alcohol problems among Indians remain unresolved" (p. 366). To address these and other important issues related to the health and mental health of urban Indians, this study uses structured interviews and diagnostic assessments to identify risk factors for, and measure prevalence of, alcohol abuse, drug abuse, and psychopathology in 523 urban Indian youth and 274 urban Indian women. The intent of this paper is to introduce the project. Study aims, rationale, research design, methods, sample characteristics, and assessment instruments are described in detail to provide a foundation from which subsequent data based papers can be evaluated. Substance use at baseline and 48-month follow-up is reported for two study cohorts. Finally, several issues inherent in this type of research are discussed.

Background

American Indian Research

American Indian Research (AIR) has studied alcohol, drug, and mental health issues among urban American Indians and Alaska Natives

in the Pacific Northwest since 1977. AIR is part of the Department of Psychiatry and Behavioral Sciences at the University of Washington School of Medicine, with offices at the Seattle Veterans Affairs Medical Center. Located in King County, Seattle is the largest urban center in Washington State. Sixty-two percent of the state's 81,483 Indian residents live in urban areas, and 21% live in King County (U.S. Department of Commerce, 1992b), making Seattle an ideal location for studying urban Indian health. The research group has benefited from its unique interface with the American Indian community, the Seattle Indian Health Board, the Indian Health Service, the University of Washington, and the Seattle Veterans Affairs Medical Center.

In the early 1980s, AIR received two grants from the National Institute on Alcohol Abuse and Alcoholism (NIAAA) to study adult Indians, alcohol abuse, and alcoholism treatment outcome (Walker, Benjamin, Kivlahan, & Walker, 1985). These studies documented the severity and chronicity of alcohol problems in four treatment samples of urban Indian adults, and the failure of existing tertiary treatment strategies to produce lasting sobriety (Kivlahan, Walker, Donovan, & Mischke, 1985). Through this work we established active and ongoing ties with the American Indian community. Findings from these studies suggested that primary and secondary intervention efforts targeting earlier stages in the development of alcohol dependence were needed. However, there were no published empirical studies to guide early intervention efforts.

Our current research with Indian youth and their families derived from the findings and methods developed earlier with adults. It is a ten-year, prospective longitudinal study of alcohol abuse, drug abuse, and mental health status of two generations of urban American Indians. Phase I, the *Urban American Indian Adolescent Alcohol and Drug Abuse* study, was funded in 1987 for five years by NIAAA. In 1993, NIAAA renewed funding for an additional five years to complete Phase II, *Alcohol Abuse in Urban Indian Adolescents and Women*. The broad aim of the research is to study the epidemiology of alcohol abuse, drug abuse, and psychopathology in a sample of urban American Indian adolescents and women. Specifically, using structured interviews and diagnostic assessments, we will: (a) describe the prevalence and incidence of alcohol abuse in urban Indian adolescents and women; (b) describe the comorbidity of alcohol abuse with drug abuse and other psychopathologies in Indian adolescents and women; (c) assess the contribution of adolescent alcohol abuse to suicide, school dropout, and unsafe sexual behavior; (d) describe the natural history of alcohol-related problems in American Indian women; (e) develop and test an additive risk factor model predicting adolescent alcohol abuse; (f) develop a reliable and efficient screening battery to identify American Indian youth at elevated risk for substance abuse; and (g) assess conduct disorder, mother's emotional status, cultural identification and participation, and gender as potential mediators or

moderators of the relationship between alcohol abuse and family history factors. Our ultimate goal is to aid development of efficacious and culturally sensitive prevention and intervention programs for Indian adolescents and women.

During Phase I we collected baseline (T1) measures of potential predictors of substance abuse from 444 Indian youth and their primary caretakers before the onset of regular substance use by the youth. Annual assessments documented changes in these measures over three years (T2, T3, & T4). During Phase II we are administering diagnostic interviews to all youth and primary caretakers, including 276 Indian women. High rates of follow-up completion over the first five years of the study demonstrate the potential for successful longitudinal research with Indian samples.

In this paper we describe the study aims, rationale, design, methods, sample characteristics, and instrumentation. Future articles will focus on: prevalence and change over time of substance use; risk factors for substance use and abuse, risk factors for other psychiatric disorders; family history of alcohol dependence, drug dependence, and psychopathology; strategies for successful longitudinal follow-up in multi-cultural samples; reliability and validity of assessment instruments, including predictive validity; and strategies for early intervention with American Indian youth at high-risk for alcohol and substance abuse and related problems.

American Indian Adolescent Alcohol Use

In the National Institute on Drug Abuse (NIDA) annual survey of high school seniors, Bachman et al. (1991) concluded that since 1976 "Native Americans had the highest rates for cigarettes, alcohol, and most illicit drugs." Combining annual data from 1985–1989, 48.1% of Indian males and 33.7% of Indian females reported having five or more drinks in a row in the two weeks prior to survey completion. Caucasian males reported the same rate of heavy drinking as Indian males, and Caucasian females nearly the same rate as Indian females. However, the authors noted that given the high rate of academic dropout among Indians, data on the total age cohort might reveal an even more significant problem. Unlike school surveys, our study follows a community sample of adolescent subjects through the age when they would be high school seniors, regardless of school participation. In addition to being the first longitudinal investigation to follow urban Indian adolescents through the years of greatest risk for onset of substance abuse, our study includes questions paralleling those of the annual survey of high school seniors to permit an empirical test of discrepancies between what Bachman et al. (1991) refer to as "the two worlds of drug use data" (i.e., community and school-based).

Two recent school-based cross-sectional studies documented comparatively high rates of alcohol use among Indian adolescents. Beauvais, Oetting, Wolf, and Edwards (1989) reported higher lifetime

prevalence rates for reservation and rural Indian high school seniors, relative to high school seniors nationally, on six of seven categories of drug use. Particularly striking were Indian self-reports of having “gotten drunk” (38.7%) and used marijuana (36.5%) during the month prior to assessment. A Washington state school-based survey of alcohol use found that at eighth grade, 28% of Indian students statewide reported drinking at least monthly and/or occasionally drinking five or more drinks in a row, compared to 15% of Caucasians (Office of the Superintendent of Public Instruction, 1991).

**Adverse Consequences of Alcohol Use:
Suicide, School Dropout, and Unsafe Sex**

Indian youth aged 15–24 served by the IHS have suicide rates 2.9 times the national rate (IHS, 1993). One study of Indian high school students reported that 23% of a boarding school sample had attempted suicide (Manson, Beals, Dick, & Duclos, 1989). Other reports suggest an association between drinking and attempted suicide. For instance, a school-based study of Navajo adolescents found weekly use of hard liquor related to increased risk for suicide attempt (Grossman, Milligan, & Deyo, 1991). We ask questions about suicidal thoughts and attempts, and assess the severity of attempt, concurrent intoxication, and exposure to attempted and completed suicide in family and friends.

Alcohol use adversely affects the school performance of all adolescents, and Indian adolescents in Seattle are over-represented in school-based negative outcomes (Seattle Public Schools, 1991). During 1990–91, 35% of Indian high school students were categorized as dropouts, versus 20% for Blacks and 15% for the district as a whole. Academic attainment, grade point average, and achievement test scores are lower for Indians than for any other ethnic group. Poor attendance rates and high rates of discipline complete a picture of concern for Indian adolescents. In subsequent papers we will report differences in alcohol abuse parameters between dropouts and those attending school.

Another high-risk behavior related to adolescent alcohol use is unprotected sexual activity. Among all ethnic groups, American Indians had the largest proportional increase in diagnosed AIDS cases in 1989 (Hooper & Conway, 1989). Elliott and Morse (1987) observed that precocious sexual activity often occurs as part of a pattern of deviant behavior that includes substance abuse. Among youth ages 11–17, sexual activity was reported by 10% of boys and 3% of girls who were not using drugs, compared to 71% of boys and 52% of girls who were using multiple illicit substances. Beauvais (1992b) speculated that AIDS is likely to become a growing problem among Indians. We document high risk sexual behavior and its relationship to substance use in our adolescent sample.

Psychosocial Risk Factors for Adolescent Alcohol Abuse

Investigation of factors related to onset of alcohol abuse in Indian adolescents will help focus prevention and early intervention efforts. The acquisition, maintenance and change of alcohol-related problems in the present study are conceptualized within a biopsychosocial perspective (Donovan, 1988). During Phase I we assessed a number of conceptual domains relevant to an explication of the etiology of Indian adolescent substance abuse, and adopted a risk factor approach to prediction of adolescent substance abuse. Risk factors are discrete categories of individual, situational, and environmental factors hypothesized to increase the likelihood of alcohol abuse. While the temporal ordering and direction of the relationship between risk factors and alcohol abuse is often unclear from cross-sectional studies, risk factors, when present, increase the probability of subsequent or contemporaneous alcohol abuse. The goals of prevention are served by the findings of risk factor evaluations, as prevention activities can be targeted to factors known to be associated with alcohol abuse. Risk factor models focusing on Indian adolescents are rarely reported (Moncher, Holden, & Trimble, 1990).

Proponents of risk factor approaches to the study of adolescent substance abuse (Bry, McKeon, & Pandina, 1982; Hawkins, Lishner, Catalano, & Howard, 1985; Newcomb, Maddahian, & Bentler, 1986) emphasize the need for comprehensive assessment of risk factor domains. However, it is also necessary to determine which factors to include in the assessment and model testing process. The risk factor dimensions we chose to evaluate are those found to be predictive of adolescent substance abuse in at least three previous empirical investigations. Risk factors meeting this criterion are: *family history of alcoholism* (e.g., Hesselbrock, Bauer, Hesselbrock, & Gillen, 1991); *childhood conduct disorders* (e.g., Zucker & Gomberg, 1986); *adolescent psychopathology* (e.g., Lerner & Vicary, 1984); *current psychological distress among caretakers* (e.g., Labouvie, Pandina, White, & Johnson, 1986); *sensation seeking orientation* (e.g., Pedersen, 1991); *religiosity* (e.g., Bloch, Crockett, & Vicary, 1991); *peer deviance and perceived/actual peer drug use* (e.g., Walter, Vaughan, & Lohall, 1991); *low self-esteem* (e.g., Kaplan, Martin, Johnson, & Robbins, 1986); *precocious sexual activity* (e.g., Elliott & Morse, 1987); *poor school performance/dropping out* (e.g., Hawkins et al., 1985); *dysfunctional family interaction patterns and environment* (e.g., Brook, Cohen, Whiteman, & Gordon, 1992); *neuropsychological functioning* (e.g., Tarter, Jacob, & Bremer, 1989); *positive alcohol-related expectancies* (e.g., Brown, Christiansen, & Goldman, 1987); *early use of alcohol and drugs* (e.g., Kandel & Davies, 1992); and *poverty* (e.g., Brunswick, 1988). *Cultural identification* (e.g., Moncher et al., 1990), and *participation in cultural activities*, are included as potential risk factors in order to assess the role of minority cultural involvement in Indian adolescent alcohol abuse. Other variables of

interest, such as density of family history of alcohol abuse and exposure to drinking in the home, will be explored in secondary analyses.

Risk factor approaches to alcohol and other drug abuse assume that vulnerability is multifactorial (Woody, Urschel, & Alterman, 1992). While a number of theoretically based models developed on other projects warrant investigation (Craig, 1982; Hawkins et al., 1985; Jessor & Jessor, 1978; Kandel, 1984; Kaplan et al., 1986; Kumpfer & Turner, 1990–91; Newcomb & Bentler, 1988; Oetting, Swaim, Edwards, & Beauvais, 1989; White, Johnson, & Horowitz, 1986), we selected the additive risk factor model (Clayton, 1992) as the most parsimonious and directly testable. In this approach, an individual's risk is considered an additive function of the number of risk factors he or she possesses. Newcomb et al. (1986) found that 1% of 994 adolescents in grades 10–12 with no risk factors reported daily marijuana use, compared to 56% of those with seven or more risk factors. Similarly, Moncher et al. (1990) found that fewer than 5% of a sample of Indian adolescents with no risk factors reported drinking alcoholic beverages, while nearly 90% of subjects exposed to 10 or more factors reported alcohol use. Number of risk factors appears to be linearly associated with frequency of heavy alcohol use in adolescent samples. Predictions from logistic regression analyses of alcohol abuse incorporate variables across risk factor domains, and provide an assessment of their relative role in adolescent alcohol abuse. Based on the determination of factors predictive of risk, we will test whether a brief self-report risk screening procedure predicts late adolescent alcohol abuse. Brief screening provides a cost-effective approach to population evaluation and targets diagnostic interviewing to those at greatest risk for problem development (Kleinbaum, Kupper, & Morgenstern, 1982).

Mediating and Moderating Processes

It is now generally accepted that children of alcoholics have a greater risk for developing alcohol abuse and other disorders than children of non-alcoholics. However, not all individuals at risk inevitably develop alcohol problems (Sher, 1991). This observation has prompted attempts to identify more specifically the nature of the vulnerability transmitted within families, and the processes that may mediate or moderate risk. Baron and Kenny (1986) clarified the mediator/moderator distinction in accounting for such underlying mechanisms. Mediating variables account for the relation between a predictor and a criterion (i.e., a covariate), while moderator variables affect the direction or strength of the predictor-criterion relationship (i.e., an interaction effect). Moderators act as protective variables reducing the impact of a known vulnerability, or as magnifying variables increasing the impact of a vulnerability. Rogosch, Chassin, & Sher (1990) reviewed the empirical support for personality processes as mediators and moderators of alcohol abuse risk and provided an example of appropriate analyses

to test these effects. They noted the importance of prospective follow-up assessments to test for between-group differences in drinking outcomes. Continued follow-up of our high risk adolescent sample will provide an opportunity to apply these analyses. Moderator variables may help target interventions to modifiable factors. Moderator variables that buffer the risk associated with positive family history of substance abuse and/or psychological problems are of particular interest. Two proposed, but not yet adequately tested, moderator variables are maternal emotional status (Jacob & Leonard, 1986) and ritualized family interactions (Wolin, Bennett, Noonan, & Teitelbaum, 1980). To explore the moderating effects of these variables in our sample, we collect data using the Brief Symptom Inventory (Derogatis & Melisaratos, 1983), and questions on family rituals.

Research reported to date has not tested the mediating or moderating role of culture. Walker and Kivlahan (1984) reviewed the problems of defining the terms culture, acculturation, ethnicity, and "Indianness." We view culture as a life context factor (Cronkite & Moos, 1980) that might explain variance in alcohol use beyond that explained by other predictors. Based on our work (Walker & Kivlahan, 1984) and that of Oetting and Beauvais (1990–91), data on cultural content (language use, ceremonial adherence, traditional medicine, and involvement in traditional activities) are being gathered along with assessment of cultural identification. Greater Indian cultural identification and participation may reduce the likelihood of alcohol abuse. Recognizing the tribal heterogeneity of our urban sample, we will evaluate data by tribe and cultural/language group.

Epidemiology of Alcohol Use and Abuse Among American Indian Women

The research literature on alcohol use and abuse among Indian women is scant. The few empirical studies reported over the last twenty-five years describe small, generally reservation-based clinical samples. Mortality studies suggest that Indian women may be particularly vulnerable to the adverse effects of alcohol. They account for nearly half of all Indian deaths from cirrhosis, yet they tend to drink less than Indian men (Institute of Medicine, 1990). Among certain tribal groups, although not all, the prevalence of fetal alcohol syndrome and fetal alcohol effects is much higher than in the general population (May & Hymbaugh, 1989). One of the few studies to examine drinking in American Indian women found that approximately 40% of a sample of 82 women treated in a primary care medical setting, for non-substance-related and non-psychiatric conditions, reported a history of problem drinking (Walker, Walker, & Mariano, 1987). Over half these women had received treatment for alcohol dependence during their lifetime. Two studies report comorbid psychiatric and substance use disorders among Indian women. Shore, Manson, Bloom, Keepers, and Neligh (1987) observed that 35% of their sample of 54 Indian women patients with a primary diagnosis of major depression had a secondary diagnosis of

Table 1
*Number of Subjects, Mean Age, and Assessment Schedule for
 Phase I and Phase II Studies¹*

	Phase I					Phase II			
	T1	T2	T3	T4	T5	T6	T7	T8	T9
Sample ²	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97
Cohort 1 (N)	(224)	(221)	(217)	(218)	(211)	(211)	(205)	(199)	(193)
Mean Age	11.7	12.7	13.7	14.7	15.7	16.7	17.7	18.7	19.7
Cohort 2 (N)	(66)	(65)	(66)	(66)	(66)	(64)	(62)	(60)	(58)
Mean Age	11.7	12.7	13.7	14.7	15.8	16.7	17.7	18.7	19.7
Cohort 3 (N)					(78)	(74)	(72)	(70)	(68)
Mean Age					16.5	17.4	18.4	19.4	20.4
Cohort 4 (N)		(76)			(65)			(59)	
Mean Age		15.5			18.6			21.6	
Cohort 5 (N)			(79)			(72)			(66)
Mean Age			12.0			15.1			18.1
Cohort 6 (N)					(236)	(266)	(258)	(250)	(243)
Mean Age					42.6	43.2	44.2	45.2	46.2

¹Numbers in **boldface** are estimates for remaining years of data collection, based on 3% annual attrition.

²Cohort 1 subjects were recruited from two school districts while they were in the fifth and sixth grade. Cohort 2 subjects were recruited from the membership of a local Indian Health Board, and were also in the fifth and sixth grade. Cohort 3 subjects were recruited from the same two school districts as Cohort 1, while both cohorts were in the ninth and tenth grades. Cohort 4 and Cohort 5 subjects were recruited from the same two school districts as Cohort 1, while they were in the ninth and sixth grades, respectively. Cohort 6 subjects are adult Indian women who are the primary caretakers for the youth subjects.

alcoholism, while 24% were diagnosed with generalized anxiety, 24% with phobias, and 15% with drug use. We found considerable psychiatric comorbidity among Indian women with a history of alcohol dependence; 61% scored in the clinical range on a measure of current psychiatric distress, compared to 29% of Indian women with no history of alcohol dependence (Walker, Lambert, Walker, & Kivlahan, 1993). Thus, preliminary indications suggest that substance abuse and psychopathology represent important problems for American Indian women.

While Phase I focused primarily on adolescent alcohol use, several factors led to an increased emphasis on Indian women's alcohol use in Phase II. First, there is a high lifetime prevalence of alcoholism in this special population that is not well studied (Institute of Medicine, 1990). Second, there may be adverse or protective influences of maternal drinking behavior and other psychopathology on adolescent development (Jacob & Leonard, 1986; Moos & Billings, 1982). Third, we have established a successful research relationship with a sample of 276 Indian women, 246 of whom are biological mothers of the adolescent subjects. Finally, in the context of our demonstrated ability to follow two generations in a longitudinal design, we have the opportunity to add to the sparse literature addressing the natural history of women's drinking.

Methods

Experimental Design and Assessment Schedule

Six independent cohorts constitute the study population (see Table 1). Cohort 1 is comprised of 224 American Indian youth recruited from the fifth and sixth grades of two urban school districts during the 1988–89 academic year (T1). This cohort is assessed annually and will complete a total of nine interviews during Phase I and Phase II of this project. Cohort 2 consists of 66 subjects recruited from the membership of the local Indian Health Board while they were enrolled in the fifth and sixth grades during the 1988–89 academic year. Cohort 1 and Cohort 2 have similar mean ages, and follow the same assessment schedule. Cohort 3 is comprised of 78 youth recruited during the 1992–93 academic year (T5) from the ninth and tenth grades of the same two school districts as Cohort 1. Thus Cohort 3 belongs to the same age and grade cohorts as Cohorts 1 and 2. Cohort 3 will complete a total of five annual interviews during Phase II. If demographic and behavioral comparisons show adequate homogeneity, they will be added to Cohort 1 to minimize statistical power issues that could arise due to attrition in a long-term project.

Two cross-sectional cohorts were recruited during Phase 1 of the study to test for period, cohort, and treatment effects. Cohort 4 is comprised of 76 ninth graders recruited during the 1989–90 academic year (T2) and Cohort 5 is comprised of 78 sixth graders recruited during the

1990–91 academic year (T3). Each cross-sectional cohort is scheduled to complete two additional interviews during Phase II (Cohort 4 at T5 and T8; Cohort 5 at T6 and T9).

Cohort 6 is comprised of 276 American Indian women. These women, mostly biological mothers of the five youth cohorts, were interviewed as the youths' primary caretakers during Phase I. In Phase II we recruited them as subjects in their own right. They will complete five, six, or nine interviews depending on when they were first interviewed as a caretaker.

Table 1 shows the sample size, mean age at each annual assessment, and interview schedule for each cohort. Numbers shown in **bold-face** are estimates based on a three percent annual attrition rate for years not yet completed.

Sample Selection Criteria

Youth eligible for participation in Cohorts 1, 3, 4, and 5 met four criteria. First, they were enrolled in grades five, six, nine, or ten in one of two school districts. The two districts have the highest Indian enrollments in the Seattle metropolitan area. Second, a parent or guardian identified the subject as American Indian or Alaska Native on HEW Form 506, *Indian Student Certification*, when the youth enrolled in school. Third, they did not have major cognitive dysfunction. Finally, they were no more than two years older than the mean age for their grade. Youth eligible for participation in Cohort 2 met five criteria; they were in the fifth or sixth grade; received services at the Indian Health Board between August 1985 and July 1988; were identified as American Indian by clinic records; did not have major cognitive dysfunction; and were no more than two years older than the mean age for their grade. The following paragraphs describe the recruitment of Cohort 1. The same procedures were followed for all cohorts.

Recruitment of Cohort 1

In 1988–89 the two school districts identified 409 fifth and sixth grade Indian students and their adult caretakers. We attempted to recruit all 409 students. Sixty-seven students were deemed ineligible for the following reasons: (a) they moved out of the school district before we could contact them [n=56]; (b) they were incapacitated by fetal alcohol syndrome, severe cognitive deficit, or deafness [n=3]; (c) the parent denied the youth was Indian [n=7]; and (d) participation in our pilot study six months earlier [n=1]. Elimination of these individuals resulted in a final Cohort 1 eligible population of 342 fifth and sixth grade American Indian and Alaska Native students.

Personalized introductory letters inviting participation in the study were mailed to the parent or caretaker of all 342 eligible students. The letter explained that the University and their school district had reviewed and approved the research, and that their school district had given us their names and addresses. It also described the types of questions they would answer, how their confidentiality would be protected, and the payment they would receive for participation. One week after mailing the initial contact letter, a staff member telephoned the parent to answer questions and schedule an interview appointment.

Project staff documented all efforts to contact potential subjects. Recruitment efforts persisted until potential subjects were confirmed to have moved out of the catchment area or they actively refused to participate. Subjects who did not keep interview appointments were contacted and rescheduled. Between November, 1988 and August, 1989 we recruited and interviewed 224 (65%) Cohort 1 youth and caretaker dyads. Of those interviewed, 89 (26%) refused and we were unable to contact 29 (9%) despite repeated efforts. To minimize age differences, sixth grade subjects were interviewed in the fall and fifth grade subjects in the spring. This procedure resulted in a Cohort 1 mean age of 11.7 years ($\sigma = .61$) at baseline (T1) assessment.

Attrition

Cohort 1. Twelve-month follow-up (T2) attrition was minimal; 221 (99%) youth and 223 (99%) adults completed their second interview. High rates of participation were sustained at subsequent interviews: 217 (97%) youth and 216 (96%) adults completed their 24-month interview (T3); 218 (97%) youth and 213 (95%) adults completed their 36-month interview (T4); and 211 (94%) youth and 207 (92%) adults completed their 48-month interview (T5). In some cases a youth was living with a different parent or guardian at follow-up interview. Consequently, nine new adults were interviewed at T2, seven at T3, five at T4, and twelve at T5. On average, 85% of all follow-up interviews were conducted within five weeks of the anniversary of the first interview.

Cohort 2. Except for one youth who missed the T2 interview, the 66 subjects in this group achieved 100% follow-up completion through T5.

Cohort 4. Despite three years of no contact that separated their first and second interviews, 86% of these 76 subjects completed the follow-up at T5. Six subjects (8%) refused to continue, and five (6%) could not be relocated.

Characteristics of the Five Youth Cohorts

Subjects from the two school districts in Cohort 1 were similar with respect to age, gender, grade, caretaker's gender, household size,

per capita income, parents' occupational status, and whether they received services from the Indian Health Board. These subjects were combined for all analyses. Subjects recruited from the Indian Health Board differed from the school district samples only on measures of income. A larger proportion (48.5% vs. 29.0%, chi-square = 8.7, $df = 1$, $p < .01$) of the Indian Health Board subjects lived in households with income levels below federal poverty guidelines than subjects from Cohort 1. Table 2 describes characteristics of the five youth cohorts at the baseline interview.

Table 2
Characteristics of Five American Indian Youth Cohorts

	Cohort 1	Cohort 2	Cohort 3	Cohort 4	Cohort 5
N	224	66	78	76	79
Year of Baseline Assessment	1988 -89	1988 -89	1992 -93	1989 -90	1990 -91
Assessment Interval	1 year	1 year	1 year	3 years	3 years
Mean Age at Baseline	11.67	11.69	16.49	15.51	12.04
Gender (%)					
Male	49.6	45.5	46.2	48.7	53.2
Female	50.4	54.5	53.8	51.3	46.8
Indian Blood Quantum (%)					
1/2-4/4	31.4	22.7	26.0	35.5	35.4
1/4-1/2	27.8	36.4	20.8	25.0	27.8
< 1/4	36.3	34.8	37.7	32.9	22.8
Unknown ¹	4.5	6.1	15.5	6.6	14.0
Indian Lineage (%)					
Biological Mother is Indian	73.2	80.3	76.9	69.7	79.7
Biological Father is Indian	71.4	57.6	67.9	69.7	62.0
Both Parents are Indian	45.1	37.9	44.9	39.5	41.8
Tribal Enrollment² (%)					
Youth	33.6	31.8	36.4	35.5	44.3
Indian Mothers	57.9	71.7	55.9	66.0	58.7
Indian Fathers	53.8	57.9	40.0	45.3	55.1
Identification with Indian ethnicity³ (%)					
All or nearly all Indian	27.0	19.7	31.2	35.4	20.8
Mostly Indian	31.8	40.9	29.9	23.1	33.3
A little Indian	37.0	31.8	32.5	35.4	38.9
Not at all Indian	4.3	7.6	6.5	6.2	6.9

Table 2 (Continued)
 Characteristics of Five American Indian Youth Cohorts

	Cohort 1	Cohort 2	Cohort 3	Cohort 4	Cohort 5
Family Structure (%)					
Both Biological Parents	32.6	34.8	25.6	27.6	32.9
Mother & Step-Father	13.4	18.2	6.4	19.7	6.3
Father & Step-Mother	1.8	1.5	0.0	3.9	1.3
Mother Only	33.9	34.8	50.0	34.2	39.2
Father Only	5.8	4.5	5.1	6.6	6.3
Median Household Income	\$20,000	\$13,000	\$18,000	\$28,000	\$23,000
(Range)	(3,600–72,000)	(9,000–61,000)	(5,300–66,000)	(1,800–80,000)	(6,000–100,000)
Per Capita Income Below Poverty Line (%)					
	29.0	48.5	32.1	17.6	22.8
Income Subsidized By: (%)					
Tribal Per Capita Payments	10.7	3.1	6.4	5.3	17.7
Alaska Native Claims Settlements	9.8	21.5	9.0	11.8	8.9
Welfare/Food Stamps	30.8	36.9	41.0	18.4	24.1
Relationship of Primary Caretaker to Youth (%)					
Biological Mother	76.3	84.8	80.8	72.4	77.2
Biological Father	9.4	9.1	9.0	13.2	11.4
Other Biological Relative	8.8	1.5	6.4	3.9	5.2
Non-biological Relative	5.4	4.5	3.9	10.5	6.4

¹Subjects who were adopted or placed in foster care homes may not know the specific details about their genealogy.

²Tribal enrollment is a census variable. Requirements vary across tribal governments and frequently require birth or residence within the tribe's geographic boundaries. Many of these urban residents may not meet geographic criteria for enrollment.

³Measured at T5 for Cohorts 1–4 and T6 for Cohort 6.

The combined youth samples are characterized by a rich tribal heterogeneity, representing over 50 tribes from nine culture areas. The five tribes with highest representation are Tlingit (11.4%), Cherokee (10.2%), Blackfeet (7.3%), Ojibwa (6.8%) and Sioux (6.5%). Approximately one-third of the youth are enrolled members of their tribe. The youth's Indian blood quantum was calculated from the primary caretaker's report of the youth's parents' and grandparents' blood quantum. When blood quantum was unknown for any parent or grandparent, the youth's minimum blood quantum was calculated from known data. Approximately 30% of the youth had a minimum blood quantum between 4/4 and 1/2,

27% between 1/2 and 1/4, and 34% less than 1/4. Nine percent of the caretakers did not know the youth's genealogy. Two-thirds or more of each cohort were born in an urban area, and over 80% had lived most of their lives in Seattle. Fewer than 15% had ever lived on a reservation or in a predominantly Indian community. At T5, the majority of youth described their ethnic identity as either "mostly" Indian (31%) or "all or nearly all" Indian (28%), and the remainder described themselves as "a little" Indian (35%) or "not at all" Indian (6%). Though 45% did not identify at all as Caucasian, 22% described themselves as "a little" Caucasian, 24% as "mostly" Caucasian, and 10% as "all or nearly all" Caucasian.

The majority of Indian parents are affiliated with tribes from areas other than the Pacific Northwest Coast; 14 (4%) belong to one of the 13 small Puget Sound tribes. Consistent with other major urban areas, this tribal heterogeneity suggests a complex history of migration to the Northwest from across the country. Approximately half of the Indian parents had lived on a reservation or in a predominantly Indian community. One-fourth of the Indian mothers and fathers were born in Seattle, and 33% of the mothers and 21% of the fathers were brought to the area by their parents. Sixty-three percent of the Indian mothers and 55% of the Indian fathers were enrolled in their tribe.

Characteristics of the Indian Women Cohort

A total of 276 Indian women have participated as the youths' primary caretakers over the course of this study. These women are predominantly the biological mothers of the youth, although some are aunts, grandmothers, or unrelated Indian caretakers. This cohort includes 149 biological mothers paired with daughters, and 127 biological mothers paired with sons. Table 3 presents characteristics of the Indian women cohort.

Instrumentation

Assessment Procedures

Several global features of the assessment and data collection activities embodied in this research deserve brief mention. Because recent research (Glantz & Pickens, 1992) has amply demonstrated the multifactorial nature of alcohol and drug dependence liability, we evaluate youth and parents at multiple assessment points across a diversity of risk factor domains. Our goal is to follow youth and their families for a total of 15 years, to obtain data on three generations of American Indians. The instruments we employ demonstrate acceptable psychometric properties when applied to the general population, though many have not previously been analyzed with American Indian samples. In addition, instruments utilized in this research were evaluated for reading level and age appropriateness for

Table 3
Characteristics of 276 American Indian Women

<i>Mean Age</i>	42.3
<i>Mean Years of Education</i>	12.6
<i>Indian Blood Quantum (%)</i>	
1/2–4/4	54.8
1/4–1/2	24.7
< 1/4	13.6
Unknown	6.8
<i>Tribal Enrollment (%)</i>	62.2
<i>Tribal Affiliation</i>	
Local Tribes (%)	5.0
Number of Tribes Represented	49
<i>Identification with Indian ethnicity (%)</i>	
All or nearly all Indian	49.6
Mostly Indian	27.1
A little Indian	17.8
Not at all Indian	5.5
<i>Median Household Income</i>	21,600
(Range)	(2,600–200,000)
<i>Per Capita Income Below Poverty Line (%)</i>	32.2
<i>Income Subsidized By: (%)</i>	
Tribal Per Capita Payments	11.4
Alaska Native Claims Settlements	14.8
Welfare/Food Stamps	37.1
<i>Relationship of Caretaker to Youth (%)</i>	
Biological Mother	89.2
Biological Female Relative	9.1
Non-biological Indian Female	1.8

the target cohort (i.e., fifth graders were not given instruments with higher reading levels; youth were not asked about sexual behavior prior to age 15 or ninth grade.) At the conclusion of the baseline interviews, all adult and youth scaled instruments were evaluated for internal consistency reliability using Cronbach's alpha (Nunnally, 1978). Reliability coefficients of those scales selected for continued inclusion ranged from .70 to .96. Attention to more detailed psychometric issues (i.e., continuity and predictive validity) will be presented elsewhere (e.g., Walker, P.S., 1993). Adolescents and caretakers are assessed simultaneously in separate rooms during interviews averaging two and one-half hours. Two-thirds of test administrators

in T1–T5 were American Indian, and 65% of all T1–T5 interviews were conducted by American Indian interviewers. All assessments are intended to be face-to-face. However, each year several subjects move away and it is necessary to conduct their interviews by telephone. Telephone interviews of adolescent subjects generally yield findings similar to structured interviews in substance abuse and mental health studies (Reich & Earls, 1990).

Assessment Instruments

We selected instruments that measure variables in three broad classes; substance use and abuse, adverse consequences of use, and risk factors for adolescent substance use. Table 4 lists the measurement domains, respondents, instruments, and measures obtained. Each instrument is described below.

Assessment of Substance Use and Adverse Consequences

Substance Use and Abuse

Patterns of adolescent alcohol and drug use are assessed with our own *Adolescent Alcohol and Drug Use Questionnaire (AQ)*. Items assessed include quantity and frequency of alcohol and other substance use; age of onset and recency of use; reasons for drinking; perceptions of sibling and parental alcohol and drug use; frequency of alcohol-related problems; access to alcoholic beverages; and perceptions of family and friends' attitudes about, and actual, drinking behavior. Intentions to drink over the next year and over the life span are assessed, as are the adolescent's assessment of the risks attendant to drinking. Analogous measures are administered for marijuana, tobacco, and other drug use. Caretakers also respond to a number of items assessing the youth's alcohol and drug use.

The *Rutgers Alcohol Problem Index (RAPI)* is a 23-item scale that provides an assessment of adolescent problem drinking and the frequency of adverse alcohol-related outcomes during the three years prior to the interview (White & Labouvie, 1989). We modified the time frame to assess frequency of alcohol-related problems over the previous year.

The diagnoses of alcohol and other substance abuse/dependence are based on the Adolescent Version of the *Children's Semi-Structured Assessment for the Genetics of Alcoholism (C-SSAGA-A)*. This interview protocol, appropriate for individuals between 13 and 17 years of age, is based on the Diagnostic Interview for Children and Adolescents and allows the determination of DSM-III-R diagnoses (Child Assessment Committee of COGA, 1992). The instrument is currently used in the NIAAA-funded multisite Collaborative Study on the Genetics of Alcoholism

Table 4
Assessment Battery: Measurement Domain,
Respondent, Instrument, and Measures

Measurement Domain	Respondent/Instrument	Measures
Substance Use and Abuse		
Alcohol and Drug Use Patterns	(A) Alcohol & Drug Use Questionnaire (AIR)	≥ 5 drinks past 2 weeks
	(P) Adult Biographical Questionnaire (AIR)	Corroboration of adol. report
Alcohol Related Problems	(A) Rutgers Alcohol Problems Inv. (White)	Total Score
Alcohol and Drug Abuse Diagnoses	(A) C-SSAGA-A (COGA)	DSM-III-R diagnosis
Adverse Consequences of Use		
Suicidality	(A) C-SSAGA-A	Any Suicide attempt
Academic Dropout	(S) School Records/Parent & Youth Report	
High Risk Sexual Behavior	(A) Adolescent Biographical Quest. (AIR)	Unsafe sexual practices
Adolescent Risk Factors		
Family History-Alcohol/ Drug Dependence	(P) FHAM (Janca)	1° & 2° relative; DSM-III-R criteria
Parent Alcohol/Drug Dependence	(P) Adult Biographical Questionnaire (AIR)	DSM-III-R criteria
Conduct Disorder Externalizing behavior	(A) C-SSAGA-A	Conduct disorder
	(P) Child Behavior Checklist (Achenbach)	Externalizing T-score
	(A) Youth Self Report (Achenbach)	Externalizing T-score
	(S) Teacher Report Form (Achenbach)	Externalizing T-score
Adolescent Psychopathology Internalizing behavior	(A) C-SSAGA-A	DSM-III-R diagnosis
	(P) Child Behavior Checklist	Internalizing T-score
	Total behavior problems	Total Behaviors T-score
	(A) Youth Self Report	Internalizing T-score
Caretaker Psychological Distress	(P) Brief Symptom Inventory (Derogatis)	General Severity Index
	(P) SSAGA (COGA)	DSM-III-R criteria
Sensation Seeking	(A) Sensation Seeking Scale (Zuckerman)	Total scale score

Table 4 (Continued)
 Assessment Battery: Measurement Domain,
 Respondent, Instrument, and Measures

Measurement Domain	Respondent/Instrument	Measures
Religiosity	(P) Adult Biographical Questionnaire (AIR)	Religious participation
Peer Influences	(A) Alcohol & Drug Use Questionnaire (AIR)	Peer use and problem behavior
Self-Esteem	(A) Self Perception Profile (Harter)	Global Self Worth
Sexual Activity	(A) Alcohol and Drug Use Questionnaire	Precocious sexual activity
Academic Involvement & Performance	(S) School Records	Grades, CAT, attend, discip.
	(A) Self Perception Profile (Harter)	Academic Competence Scale
Family Interaction & Environment	(P) Family Relationship Index (Moos)	Total index score
	(A) Family Relationship Index	Total index score
Neuropsychological Functioning	(A) Digit Symbol (Coding B) Test	Level of performance
	(A) Trail Making Test (A & B)	Level of performance
Alcohol Related Expectancies	(A) Alcohol Expectancy Questionnaire (AIR)	Total score
Onset of Alcohol and Drug Use	(A) Alcohol and Drug Use Questionnaire	Age of first regular use
Poverty	(P) Adult Biographical Questionnaire	Per capita income; poverty level
Cultural Identity	(A) Ethnic Self Identity (Oetting/ Beauvais)	Scale score
	(P) Ethnic Self Identity	Scale score
	(P) Traditional Indian Activities (AIR)	Scale score
	(A) Traditional Indian Activities (AIR)	Scale score
Assessment of Women's Behavior		
Alcohol & Drug Abuse/ Dependence DX	(P) SSAGA	DSM-III-R diagnosis
Alcohol Related Problems	(P) AUDIT (World Health Organization)	Total score
Psychiatric Distress	(P) Brief Symptom Inventory	General Severity Index
	(P) SSAGA	DSM-III-R diagnosis

Respondent Key: (P) Parent; (A) Adolescent; (S) School Records

(Bucholz, Cadoret, Cloninger, Dinwiddie, Hesselbrock, Nurnberger, Reich, Schmidt, & Schuckit, 1994).

Suicidality

Suicidality is assessed by a subcomponent of the Major Affective Disorders section of the C-SSAGA-A. Questions assess whether the adolescent feels so bad that he/she wished they were dead, preoccupation with death and dying, plans to kill oneself, and actual suicide attempts.

Academic Dropout

School records, self-report, and caretaker-report are used to determine whether the adolescent has dropped out of school.

High-Risk Sexual Behavior

Adolescents' involvement in high-risk sexual activities are assessed using eleven items developed by the Centers for Disease Control and Prevention to measure adolescent sexual behavior (Morris, Warren, & Aral, 1993). The self-administered *Youth Sexual Behavior Questionnaire* items include awareness of AIDS/HIV, age at first sexual intercourse, number of sexual partners, whether the most recent sexual encounter involved alcohol or drugs, and whether a condom was used.

Assessment of Adolescent Risk Factors

Family History of Alcoholism

The *Family History Assessment Module* (FHAM; Janca, Bucholz, & Janca, 1991) is used to assess family history of substance abuse and psychopathology. This structured interview utilizes standard diagnostic criteria to produce DSM-III-R diagnoses of alcoholism, drug abuse/dependence, depression, mania, schizophrenia, and antisocial personality. The caretaker is interviewed regarding the adolescent's first and second degree biological relatives.

Childhood Conduct Disorders

The Cross-Informant Externalizing Behavior Scales of the *Child Behavior Checklist* (completed by adult caretakers) (CBCL: Achenbach, 1991a), the *Youth Self-Report* (YSR, Achenbach, 1991b), and the *Teachers Report Form* (TRF; Achenbach, 1991c) provide a continuous measure of the youth's overt behavior from three sources. The Externalization scale includes measures of delinquent and aggressive behavior. Behavioral disorders in adolescents are assessed using C-SSAGA-A modules that provide formal diagnoses for Oppositional Disorder, Conduct Disorder, and Attention Deficit/Hyperactivity Disorder.

Adolescent Psychopathology

The psychiatric status of adolescents is assessed both continuously and categorically. The Cross-Informant Internalizing Behavior Scales of the CBCL, the YSR, and the TRF provide measures of social withdrawal, somatic complaints, and anxiety/depression. The C-SSAGA-A is used to diagnose attention deficit/hyperactivity disorder, oppositional disorder, conduct disorder, major affective disorder, anxiety disorder, and suicidal ideation.

Caretaker Psychological Distress

The *Brief Symptom Inventory* (BSI), a 53-item version of the Symptom Checklist-90 (Derogatis, 1977) provides a measure of acute psychological distress. Recent evidence suggests that the instrument is best viewed as measuring the degree, rather than the precise nature, of psychopathology (Boulet & Boss, 1991). The *Semi-Structured Assessment for the Genetics of Alcoholism* (SSAGA Bucholz et al., 1994) provides a diagnostic assessment of the adult caretaker. This semi-structured interview is designed to assess current and lifetime physical, psychological, and social manifestations of alcoholism and related disorders. In addition to alcohol and drug use disorders, diagnoses of primary interest include depression, dysthymia, panic disorder, and antisocial personality. The SSAGA allows an assessment of the comorbidity of alcohol dependence and other psychiatric disorders.

Sensation Seeking Orientation

Form V of the *Sensation Seeking Scale* (Zuckerman, 1979) is used to assess sensation seeking orientation in the youth. This 40-item scale was used with individuals 12 years old (Pandina, Johnson, & Labouvie, 1992), and found predictive of alcohol and drug use in adolescents (Bates, Labouvie, & White, 1986).

Religiosity

Religious affiliations of adolescents and their family members, and attendance at religious activities, is assessed with four items from the *Adult Biographical Questionnaire*.

Peer Influences

The *Adolescent Alcohol and Drug Use Questionnaire* (AQ) includes an assessment of peer and parental influences on substance use. Peer attitudes toward, and frequency of, alcohol, marijuana, tobacco, and other drug use is assessed. Peer influences, amount of time spent with friends, parental approval of friends, and friends' antisocial conduct are also assessed.

Low Self-Esteem

The 45-item *Self-Perception Profile for Adolescents (SPA)* (Harter, 1988) provides an assessment of adolescents' perceptions of global and situation-specific self-worth.

Precocious Sexual Activity

Two items from the *Youth Sexual Behavior Questionnaire* ask if the youth has ever had sexual intercourse and, if relevant, age at first intercourse.

Academic Involvement and Performance

We follow youth, regardless of their school attendance, for the duration of the study. Where available, grade point average, school attendance, disciplinary action, and standardized scores on school-administered tests are recorded from school archives.

A construct related to academic performance, attention deficit/hyperactivity disorder, is assessed by the adolescent's caretaker on the Attention Problems scale of the *Child Behavior Checklist* (Achenbach, 1991a). Adolescents and teachers complete parallel forms of the attention problems scale on the *Youth Self-Report* (Achenbach, 1991b) and the *Teacher's Report Form* (Achenbach, 1991c), companion scales to the CBCL. Grade failures are reported annually by both parents and youth.

Dysfunctional Family Interaction Patterns and Environment

The nature of, and changes in, family structure and household configuration are evaluated annually. Specific items assess size of household; nature of each household member's relationship to the adolescent; changes, if any, in the youth's primary caretaker; residential changes; number of new full, half, and step/adopted brothers and sisters; legal proceedings involving the adolescent (e.g., adoption, foster care); divorce, remarriage, and death of family members.

Family relationships are evaluated with the *Moos-Family Relationship Index* (Moos & Moos, 1986), a 27-item measure completed independently by the adolescent and caretaker. The scale assesses family cohesion, expressiveness, and conflict. Additional information concerning family functioning is derived from C-SSAGA-A modules that assess the nature and extent of parental time spent with the adolescent, discipline, adults as role models, and family rules.

Neuropsychological Function

Brief screening for neuropsychological function includes the *Trail-Making Test* (Lezak, 1983) and the *Digit Symbol Test* (Wechsler, 1974). Both tests assess visual scanning, psychomotor efficiency, perceptual speed, cognitive flexibility, and ability to shift perceptual set.

Alcohol-Related Expectancies

Adolescent alcohol-related expectancies are assessed using a 14-item scale embedded in the AQ. Ten items, drawn from several adolescent alcohol expectancy questionnaires (e.g., Brown et al., 1987), reflect positive expectancies (e.g., drinking makes people worry less), and four items reflect negative expectancies (e.g., drinking makes it harder to get along with friends).

Early Use of Alcohol and Drugs

Age of onset of alcohol and other drug use and regular use is recorded for each substance as part of both the C-SSAGA-A and the AQ.

Poverty

The ABQ assesses demographic variables related to family income and poverty status. These include: use of Indian-specific and other social services; parental employment, educational and occupational attainment; per capita income; source of income for the last year; any support from welfare; and number of months worked out of the previous twenty-four months.

Cultural Identification and Participation

Two scales provide an assessment of cultural identification and the extent to which subjects participate in cultural activities. The first scale, developed by Oetting & Beauvais (1990–91), consists of seven items that ask which of five ethnic groups (Black, Spanish or Mexican-American, American Indian/Alaska Native, Caucasian or White-American, and Asian) best describes the adolescent's self-reported cultural identity. We modified this questionnaire to include Pacific Islander for our population and geographic area. The second scale, developed by our research group, asks the individual to indicate which of 16 traditional Indian customs and activities they have engaged in over a specified time frame.

Mediator/Moderator Variables

Analyses will be conducted to determine the influence of a number of variables on the relationship between family history and adolescent drinking behavior.

Family History Variables

Three family history variables will be examined. The first is the presence of a positive history of alcohol abuse/dependence among the adolescents' first degree relatives. The second is a family history of psychopathology other than substance abuse. Each of these will be derived from the FHAM. The third variable is whether one or both of the adolescents' biological parents are Indian.

Mediating/Moderating Variables

Three variables will be examined. The first is the presence of a C-SSAGA-A diagnosis of conduct disorder in the adolescent. The second variable is level of caretaker psychological distress defined in terms of either the global BSI distress index or the presence of SSAGA-based DSM-III-R diagnoses. The third variable reflects the influence of the adolescents' cultural identity derived from the *Youth Biographical Questionnaire*.

Assessment of Indian Women's Drinking

In addition to providing information about the behavior of the adolescents for whom they are caretakers, Indian women in this study are assessed across a range of sociodemographic and psychiatric domains.

Drinking-Related Measures

Lifetime and current alcohol and drug use disorders are based on the SSAGA. The SSAGA also assesses alcohol-related variables such as frequency of heavy drinking days and self-reported intoxication, presence of alcohol-related problems, and presence of alcohol dependence symptoms.

The utility of a brief screening measure, the *Alcohol Use Disorders Identification Test* (AUDIT; Claussen & Aasland, 1993) will be evaluated. The 10-item AUDIT measures three components of alcohol use: (a) pattern of alcohol consumption, (b) alcohol-related problems, and (c) alcohol dependence. Information from the SSAGA and AUDIT will help define the natural course of the women's drinking across the study period. Annual assessments allow a determination of the onset, persistence, and/or remission of problem drinking.

Comorbid Conditions

Level of acute psychological distress for the women is assessed annually using the BSI. The diagnosis of other psychiatric conditions is based on the SSAGA. The primary areas of interest from the SSAGA include alcohol dependence, drug dependence, depression (including suicidality), dysthymia, panic, and antisocial personality disorder. The temporal order of onset of psychiatric disorders, including alcohol and drug disorders, is assessed using the SSAGA.

Results

The following is a brief introduction to the depth and breadth of substance use data collected during the first five years of study. Data are reported annually for the 290 youth comprising Cohort 1 (N=224) and Cohort 2 (N=66). Cohort 1 was recruited from two school districts, and Cohort 2 was recruited from the membership of a community Indian

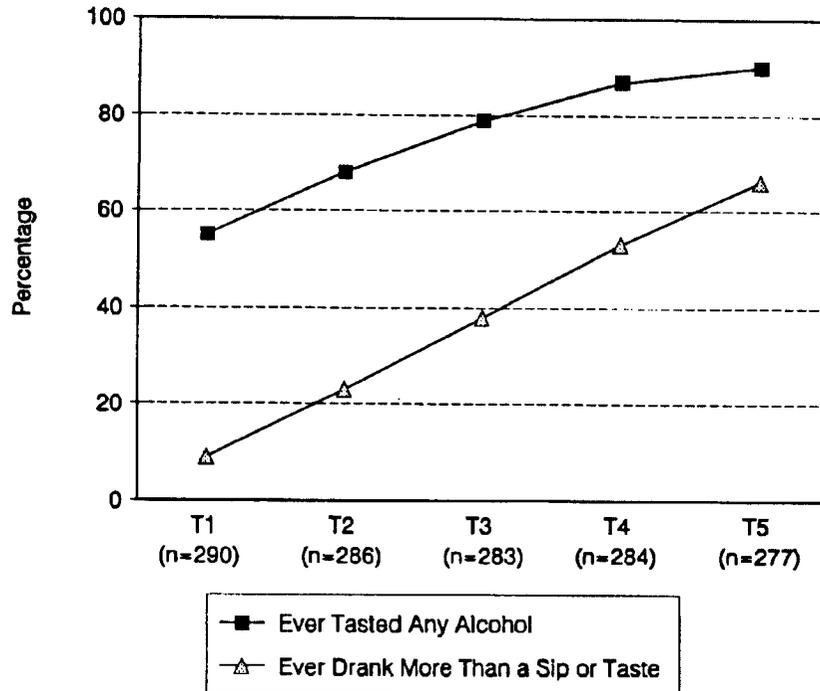


Figure 1
Definitions of Drinking: "Any" vs. "More Than a Sip or a Taste."

Health Board. Both cohorts were enrolled in the fifth or sixth grade at the baseline interview (T1). In addition, these youths' families are examined for the presence of a history of alcohol dependence, drug dependence, or mental health treatment.

Definitions of Drinking

Estimated rates of adolescent drinking vary greatly according to one's definition of drinking. The extent of this variation in our sample can be seen in Figure 1, which presents the percentage of youth ($N=290$) reporting that they had "ever tasted alcohol" and the proportion indicating that they had consumed "more than just a sip or taste" in their lifetime, across the T1–T5 assessments. While 54% had tasted alcohol by the sixth grade, only 9% had ever consumed more than a sip or taste, and less than 7% had done so in the year preceding their T1 interview. The difference between these two measures of drinking diminishes each year, and if drinking continues in a linear relation with age these measures will come close to converging by the time these youth are in the twelfth grade.

Labeling youth who have only tasted alcohol as “drinkers” makes provocative headlines, but exaggerates the true prevalence of drinking. We define as “drinkers” only those youth who have had more than a sip or taste of alcohol during any specified interval.

Substance Use at Baseline Interview

Table 5 compares lifetime substance use prevalence rates of the two cohorts at the baseline and 48-month follow-up interviews. Differences between Cohort 1 and Cohort 2 in substance use prevalence were tested using contingency table analyses. While cell sizes were too small in some cases to allow meaningful *chi-square* comparisons, there were no statistically significant differences between the two cohorts on any of the substances assessed at T1 and T5.

Our attempt to recruit a sample of youth who had not initiated substance use was largely successful. At T1, 9% had consumed more than a sip or taste of alcohol at least once; 3.4% reported they had been drunk (i.e., “drank enough so that it was hard to walk, talk, remember or decide what to do”); 21% has used tobacco, either cigarettes (16.2%) or smokeless tobacco (9.3%); 5.5% had used marijuana; and 2.1% had inhaled something to get high. A detailed examination of the 26 youth who reported drinking alcohol reveals that five drank only one time in their life, six drank alcohol twice, eight drank 3–5 times, and seven reported more than five drinking experiences. Five youth reported drinking any alcohol in the 30 days preceding their T1 interview, and two youth reported becoming drunk during that period. While 49 youth reported lifetime tobacco use, only 11 had smoked cigarettes in the 30 days preceding their T1 interview; five reported chewing tobacco during that period. Of the 16 youth who had ever tried marijuana at T1, 13 had tried it in the previous year, and five had tried it in the previous 30 days. Except for these few youth who reported alcohol, tobacco, and marijuana use, baseline information was collected on this sample prior to their initiation into substance use behavior.

At T1 we asked youth specifically about alcohol, tobacco, and marijuana use, but not about any other drug use. We chose not to present a “shopping list” of drugs to these children until they were older, and did not introduce a full list of drugs until the T4 interview (mean age = 14.7 years). Instead, we operated on the premise that those who had used a drug would be able to tell us, at least in broad categories, what they had used. At T1 we asked if the youth had ever taken any other drugs, and if they had ever used any other means to get high. Only eight subjects responded positively to these questions, and six of them indicated they had used inhalants (e.g., sniffing glue, gasoline, nail polish, spray paint, or helium) to get high. One youth had taken speed once “by accident when tricked by some cousins,” one youth smoked chewing tobacco once and got “dizzy,” and one youth who reported drinking alcohol over 100 times also reported using hairspray, helium, glue, cocaine, and LSD to get high.

Table 5
Lifetime Prevalence of Substance Use at Baseline and 48-Month Follow-up in Two Urban American Indian Youth Cohorts

	T1 (Baseline)			T5 (48-Month follow up)		
	Cohort 1 (School District)	Cohort 2 (Health Board)	Combined Cohorts	Cohort 1 (School District)	Cohort 2 (Health Board)	Combined Cohorts
N	224	66	290	211	66	277
Mean age	11.67	11.69	11.67	15.74	15.76	15.75
Alcohol						
Never tasted	46.0	45.5	45.9	10.4	10.6	10.5
Tasted only	44.6	47.0	45.2	20.9	33.3	23.8
Drank more than a sip	9.4	7.6	9.0	68.7	56.1	65.7
Drank to intoxication	4.0	1.5	3.4	42.2	39.4	41.5
Tobacco						
Cigarettes	16.1	16.7	16.2	57.8	53.0	56.7
Smokeless	10.7	4.5	9.3	24.2	15.2	22.0
Either	21.9	18.2	21.0	61.1	53.0	59.2
Marijuana	5.8	4.5	5.5	46.9	45.5	46.6
Inhalants	2.7	0.0	2.1	6.7	4.5	6.2
Other Drugs						
Amphetamines				5.2	10.6	6.5
Cocaine				6.7	3.0	5.8
Codeine or Morphine				3.8	3.0	3.6
Crack Cocaine				2.9	0.0	2.2
Hallucinogens				14.8	10.6	13.8
Heroin				1.9	0.0	1.4
Methadone				0.5	0.0	0.4
PCP, Angel Dust				1.4	1.5	1.4
Quaaludes, Seconal				1.4	0.0	1.1
Steroids				0.5	0.0	0.4
Valium, Librium, Xanax				1.4	1.5	1.4

Substance Use at 48-Month Follow-Up

At T5, subjects were in the ninth and tenth grades, and reported higher lifetime rates of drinking (65.7%), intoxication (41.5%), tobacco use (59.2%), and marijuana use (46.6%). Few youth had tried hallucinogens (13.8%), amphetamines (6.5%), inhalants (6.2%), and cocaine (5.8%), and none reported using peyote.

Changes in Substance Use Over Time

Figures 2–5 chart the lifetime, annual, and 30-day prevalence of alcohol use, intoxication, tobacco use, and marijuana use from T1 through

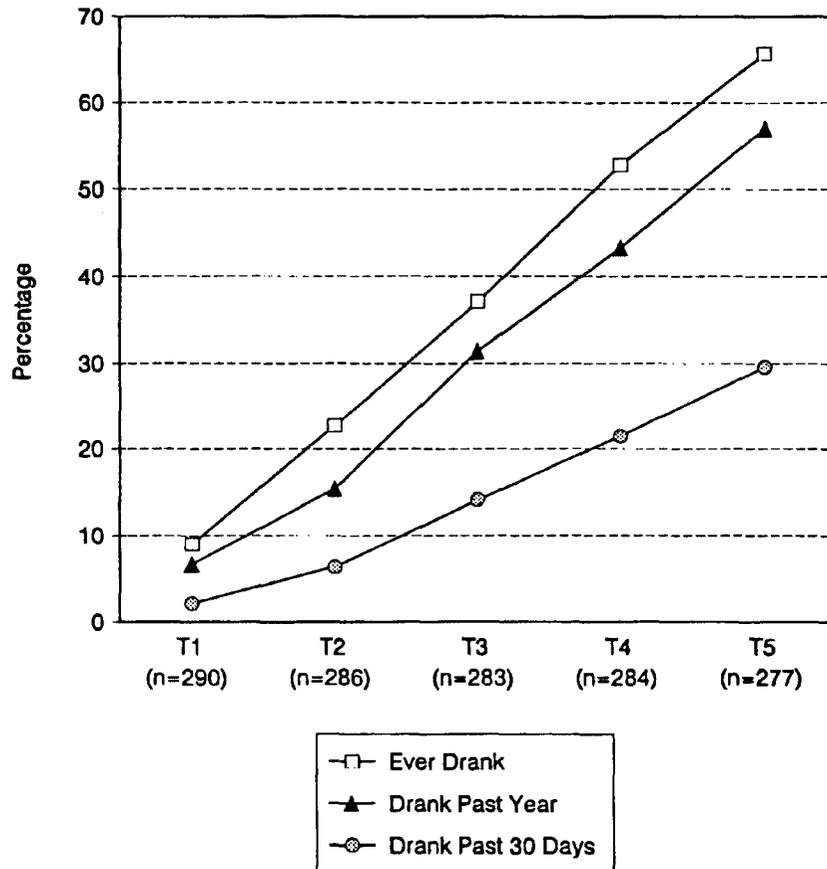


Figure 2
Lifetime, Annual and 30 Day Prevalence of
Drinking Among Urban Indian Youth.

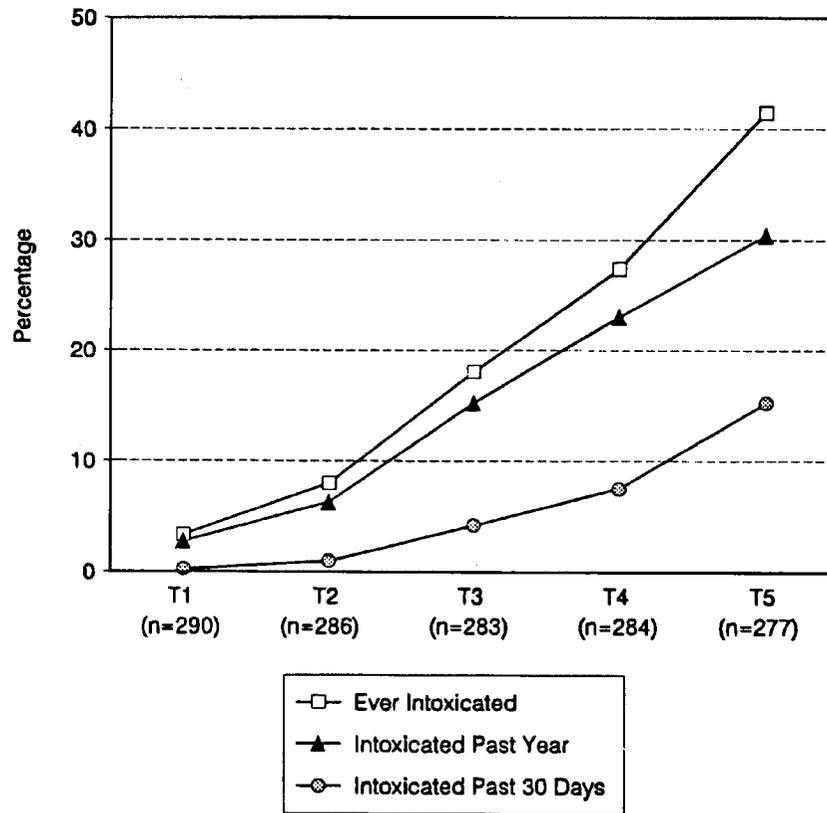


Figure 3
Lifetime, Annual and 30 Day Prevalence of Intoxication
Among Urban Indian Youth.

T5. These charts depict steadily increasing rates of substance use over the first five years of the study. During the 30 days preceding the T5 interview, 30% of the youth reported drinking, 15% had been drunk, 37% had used tobacco, and 18% had used marijuana. Additional analyses will examine patterns of substance use onset and change over time, gender differences in substance use initiation and maintenance, and comparisons between our adolescent sample and other Indian and non-Indian samples.

Parental History of Substance Abuse and Mental Health Treatment

In 1988, 37.9% of adults age 18 and over in the United States reported they had at least one biological family member (degree of relationship not defined) who they classified as a problem drinker or alcoholic

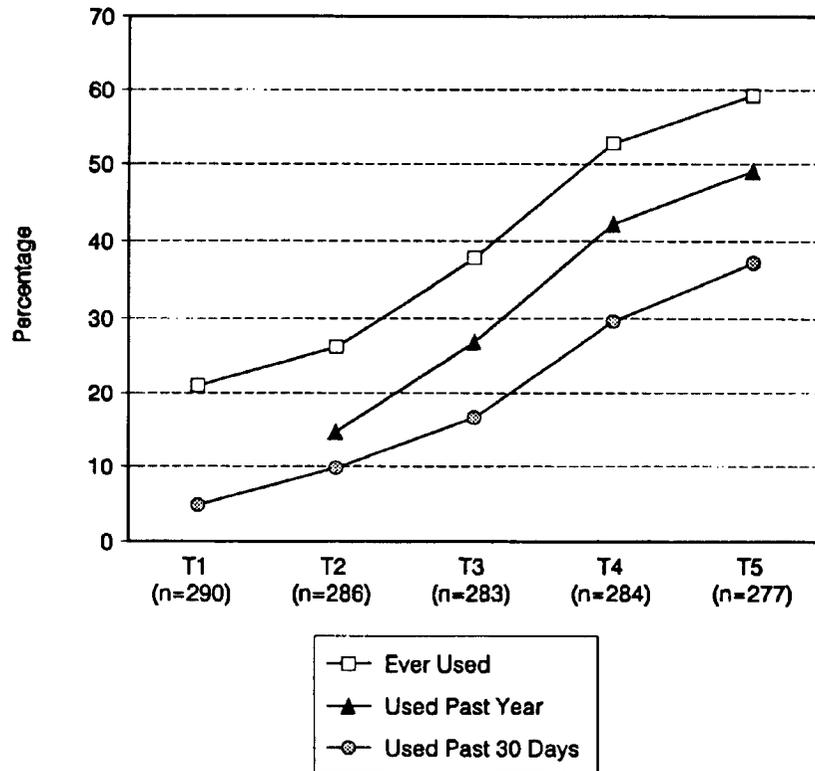


Figure 4
Lifetime, Annual and 30 Day Prevalence of Tobacco Use
Among Urban Indian Youth.

(National Center for Health Statistics, 1991). In the same year, 70% of our American Indian adolescent sample had at least one parent or grandparent meeting our criteria for lifetime alcohol dependence (three or more DSM-III-R symptoms in their lifetime). Table 6 shows the percentage of these youths' biological parents with a lifetime history of alcohol or drug dependence symptoms, and the percentage who had ever been treated for alcohol abuse, drug abuse, depression, or anxiety. Forty-nine percent of the youth had at least one parent with lifetime alcohol dependence symptoms, and 27% had a parent with lifetime drug dependence symptoms. Thirty percent had at least one parent who had received some form of treatment for alcohol abuse, 12% for drug abuse, 26% for depression, and 15% for anxiety. As these youth mature, the association between adolescent substance use, and parental substance abuse, depression, and anxiety, will be evaluated.

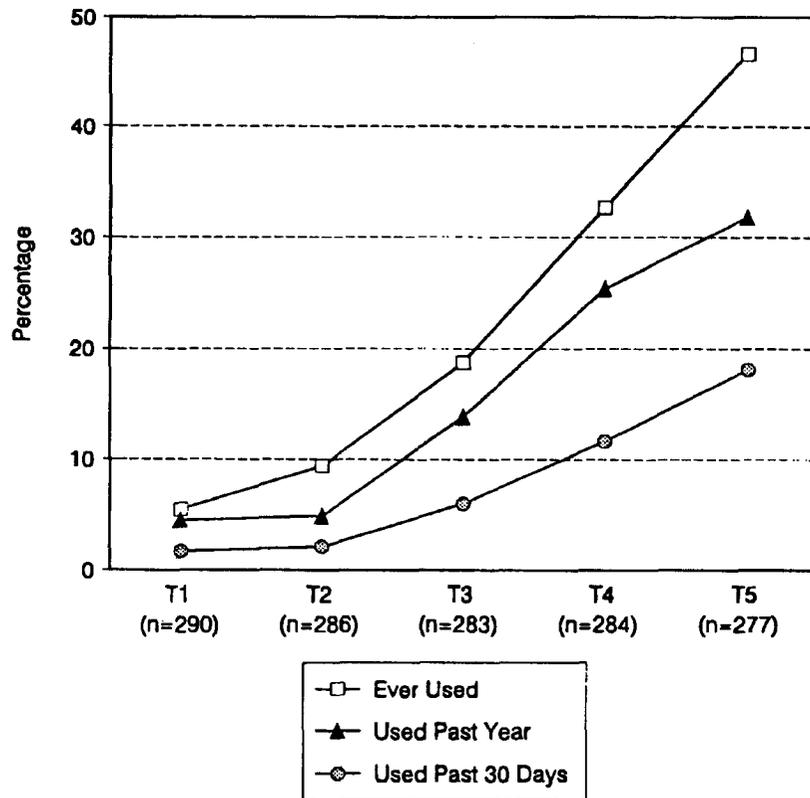


Figure 5
Lifetime, Annual and 30 Day Prevalence of Marijuana Use
Among Urban Indian Youth.

Discussion

Researchers face unique challenges when designing and implementing longitudinal research. Issues related to sample selection, Indian ethnicity, recruitment, informed consent, confidentiality, definitions of alcohol use, and follow-up strategies are discussed below. Alternative approaches to the resolution of these concerns may be equally valid depending on the specific research aims, geographic location, community goals and alliances, and available resources.

Table 6
 Parental History of Lifetime Alcohol Dependence, Drug Dependence, and
 Mental Health Treatment, for 290 Urban American Indian Youth (percent)

Symptom	Father	Mother	Either
At least 3 DSM-III-R symptoms for			
Alcohol dependence	36.6	25.5	48.6
Drug dependence	19.7	12.8	26.6
Alcohol or drug dependence	45.5	30.7	57.6
Inpatient or outpatient treatment for			
Alcohol abuse	20.4	15.2	30.0
Drug abuse	7.3	5.2	11.7
Alcohol or drug abuse	22.4	16.9	33.4
Depression	5.9	23.1	25.5
Anxiety	4.8	12.1	15.2
Any inpatient mental health treatment	16.6	15.5	27.9
Any mental health treatment	30.0	46.6	58.6

Sample Selection

A major challenge confronting research with Indian populations is the identification of a sample of sufficient size and heterogeneity to provide the statistical power necessary to detect true subgroup differences in outcomes and to generalize findings beyond the sample. The 1990 Census (U.S. Department of Commerce, 1992a) identified fewer than two million American Indians, less than 1% of the total population of over 248 million Americans. There are over 500 federally recognized tribes and bands (Bureau of Indian Affairs, 1993) distributed throughout the fifty states, and while over half live in urban areas of 2,500 or more, the remainder live in rural reservation and off-reservation communities. Consequently, even large epidemiological surveys usually fail to obtain sufficient numbers of American Indian respondents to warrant reporting findings for them as a group. Although some tribes, such as the Navajo, are large enough to provide the necessary statistical power, their homogeneity limits generalizing findings beyond their own members.

Meeting the sample selection challenge entails a number of compromises. For example, to address ethnic differences in substance use among high school seniors, the National Senior Survey (Bachman et al., 1991) aggregated annual data collected over five years (1985–1989) and thus obtained a sample of 537 American Indian males and 531 American Indian females. The results indicated that male and female Indian seniors reported the highest rates of alcohol, tobacco, and most illicit drug use of

all ethnic groups studies. The findings of this influential study with a large sample of American Indians may be generalizable only to self-identified Indians reaching twelfth grade and attending school on the day of the survey. It may obscure regional, period, and tribal differences in substance use by Indian youth.

Our decision to study an urban Indian sample stems partly from our location in a metropolitan area with over 21% of the State's total Indian population of 81,483 (U.S. Department of Commerce, 1992b). It is in close proximity to 13 reservations, and historically a destination site under the Indian Relocation Act of 1954. Additionally, while there is little empirical data on substance use and abuse among Indian people in general, most studies have focused on reservation and rural samples, or small samples of clinic populations. Very little has been published describing urban Indians and their substance using behaviors. Thus, our decision was driven by the need for more information pertinent to urban Indians, and the ready availability of the sample.

Indian Ethnicity

Perhaps our greatest challenges in sample selection were establishing criteria for eligibility to participate in the study, and identifying a population of Indian youth large enough to produce sufficient recruits to meet statistical requirements. It was important that the criteria define a target group of American Indians in a manner that could be replicated. Few researchers describe the criteria they use to establish the ethnicity of their subjects. This lack of specificity contributes to the societal tendency to lump all Indian peoples together, and thus to minimize group differences and over-generalize results. The question, "Who is Indian?" is emotionally and politically charged. How this question is answered can have a major impact on the research process. This is no less true of research with reservation samples than with urban samples. While the question of ethnicity may appear moot with research conducted among members of a specific tribe, students in an Indian-only school, or patients in an IHS facility, eligibility for tribal enrollment or IHS services may exclude many Indian people. Using blood quantum or tribal enrollment exclusively may limit the sample size and exclude an unknown number of potential subjects. This may be even more true in an urban setting than a reservation setting. Many of our youth might not be able to prove blood quantum for Certificates of Degree of Indian Blood (CDIB), and only one-third are enrolled members of their tribe. In addition, urban Indians may have access to a greater variety of educational, social service, and health care options, and some may not utilize Indian specific resources even when they are available.

Relying solely on self-report of ethnicity, a common procedure in survey research, may also misrepresent the Indian population from which a sample is drawn. Not all people of Indian ancestry self-identify as

Indian, and some people with no Indian ancestry may say that they are Indian. This lesson was reinforced when we attempted to identify our Indian sample from school district student enrollment lists. In the two school districts we selected, parents are asked the ethnicity of their child when they enroll for school. All parents who indicate that their child is American Indian or Alaska Native are also asked to complete the *Indian Student Eligibility Certification* form, which requests additional information about family tribal background, membership status, and the address of the tribal headquarters. This form provides the documentation the school district needs to receive funds under the *Indian Education Act of 1988*. In 1988, a representative of one school district, responsible for verifying information on this form, estimated that each year 200 parents identify a child as Indian when the child has no Indian ancestry. One explanation was related to the school district's policy of busing children to schools outside of their neighborhoods in order to achieve racial integration across all schools. As there are relatively few Indian children in most neighborhoods, they are more likely to be assigned to a nearby school, which is often preferred by the parent and child. Alternately, in neighborhoods with a high proportion of ethnic minority families, Indian parents may identify their children as Caucasian for the same reason. There are other reasons why Indian parents may chose to identify their children as non-Indian. They may feel it protects their children from racial prejudice or stereotyping, or that it protects the family from being identified as potential subjects in yet another research study of American Indians.

Thus, while it may be possible for the school districts to verify the ancestry of self-identified Indian students, this process will not identify all Indian students in the district. It misses those who do not chose to be identified as Indian, and it misses youth who have dropped out of school or do not go to school for some other reason.

Recruitment Issues

We recruited subjects from school districts and from a local Indian health board. Both sources reviewed and approved the research plan and human subjects research assurances, and assisted us by providing enrollment lists. Recruiting from the school districts had several methodological advantages over the health board. First, since we were specifically looking for fifth- and sixth-grade Indian students, the school districts provided us with lists that included only that group. The health board could not identify members by grade level, and used date-of-birth and tribal background to identify Indian youth 9–12 years old in July, 1988. Secondly, the school district lists were current, while the health board list was drawn from all members who had received services in the previous three years. This list included many youth who were not in the fifth or sixth grade, lived outside the metropolitan catchment area, or who moved from

the area since their last clinic appointment. The population from which the health board sample was drawn was therefore much harder to define than the school district population, and recruitment from the health board was more costly in terms of time and effort required to trace people who had moved. Upon completion of the recruitment phase, we were unable to locate only 8% of those on the school district list, but could not locate 38% of the health board list, despite considerable effort. If we assume that all those who we could not locate from each list had indeed moved out of the area, response rates were comparable at 72% for the school districts and 73% for the health board. If this assumption is not made, the response rates were 65% and 45%, respectively. For us, the school districts provided a larger, more narrowly defined population that was less costly to recruit compared to the health board. In addition, subjects recruited from the health board list attended schools in many other school districts, increasing the effort required to obtain teacher and school district data for these subjects.

Informed Consent and Confidentiality

Unless specifically exempted, all federally funded research involving human subjects requires certain assurances for the protection of those subjects from harm as a result of their participation in the research. Proposals must provide detailed descriptions of the population to be studied, recruitment process, potential risks and benefits, the nature of the information that will be provided to prospective participants about the purpose of the research, and how consent will be obtained. There may be physical, psychological, social, legal, or other types of risk to the subject. When risk is more than minimal, informed, signed consent is required.

In the past, proposals for federally funded research that could not link individual participants to their responses were exempt from these federal regulations on informed consent. There is currently an effort in Congress to tighten regulations governing federally funded research with minors. The Family Privacy Protection Act of 1995 (H.R. 1271) passed the House of Representatives and was forwarded to the Senate on April 5, 1995. If passed by the Senate, it will require prior written consent from a parent or guardian before a minor can be asked questions related to the following: parental political affiliations or beliefs; mental or psychological problems; sexual behavior or attitudes; illegal, antisocial, or self-incriminating behavior; appraisals of other individuals with whom the minor has a familial relationship; relationships that are legally recognized as privileged; and religious affiliations or beliefs. Although states may have existing statutes requiring parental permission to ask minors certain types of questions, the proposed federal legislation covers a much broader range of issues. If passed, this law could substantially increase the costs and reduce the validity of certain types of research, particularly national

school-based surveys of adolescent substance use, sexual activity, gang involvement, and other risky behaviors.

Our policy has been to inform participants completely about the purpose of the research and the types of questions we ask each year, and to obtain signed consent from both the youth and parent or guardian before they join the project. Each year we obtain signed permission from both to request school records and to send questionnaires to teachers. In this way the participants become partners in the project, and share the long-term goals of the research. Any deviation from complete honesty, when discovered, would quickly spread through the Indian community, and jeopardize completion of the project. We believe our adherence to this policy, and the efforts we took to explain the research and answer participants' questions at the beginning and annually, have been important factors contributing to our consistently high rates of annual follow-up completion.

Risks to participants in this project are minimal. Some questions may cause embarrassment or emotional distress if they remind the participant of unpleasant events in their past. Following each assessment, participants are given a chance to share their opinions or concerns, and to ask questions about the interview. We also encourage them to call us, collect if necessary, if they have questions or concerns about the research that arise after an interview. While our research project does not include a clinical component, all participants are given a current list of local and toll free numbers for a variety of social, health, and mental health resources.

Another potential risk is a breach of participants' privacy, and we go to great lengths to insure that the information they give us remains confidential. Because of the highly personal nature of some of the questions we ask, it is imperative that participants trust our ability to maintain their confidentiality. Each year before beginning an interview, we review with them the steps we take to do so. First, all staff sign an oath of confidentiality as a condition of employment. Second, the research project and staff are covered by a Certificate of Confidentiality from the Public Health Service, which protects research subject data from subpoena by any Federal, State, local, civil, criminal, administrative, legislative, or other entity. Third, participants' names do not appear on any of the questionnaires they complete, or in the computerized data files. Instead, each participant is assigned a four-digit identification number, and the key that associates names with identification numbers is locked in a file cabinet in a different room from where the locked data files are stored. Finally, we remind both youth and adult that we will not share anything they tell us with the other. Without their utmost confidence in the anonymity of their answers and our ability to protect their privacy, it is unlikely that they would continue to participate year after year.

Defining Alcohol Use

An important decision for substance use survey designers is how to measure “use.” Some researchers consider any drinking at all, even a sip or taste, as the criterion for alcohol use. Thus, no distinction is made between the infant who is given sips of beer by parents, a young child who is given a taste of beverage alcohol by a parent to satisfy an expressed curiosity, a child who sneaks a sip of a parent’s drink when the parent isn’t looking, and a youth who obtains alcohol outside the home and consumes it without parental knowledge or consent. Each example represents a different level of volition and intent by the child, and conveys a different meaning in terms of alcohol use.

One can argue that there is a fundamental difference between individuals who have never tasted alcohol, and those who have, regardless of how little they have consumed. If an important difference exists between these two groups, we have not seen it documented in the literature. However, our decision to identify three groups — those who have never tasted alcohol, those who have had only a sip or taste, and those who have had more than a sip or taste — will allow us to address this issue empirically. While we defined “drinkers” at T1 as those who had consumed more than a sip or taste of alcohol during a specified time frame, we might just as reasonably have called those youth “initiates,” and restricted the term “drinker” for youth who had crossed some threshold of drinking, such as ten drinks over their lifetime, or five drinks in the past year. For example, some epidemiological studies define adult drinkers as those who have had more than 100 drinks in their lifetime. However, applying the same definitions of drinking to adults and youth, or even males and females, may mask true differences between groups and produce misleading conclusions. A good example is the current tendency for researchers to define recent heavy drinking as five or more drinks in a row in the previous two weeks, regardless of age or gender. We argue that consuming five drinks in a row carries very different meaning and consequences for a 14-year-old, 85-pound female and a 30-year-old, 185-pound male. Age, gender, weight, and health all influence the effects of alcohol on an individual, yet researchers often ignore these differences. The researcher has to decide what criteria make sense for the population under study and consider the time and resources available. We chose to ask questions about quantity, frequency, and variability using both categorical and continuous measures, to allow the widest flexibility in comparing our results to other studies.

Maintaining Follow-Up — Strategies for Success

A critical determinant of successful completion of a longitudinal study is the ability to maintain contact with subjects and obtain complete data at each assessment. The procedures we employ were developed in

an earlier study with clinic samples of adult Indian alcoholics, and are continually refined to meet changing conditions within our community sample. The effectiveness of these procedures is demonstrated by the annual follow-up rate of 94% or greater. While a thorough delineation of our follow-up strategies is beyond the scope of this discussion, several observations may be worthwhile here.

In our experience, relocating participants every year is reasonably straightforward, even for highly mobile families, unless they are actively "in hiding." When we obtained participants' informed consent at the beginning of the study, we asked their permission to contact tribal, health, and social service agencies for assistance in locating them in future years. In addition, each year we ask participants for names, addresses, and telephone numbers of relatives and friends who would know how to locate them if they moved. In our experience, participants will cooperate in these requests if they are confident in our assurances of total confidentiality. We also provide postage paid change-of-address cards, and reimburse participants \$2.00 for keeping us informed if they move or change telephone numbers. A final strategy we employ is to mail an annual newsletter with "Address Correction Requested" stamped on the envelope. If the participant has moved and left a forwarding address, the Post Office returns the envelope with the new address on it. These are simple and effective strategies, but require constant attention throughout the year.

Minimizing attrition is far more complex than simply relocating participants. What motivates people to continue participating in a study that repeatedly requires them to share their time and personal aspects of their lives with relative strangers? Certainly, paying research subjects for their time and travel expenses is an effective incentive. We pay subjects approximately \$10.00 per hour, and reimburse travel an average of \$5.00 per interview. We provide "hospitality" in the form of snacks, coffee, and fruit juice, and give nominal gifts to the youth each year, such as school supplies or baseball caps. Our annual newsletter provides another opportunity to thank participants for their support. These are all tangible means of showing our appreciation and respect for their contribution to the research, but we do not believe they are sufficient in themselves. Indeed, when we ask subjects why they continue to participate, they tell us it is because we are kind, caring, respectful, accommodating, non-judgmental, consistent, persistent, patient, and trustworthy. Some say they appreciate seeing familiar faces each year, and that it shows we are committed to them and to the Indian community. How we treat them, what we stand for, and their belief that they are contributing to the Indian community may be more important to their continued involvement than the financial reward.

Providing these intangible incentives to participate requires a dedicated, highly trained staff who are committed to the goals of the research and to the health of the Indian community. Building and maintaining such a

staff requires a substantial investment of time and financial resources. While we occasionally employ hourly interviewers and clerical staff, we chose from the beginning to hire permanent staff who share the vision of the research and are committed to staying with the project for long periods of time. Such individuals are not easy to locate, and once hired and trained require their own incentives to maintain interest and enthusiasm.

Methods employed to maintain high levels of follow-up may affect results in unpredictable ways. Each year we spend one-to-three hours in face-to-face contact with a parent and youth, asking detailed questions about behavior and events in their lives during the preceding year. We get to know participants well, and they share much that is personal and private with us. Some participants may find this process therapeutic. Perhaps they have no one else in their lives who listens to them without judging them. To what extent does the relationship that develops between research subject and research program affect the subject's actual and reported behavior? How does participation affect the relationship between the youth and parent? When does an annual research interview become a brief intervention? How can the researcher control and measure intervention effects?

In addition to questions regarding the effects of research methods on results, there are important legal and ethical issues concerning the relationship between the researcher and the participant in a longitudinal study. Under what conditions might it be ethically appropriate for the researcher to break confidentiality with the subject? If, under the cloak of confidentiality, the participant discloses physical or sexual abuse, the commission of a crime, or strong suicidal or homicidal ideation, what is the researcher's responsibility? Over the course of the study, does the researcher accrue responsibilities or obligations toward the participant beyond those stated in the consent form? Under what circumstances, if any, should the researcher intervene in the life of a participant?

Over the life of this project, we have dealt with these issues on a number of levels. We have consulted the executive in charge of the federal office that issues Certificates of Confidentiality, the State Attorney General, and the University Human Subjects Committee chair and executive officer. The legal and ethical lines between service and research are not crystal clear with regard to reporting laws. Our research project does not provide clinical or educational services but many of our staff belong to professions that are held individually accountable for reporting. However, one message was clear: if we ask, explicitly, about abuse or suicidal ideation and plans, we must be prepared to report or respond. Thus, some questions that were of interest, but not essential to the primary aims of the project, were excluded from our batteries. For example, we do not ask youth whether or not they have ever been abused physically, sexually, or verbally by someone who was drinking. Those whose primary research questions deal with violence might not be able to make the decision we

did without jeopardizing the aims of their project. For us, it was the reverse. We could not ask certain questions and meet mandatory reporting requirements without breaking confidentiality and jeopardizing the life of our project. We chose not to ask.

However, the question of suicidal behavior is germane to the aims of our project. We ask both the youth and parent about suicidal ideation, plans, and attempts, and we developed protocols to deal with affirmative responses. The protocols cover those who report thoughts of harming themselves, those who have made attempts, and those who may be in need of immediate care. Part of the protocol includes steps to get youth or adult participants in need of emergent care into the domain of clinical service. Because we are housed in a medical facility with mental health and psychiatric personnel as backup for emergencies, it was easier for us to develop protocols that maintain subject confidentiality than might be feasible for other projects. Careful design of questionnaires and procedures can minimize, but not eliminate, the need to address these legal and ethical issues.

Summary

The breadth and depth of data collected in this study are unique in their ability to describe a large *community sample of urban* American Indian and Alaska Native families. The prospective, longitudinal design allows assessment of biopsychosocial determinants of substance use and other psychiatric disorders in Indian youth and Indian women. By collecting baseline measures prior to drinking initiation, and following youth through the age of highest risk for onset of substance abuse, the study can evaluate the relative importance of a variety of risk factors.

While many researchers extol the virtues of longitudinal studies, few are able to commit the time and resources necessary to accomplish such an effort. We have been fortunate to conduct this research during a time of relatively stable funding and high interest in American Indian health and longitudinal research methods. Our success in following Indian families reflects individual, family, and community support for the research, as well as the commitment and hard work of a talented and dedicated staff. Our experience in following Indian families and in maintaining their continued participation in the project may be helpful to other researchers. We hope this report generates increased discussion and interest in longitudinal investigations of American Indian populations.

Acknowledgements

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Note

1. Throughout this paper the terms American Indian and Indian are used interchangeably. This is in keeping with a 1978 resolution by the National Congress of American Indians, and indicates those peoples indigenous to North America, including Alaska Natives, Eskimos, and Aleuts. When specific tribal groups are the focus of the content, they are named.

COMMENTARY
BY
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Dale Walker and colleagues are to be commended for contributing to the sparse literature reflecting prospective or longitudinal research on Indian peoples. Their work will join the small collection of longitudinal observations on Indians and alcohol, the first being the work of James Whittaker (1962, 1982) on the Standing Rock Sioux, followed by the treatment outcome studies of Joseph Westermeyer and colleagues (Westermeyer & Neider, 1985; Westermeyer & Peake, 1983), and, more recently, the mental health epidemiology of James Boehnlein and associates (Boehnlein et al., 1993) and the twenty-five year retrospective of Indian drinking careers by Stephen Kunitz and Jerrold Levy (1995). Thus, this longitudinal study will make a significant contribution toward understanding alcohol and other drug use in a diverse population of Indian peoples. An additional advantage to this study may be its especially rich data set, because the opportunity to conduct indepth interviews over a period of time has the potential of accumulating qualitative data which may better inform us, in Indian peoples' own words and perspectives, about alcohol and other substance use.

Additionally, this research has been conducted with urban Indian peoples, and includes the input of Indian women, both seriously understudied areas. In reviewing the urban studies available, most have concentrated on Indian men and their drinking behaviors (Beede, 1968; Dubbs, 1975; Lang, 1974; Stanbury, 1975; Waddell, 1975). Research by Burns, Daily and Moskowitz (1974), Joan Weibel-Orlando (1989), and Gutierrez, Russo, and Urbanski (1994) are exceptions, as this research included women in the study populations. Yet Indian women continue to be a seriously under-researched segment of the Indian population.

Why should Indian people participate in research about Indians? Hasn't there been enough? And doesn't it misrepresent Indians, fuel the stereotypes, and emphasize the worst about Native people rather than the best? Vine Deloria castigated anthropologists in 1969 for doing research on Indian people, and concerned Indian tribal leaders often voice skepticism and caution about giving permission to students and scholars alike to collect data in Indian communities, for fear that in the analysis, the reporting will misrepresent reality as the Indian people understand it. In this volume, Walker and colleagues describe the time, care, ethics, and responsibilities required to gain entry, access, and trust.

What's in it for Indian people? There are generations of non-Indian misperceptions and misunderstandings about Indian people and

Indian substance use. Historically, there have been a number of fallacious assumptions about Indians and alcohol, some of which, regrettably, Indians themselves have come to believe. These misperceptions and stereotypes include the conviction that Indians could not use alcohol safely. The Indian unfamiliarity with the physiological effects of alcohol, compounded by cultural differences in behavior and expression, led colonial communities and governments to pass increasingly restrictive laws prohibiting sale and trade of alcohol to Indians (Laws of the Colonial, 1832; Prucha, 1970). So powerful was the stereotype that Indians could not "hold their liquor" that when prohibition was finally rescinded in 1954, many tribal governments decided to continue prohibition as a local option (Fuller, 1975; May, 1976; May & Smith, 1988).

There are theories put forward that the reason Indians cannot drink safely is that, chronologically, their exposure to alcohol has been only a few hundred years, and thus they still have a unique susceptibility or "allergic response" to alcohol (Milam, 1974), which prevents them from being able to use alcohol safely. The presence of a "firewater gene", an innate, inherited susceptibility to alcohol, was also hypothesized. Early research by Leland (1976) and recent research into the genetics of alcohol heritability (Brown et al., 1993; Goldman et al., 1993) have disproved this myth. Yet, sadly, many Indian people continue to believe it.

In the literature, there is rare mention of those Indian individuals who do drink, socially and safely (Mail & Johnson, 1993). Nor is there ever a discussion of teaching Indian adolescents and young adults to drink. Given the early age of onset and even earlier evidence of positive expectancies among Indian elementary school children (Mail, 1995), education for "safe and sane" use of alcohol would have to begin well before such behavior was lawful. The current prevention curricula present an Either/Or message: Either you drink, and are therefore drunk, Or you abstain. For Indian youth in today's conflicted climate, as well as the Indian adult, there is no middle ground, nor any positive alcohol-using role models. Obviously, alcohol has caused such pain, loss, and been the source of so many negative consequences, that there is strong sentiment against any use. The suggestion of teaching "safe drinking" is an anathema. Yet, looking at the rapidly increasing use by age in Indian adolescents, both on reservation and in the cities, one can only wonder if a different message than "thus shall not" might not present a viable alternative? Especially when adolescent experimentation is known to be a norm for most youth everywhere, and the beer advertisers heavily promote the "fun" associated with beer parties (despite the industry's protests to the contrary). Have we done Indian people a great disservice by prolonged prohibition, accompanied by marginalization, discrimination, and the declaration that alcohol was the number one health problem? When maybe it was really stigma, stress, and low self-esteem which were the major mental health problems? Coupled, of course, with unacceptably high unemployment and lack of access to

good education and employment. One wonders if a rational dialogue will ever be possible, or have we become too polarized in our belief that Indians and alcohol never mixed — and never will?

Answers which will counteract the stereotypes and mythology are not easy to come by because the existing research continues to be episodic and lacks comprehensiveness. Such studies as this one, which follows individuals over time, and which discusses the importance of the relationships between subjects, their families, and the researchers, are all too rare. To date, there is an abundance of studies about some communities (e.g., Los Angeles) and a handful of tribes (e.g., Navajo, Sioux, Chippewa), plus the annual Indian Health Service national and regional prevalence data (Indian Health Service, 1993a, 1993b, as examples). Interested researchers continue to lack a good epidemiology and in-depth ethnographies which help to inform policy formulation and improve treatment approaches (e.g., such as Christine Lowery's 1994 history of Indian women's drinking). The long-running Indian adolescent surveys conducted by Gene Oetting and Fred Beauvais (Beauvais, Oetting, Wolf, & Edwards, 1989; Oetting & Beauvais, 1989) are a welcome exception, as are the serious policy reflections and deliberations of Phil May (1992). Yet there continue to be major, unaddressed issues around the use of alcohol by Indian people. Research into prevention and treatment have yielded little of value, demonstrate poor dissemination, and, when something appears to work, virtually no attempts at replication. Fortunately, there is hope that the renewed interest in cultural identification and participation will provide some protective factor against misuse of alcohol and other drugs. It remains to be seen if the several projects funded through the U.S. Public Health Service, Center for Substance Abuse Prevention and the Robert Wood Johnson Foundation will yield positive results which can be replicated. Indeed, the importance of prevention is paramount. When research has demonstrated that alcohol-related birth defects and fetal alcohol syndrome are *one hundred percent preventable*, every effort should be made to reach women of child bearing age, screen maternal clients in clinics, and engage the community in helping protect the pregnant woman. Effective prevention, including delayed initiation of use, can save lives, keep children in school, and produce healthier babies — the hope of the next generations. But to prevent, we have to know what works, and then put into practice what we know.

One final area of research which has not been addressed is the identification and elucidation of those attributes possessed by some Indian families which appear to afford them protection against alcohol misuse, even while these families live and work in societies and communities where serious alcohol misuse and destructive drinking patterns are the norm. Would there be value in ascertaining what protects these families from using or misusing alcohol and other drugs? What prevents their participation in the community pathology? Could it be identified? Taught to others?

Would it generalize from one tribal group to another? From reservation to urban settings? The concept is tantalizing, the promise provocative.

Walker and his associates, through their patience and commitment to unraveling this Gordian knot, have raised excellent issues in process, protocol, and procedure. The data resulting from their well-designed research will add substantially to the current body of knowledge. Through such work, we can hope that the epidemiology and etiology of Indian alcohol use will be better understood, that destructive patterns of drinking will be eliminated, and that Indian people can take pride in their heritage as sober, physically fit, spiritually whole and socially healthy individuals with their families and communities intact and growing. And this brings me back to the original question: Why should Indians participate in research? Because without informed, structured inquiry, we cannot move ahead. Change comes about because there are questions for which we have no answers, and someone or group of people go seeking the answers. Indian community frustration over the obvious destruction wrought by alcohol cannot be ameliorated until we have accumulated enough real knowledge about the antecedents, risks, and protective factors to recommend new strategies. Participation provides the essential information which, in the end, will benefit not only the participants, but all generations to come. Community members participate because it helps others, and helps to close the circle on alcohol misuse. This is, after all, the Indian way — Indian helping Indian, through transmission of knowledge, one generation to another.

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Author Note

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**COMMENTARY
BY
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The old show business maxim of “always leave them wanting more” applies very well to the most recent paper of Dale Walker and his colleagues. What they have put together is an intriguing set of data that is the only one of its kind, comprehensive, extremely complete in terms of participant follow-up and has the potential to answer a host of very pressing questions regarding problems experienced by urban Indian youth. As I read this manuscript I was formulating dozens of hypotheses and research questions that could be placed against these data and which could shed a great deal of light on the social and psychological functioning of urban Indian youth and their families. This body of data has significant research potential.

Probably the most striking aspect of this project is the relationship that has been forged between the researchers and those with whom they have worked over the past few years. This is in sharp contrast to the all too common approach to minority research whereby researchers consider their subject pool as an entity to be “mined”, with little concern as to the value that might accrue to the participants themselves. The exceptionally low attrition rate speaks not only to the carefulness with which this research has taken place but also the cooperation and respect the research team has been able to establish. There are, of course, dangers involved in the development of such a close working relationship. The participants may be biased in the direction of trying to please the researchers and the research itself may constitute an intervention that could well mask the “natural” development of these young people and their families. It is my sense, however, that these dangers are far outweighed by the benefits that accrue to research with a cooperative relationship. In our research we have found that if the research enterprise is trusted people will generally be truthful and, surprisingly, if they do develop a bias, they are willing to admit to it. A known bias is certainly preferable to what might develop in a more “hostile” research environment.

While a collaborative research atmosphere is generally preferable in research, it is essential when working with Indian populations. Historical circumstances, both politically and socially, have resulted in barriers and trust issues between Indian people and the majority culture. While one might wish these circumstances to be different, the reality is that there is suspicion and a feeling of exploitation that is a part of the Indian experience. If these issues are not addressed and remedied, research

efforts may not even get off the ground and if they do it is not uncommon for the efforts to be aborted midstream.

Nothing is more guaranteed to produce controversy in cross-cultural research than the use of measures that are developed and standardized on one population and then uncritically used in another ethnic or cultural group. This project employs a wide range of measures that have never been adequately tested with Indian youth. I see little problem with this *provided* that the various issues of equivalency are addressed and that any interpretations be treated extremely cautiously. This is particularly important with the issue of comorbid psychiatric problems. In many instances the criterion scores for various levels and types of pathology may be very different for Indian youth. The approach here should not be an examination of deviations from "the norm", rather the interpretation of differences should be seen as reflecting differing world views between Indian and non-Indian people emanating from differences in personal, social, and cultural development. This is not to say that morbidity is not a genuine concern; rather that the cross-cultural measurement may present problems.

With the above caveats, this project provides a good opportunity to see how the instruments that were chosen for the project fare with young people in this population. The collateral information that is collected from the mothers could go a long way toward aiding interpretation of objective scores that may point toward pathology when in fact it doesn't exist. While it was not mentioned in the Walker, et al. paper, it is hoped that when testing indicates the presence of a particular problem, this problem will become a subject of inquiry in the interviews with the family.

Another certain point of controversy in alcohol research is the definition of what constitutes use and abuse, there are about as many perspectives on this as there are alcohol researchers. The paper by Walker et al. discusses this issue but I think inadequately. It is mentioned that various questions are included regarding quantity and frequency but at the adolescent level only three categories are proposed: (a) "never used at all", (b) "ever tasted any alcohol", and (c) "ever drank more than a sip or taste". The latter category seems to cover a wide range of drinking from "normal" adolescent experimentation to heavy, abusive drinking. It appears that there will be sufficient data available to create more meaningful categories, or to even develop a scale of alcohol involvement that can be used as a continuous criterion variable. We have discovered in our work over the past 20 years that, since the use of small amounts of alcohol is nearly universal among Indian adolescents, a better indicator of seriousness of use is the level and frequency of "drunkenness". We have found, for instance, that by the age of 12 15% of Indian youth have been drunk at least once and this percentage increases to 62% by age 15. There is certainly a sufficiently high base rate of getting drunk to provide an adequate criterion.

A number of analytic strategies are certainly possible within this project and hopefully the longitudinal nature of the work will be fully exploited. An additive model of risk factors was mentioned as well as the analysis of moderating and mediating variables. Etiological studies and classification/descriptive strategies were also discussed. Given that longitudinal data will be available over a critical developmental period, linear modeling would certainly be in order to help understand some of the causative paths to alcohol abuse and other comorbid conditions. The most interesting question in this regard is the timing of the emergence of alcohol abuse and other psychological problems, thus giving some clues as to the direction of causality. The one problem that I foresee in this type of inquiry is that the majority of the measures used in the study are aimed at elucidating risk factors and there is a real possibility that the picture may be skewed toward the development of pathology. There is an emerging interest in how protective factors emerge throughout the adolescent years and it appears that these questions may be not so easily answered within this project. Such, however, is one of the limitations of longitudinal research — the outcomes are constrained by the selection of the initial instrumentation.

An area that I would have liked to see better described was the plan for the analysis of the data from the Indian women; it was not altogether clear what outcomes would be examined or what changes over time would be of interest. Along the same lines a further discussion of how the inter-generational data would be analyzed would have been helpful.

In sum this project has the potential to provide us with the opportunity to develop very rich descriptions of the developmental issues related to alcohol use among urban Indian youth and their families. The follow-up rate is excellent, and a nearly unprecedented relationship has been built with the Indian community under investigation. It is hoped that future data collection and analyses will fully capitalize on the comprehensive nature of this data set.

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COMMENTARY
BY
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Research on Indian mental health and substance abuse issues has long been problematic. From the early days of anthropologic research which was ethnocentric and intrusive, to some present day research that has served largely to harden stereotypes about Indians (e.g., on alcoholism, suicide, and depression), there have been few studies that have successfully achieved a balance between cultural sensitivity, appropriateness of content, and methodologic rigor. For this reason, it is a pleasure to see a study like Walker et al., which does strike that balance.

Perhaps in part because Walker et al. are themselves Indian, they approached this research in a thoroughly culturally sensitive manner. For example, they were able to avoid the common temptation to “hunt for train wrecks” among Indian people. Rather, they carefully defined alcohol use so as to avoid inclusion of false positives, chose cases carefully to exclude individuals who were unusual in some way, and relied on structured instruments which they examined for cultural sensitivity, rather than the more common practice of asking overly simplified and overly broad questions which do not engage the subject in their own cultural context.

In choosing instruments, however, it should be noted that these researchers found themselves in a dilemma which every culturally sensitive researcher confronts. If one uses instruments which have wide acceptance in the field, they may not be culturally sensitive. But if you develop a culturally sensitive instrument for a particular group, the results may not be comparable with the literature at large. Certainly, researchers should continue to develop culturally sensitive instruments. But it is also important to apply both those instruments and similar mainstream instruments to the same subjects, and try in some way to make a translation between the results. The subjects should be both from the cultural group under study and from a comparison group (e.g., Caucasians). Only then will we be able to truly compare results across cultures. Because Walker et al. used a wide variety of instruments, some of which are mainstream and some of which were developed by their group, perhaps they will be able to make a start on this task.

Appropriateness of content is a second area in which this study is strong. That is, these researchers have chosen to study risk factors for pathology, rather than jump into the amorphous “prevention” field. It is *au courant* in Indian country to fund “health promotion” and “prevention” activities as though they were of proven effectiveness, although often there is no real focus to these efforts, and often no evaluation of effectiveness. The

theory seems to be that if people eat right, sleep well, and treat one another respectfully, they will be happier and healthier, and if they are happier and healthier they will not get sick. In some limited instances, this may be true, although little data supports this notion in mental health or substance abuse. However, risk factor research is one area of inquiry which can lead to focused prevention activities that lend themselves to evaluation for effectiveness. Put simply, in most instances we do not know where to put programmatic dollars to decrease the incidence of mental/substance abuse disorders. Only by identifying specific risk factors which are associated with these conditions will be able to approach true prevention.

The present research is a good example of the best of risk factor research. It is prospective, longitudinal, and focused. As noted above, the pathological conditions being studied are well defined, and the subjects carefully chosen. Those who run clinical programs which are conceived of as preventing substance abuse or other mental disorders would do well to read the methodology of this study, and having done so think carefully about what risk factors they are trying to target and upon which they will base evaluations of their programs.

The methodologic rigor in Walker et al. is also impressive. Yet, there are always trade-offs in research, some of which the investigators discuss. A few other trade-offs should be mentioned, as well.

First, there are many instruments used in this study, yielding a lot of data points. This makes a great deal of sense, as it is clear that in research on potentially stigmatizing issues such as substance abuse, multiple measures of the same variables are necessary. Yet, there are two problems which arise from this strategy. First, which of the multiple measures does one accept as "truth"? A strategy must be worked out in detail to deal with this problem. Second, even though the number of cases in this study is high as Indian studies go, still, there are not enough cases to effectively make use of all the data collected. Even in multivariate analyses, the numbers of cases will support only a limited number of variables. There are statistical strategies to reduce the data, of course, which should be utilized. But I also would encourage the researchers to focus much of their efforts on a few well chosen data points on which they can do time-series analysis. One of the strengths of this study is that it is longitudinal. Such an analytic strategy would allow them to make the most of these unique longitudinal data.

There is one more issue which bears mentioning. This is the problem of comparing rates between Indians and Caucasians. Clearly, this is a descriptive epidemiologic study, rather than a hypothesis testing study, so there is no need for a control group, per se. However, it is also clear that others will use these data to compare with data collected in studies of the majority population. This is problematic for several reasons. The first is discussed above — there may be difficulties in comparing these data (collected with culturally sensitive instruments) and data

collected with other instruments. Second, there is the real possibility that even using the same instruments, Indian people (or any specific ethnic group) may exhibit a systematic difference from Caucasians in patterns of response. If these patterns do not relate either to risk factors or psychopathology, they represent systematic response bias. Part of this potential for response bias is related to cultural differences and the cultural sensitivity of instruments noted above, but it is also related to the care with which the ethnic specific data are collected by rigorous, persistent, and culturally sensitive researchers such as the Walker et al. group. For example, Indian adolescents and families may have been more candid in answering sensitive questions than were persons in majority studies precisely *because* the researchers had a good relationship with the families and because the families saw the study as helpful to the Indian community. If so, rates for non-Indian people might be lower than those found in Indians because the Indian respondents are being more truthful.

One (not very serious) answer to this dilemma would be for these researchers not to work as hard at relating to the subjects and following them over time. Another, more reasonable, answer is to do studies of potential comparison groups with the same rigor as is found in Walker et al. That is, researchers working with other populations need to be encouraged to spend a similar amount of effort relating to and following subjects. Perhaps in some existing studies of Caucasians this has been done. If so, the choice of studies for comparison with the Walker et al. study should be based on whether those studies have achieved a similar degree of rigor with regard to basic methodology, relationship building, and followup.

The above caveats notwithstanding, this research promises to provide us with enormously useful information about risk factors in Indian adolescents and women. It is becoming harder than ever to do longitudinal research, so it is important that the few longitudinal studies which do get funded are designed with the degree of care found in Walker et al., and that future studies make attempts to solve some of the dilemmas noted above.

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COMMENTARY
BY
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The breadth, intensity, and effort devoted to this study are staggering! These investigators' foresight, even courage in undertaking such a monumental work auger well for the future of American Indian (AI) youth and families. The funding agency and institutions supporting this study have shown both boldness and responsibility in fostering this major study. In the face of such a grand design, this commentator's first impulse was to shrink from comment. Further reflection led to my reaffirming certain points and considering a few suggestions, which humbly follow.

Methodological Dilemmas

These authors have tasted the challenge of longitudinal work. Their Discussion is rich with suggestions regarding this special work. Walker and collaborators have not crumpled before the inevitable ethical and humane considerations that such work inevitably engenders. To their list of special approaches might be added "finders' fees" and collaboration with ethnic urban associations — methods that this commentator has used with good effect (Westermeyer & Bourne, 1978; Westermeyer & Neider, 1984; Westermeyer & Peake, 1983).

Longitudinal research demands unique techniques and leads to personal impasses that the cross-sectional researcher can hardly begin to comprehend. These investigators carefully considered the ethical, legal, and professional obligations before and during their work. Missing from their list is the personal involvement that ensues — a kind of "field work countertransference." Perhaps they will cover this topic in a future treatise. This dimension of the work has led to great rewards, onerous responsibilities, and unavoidable tragedies for this commentator, enhancing and dogging my life in ways not foreseeable.

A central success in this study was the high proportion of subjects retained in the study over time. This commentator has likewise found that follow-up rates exceeding 90% are feasible in such studies (Westermeyer, 1989). Not only are such high rates achievable, they are necessary if one is to study the full range of subjects and not simply those within the "two standard deviation" limit acceptable to many social scientists. Such work distinguishes true epidemiological studies from social surveys seeking to describe modal behaviors and outcomes, as distinct from a

typical, unusual, or pathological outcomes of interest to clinicians and others of our ilk (Westermeyer, 1990).

Walker and coworkers have also demonstrated that near-random sampling can be accomplished for AI samples — a field in which “snow-ball sampling” and “samples of convenience” have held sway. This is not to say that such random sampling is problem-free. On the contrary, Walker et al. encountered “false positive” AI identities and suspected “false negative” AI identities. We likewise found that about half of AI patients admitted to a university hospital were accurately identified as AI by the admissions office, with one-fourth misidentified and one-fourth have no ethnic data recorded. These findings suggest that true random sampling methods for AI subjects cannot yet be achieved.

Promulgation of Findings

Walker and coworkers will likely be analyzing these rich, important data for years to come. The large number of data bits per subject and the collection of data at several points in time call for creativity and persistence in the analytic phase of their study. If this commentator’s experience with longitudinal studies holds for the Seattle study, Walker et al. will spend more time analyzing, understanding, and publishing than they have spent in collecting these data! Their “data glut” will create problems for them, since it is unlikely that they will receive adequate funding or have adequate staff (or even time) to understand and promulgate their findings. Consequently, waste will ensue: waste of subjects’ time, waste of researchers’ efforts, waste of taxpayers’ dollars, and waste of valuable information.

Walker and collaborators might address this problem proactively. Alternates (neither all-inclusive nor mutually exclusive) for approaching this problem might include the following:

1. Early on, they might publish data-rich papers that might be used by other researchers for secondary analysis. Some journals permit such data in appendix form. This approach could begin immediately. Their funding sources might assist in this effort.
2. At some future time, Walker et al. might make their data set available for analysis by others. This could occur at the conclusion of their grant funding or at some future date (say, the year 2000, or 2010). Under this plan, the authors would have to decide where to “deposit” their data (e.g., NIH, INS, the World Wide net), how to share “ownership” (since the data and the analysis comprise two separate forms of “intellectual property”), and what kind of editorial constraint or censorship they might want to exercise. Innovation,

selflessness, and consideration of all good and bad possibilities would necessarily presage such a step.

3. The investigators and their various backers might locate funds for others to analyze and publish these data at Walker et al's. bailiwick (or wickiup, if you prefer). This could provide a venue for AI college students, graduate students, medical students, residents, fellows, and junior faculty to participate in the analysis and publication of these data in Seattle. I have utilized this approach on a modest scale with longitudinal Hmong survey data (Westermeyer & Her, 1995) and Hmong opium addict data (Westermeyer & Chitasombat, 1995).

Intervention Opportunities

Even these early data suggest opportunities for prevention and early intervention of Substance Related Disorders. Prevention-intervention efforts should not await the complete analysis and publication of these data years from now. The time for designing and studying such efforts is now, or at least in the near future. Can Walker et al. devise and propose controlled intervention methods, based on their experience during this study?

Previous interventions in AI communities suggest that obtaining control groups poses a serious problem. Control groups within the same region may be "contaminated" by the propensity for AI communities to spread the words regarding effective interventions over great distances. AI leaders and communities demure from studies without benefit to community members. Creativity would be needed to develop realistic intervention studies that meet desirable criteria (e.g., controlled by AI communities, affordable, acceptable, accessible).

Summary

Like all good studies, this effort by Walker and colleagues leads not so much to fixed answers and firm solutions, as to new questions and quests.

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COMMENTARY
BY
WILLIAM SACK, M.D.

Louise Erdrich in her 1984 novel, *Love Medicine*, describes a poignant gathering of three generations of a Northern Plains Indian family following the death of a young aunt. (This woman, inebriated, dies when she tries to walk home in sub zero winter weather.) The expression of this family's grief gets intermixed with accumulated family and racial tensions as the evening proceeds. Alcohol accelerates these processes which then culminate in an outbreak of family violence. One of the younger men, King, drunkenly tries to drown his wife in dishwater and is beaten off by another in the family. The scene ends with King "confused. . .wide-eyed" trying to run off in his pickup.

Such an episode, all too familiar to clinicians and researchers alike working with American Indians, remains at its core a mystery. Is this intergenerational outburst of rage and alcohol consumption an historical/cultural phenomenon? Is it the expression of two century's endurance of oppression and exploitation of the American Indian by the White majority culture? Does the use of alcohol provide a return of the Indian male to his former warrior status (Mohatt, 1972)? Or is it a developmental phenomena which gets passed down across generations as learned behavior; that is, as children identify with their parents' drinking behaviors. Or is it a sociological phenomena of family breakdown secondary to unemployment, isolation, poverty, and despair? Or, finally, is it a biological/genetic phenomenon related to a particular, as yet unidentified, vulnerability to the metabolism of ethanol?

Dale Walker and his colleagues in Seattle have undertaken an ambitious longitudinal study of alcohol and substance abuse across two generations of an urban Indian sample by *not* specifically trying to answer any of the above questions as posed in their traditional theoretical garb. Rather, their approach has been a vigorously empirical attempt to bring state-of-the-art quantitative methods to bear on these enormously important issues. Their conceptual foundation doesn't ignore the traditional hypothesized causes of alcohol and drug abuse, but rather reframes them into risk factors that can be specifically measured by specific instruments. They posit that an accumulation of risk factors, taken from any or all of the above domains, will provide predictive power to better understand why an American Indian drinks at all, drinks moderately, or drinks to excess.

Such an additive risk factor model has worked well for other empirical researchers. Lewinsohn, Hoberman, Teri, and Hautzinger (1985), for instance, conceptualized depression as a final pathway, resulting from a variety of genetic and/or environmental factors that intermingle

in particular ways for each individual so affected. Rutter (1980) was one of the first to show the cumulative effects of psychosocial stressors in predicting children's psychopathology. He showed the greatly increased effects (more than simply additive) of accumulation of these stressors on outcome. Thus, Walker and his colleagues are on solid ground in conceptualizing their study in this fashion.

Another strength of their longitudinal design allows for measuring the *onset* of alcohol and drug abuse, rather than relying on a retrospective report by the research subject. The hazards of the latter are all too well known to behavioral scientists, but constitute the bulk of our current knowledge.

There are too many noteworthy features of this study design for me to underscore them all. Thus, I will select two: (a) sample selection, and (b) attrition.

First, the care with which this research team has constructed their several samples is an example of sophisticated thoughtfulness whose real beauty may not be at first apparent. Noting that an exclusive school based sample would likely miss important youth and families not in that particular system, they have wisely chosen (with an enormous extra effort) to also include 66 subjects from a non-school source (local Indian Health Board). This allows them to detect potential biases inherent in the former group. (Luckily, so far the two samples appear very much alike in most demographic parameters, except family income.)

The other impressive design feature of their sampling technique is the additional use of cross-sectional cohorts. This will allow Walker's team to compare data from the longitudinal groups with cross sectional groups at the same ages, but at different times. Why is this important? It will allow them to spot "cohort effects"; that data peculiar to that particular sample in time but not representative of more inherent properties of the sample itself. If the longitudinal and cross sectional samples bear the same fruit, Walker and colleagues will be able to convincingly argue that their findings are not just the result of a particular idiosyncratic cohort but are more generic to the sample itself. One does not often see this design feature in most longitudinal work.

The other more obvious, but extremely impressive, feature of this report is the phenomenally low attrition rate for the first five years of effort. Attrition is the great threat to the meaning of any longitudinal research, for every time a subject drops out, the remaining sample has been altered. Often, the more symptomatic or less functional individuals are more apt to drop out. What is left can be an artificially better appearing sample than is really the case. This in turn limits the generalizability of any of the results. Readers who are not familiar with what goes into maintaining over 90% of a sample such as this may not freely appreciate this significant achievement. Getting the initial sample, then keeping the same sample over time is the challenge! This paper clearly describes in some detail how the research team has achieved this success. The authors show that it is not merely money, magic, or good luck that kept these several hundred individuals

from over 50 different tribal affiliations in their study, but rather an extraordinary attention to "little things"; snacks at the time of the interview, a newsletter, and most of all, a personal relationship with a known research staff person. Our experience of recruiting and maintaining a Cambodian sample of research subjects completely resonates with this description. We found our subjects had to trust the research assistant and be in agreement with the overall aims of the project before anything else, including payment, would be meaningful (Sack et al., 1993). Money is not as important an incentive to participate as one might think.

When does working hard to maintain a research cohort become some form of intervention in itself? The authors raise this question themselves in their discussion of these issues of follow up. I know of no clear answer to this dilemma. But one possible solution is to create a modest "process" measure. Questions such as, "Did your involvement in our research project cause you to seek help that you might otherwise not have undertaken?" is an example of this kind of item. The rule is, if you can't control it in your design, then try to measure it!

This paper should be of particular help to young researchers wishing to design their own projects. It is the kind of "how to" paper that rarely appears in the literature. I applaud the authors for having taken the time and trouble to write it (another reflection of their attention to detail), and for their strong commitment to the generation of a new knowledge by having the patience and persistence to pursue their answers in the right way.

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COMMENTARY
BY
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Dr. Walker and his colleagues have provided early glimpses of what is likely to be an important study examining risk factors and mediating/moderating processes underlying alcohol use among American Indian adolescents and women. Their presentation deserves resounding accolades both for tackling an important research question with a powerful, although challenging, design and for providing a rich description of their process in doing so. In addition, their work naturally leads to a discussion of several lacunae still plaguing longitudinal research.

Accolades

The work of Walker and his colleagues advances previous efforts in several crucial ways. First, it focuses on an *urban* Indian sample. Since urban Indians represent half of the nation's Indian population, thorough investigations of developmental processes within this group are important. We need to understand both the similarities and differences in the lives of urban Indian youth and families compared with the lives of those living on or near a reservation. We should not automatically assume that risk and mediating processes such as ethnic identity, community attitudes, or participation in cultural activities will operate similarly in such different settings.

A second strength of this study is the two-pronged approach to generating a sample. Much legitimate criticism has been leveled at studies relying solely on school-based samples. Those children and adolescents who are present in and sufficiently connected to schools to participate in research conducted there are likely to represent the "cream of the crop" — those from the most stable living situations, the most organized families, and in general, the healthiest children. When researchers rely solely on school-based samples, we give no voice to those who live in more stressful environments, who are already experiencing troubles, and who are already feeling disconnected or pushed away from school. While the authors' child sample was younger than those most vulnerable to this criticism, they still sought a non-school-based sample to supplement their school sample. Going this extra mile is exemplary and will speak legions to concerns about generalizability as causal models are analyzed and interpreted.

Third, the importance of gathering longitudinal data cannot be overemphasized. Cross-sectional data can offer important snapshots of trends across time. Yet only data gathered repeatedly from the same participants will permit an understanding of individual-level development

that is essential to building relevant and effective treatment, prevention, and promotion programs. Despite its importance, though, longitudinal designs present myriad obstacles, obstructions, and opportunities for failure. Not surprisingly, few researchers have tackled such designs — and Walker and his colleagues have admirably related a number of the trials and tribulations they have encountered in trying to implement their longitudinal design. In many areas, they provide important details about what worked, what didn't work, and why. Most important, their follow-up rates are phenomenal. We can all learn from their successes.

Lacunae

In reading this article, and thinking about NCAIANMHR's longitudinal work through the Voices of Indian Teens and Pathways of Choice projects (Mitchell et al., in press), four broad lacunae or gaps emerge: (a) methods for handling missing data points, (b) how to deal with inconsistent answers, (c) inclusion of culturally relevant constructs and measures, and (d) responsibilities to the communities. Each of these is relevant to any longitudinal research effort, and all need our best thinking about how to handle them.

Missing Data Points

The more times we try to find research participants, the more pervasive concerns about missing data points become. Clearly, Walker's follow-up rates to date do not raise this concern. However, many others will have less stellar follow-up rates, and will need to consider analytic options. Once we fail to find a respondent in a longitudinal design, is the only choice to eliminate that person from the cohort for the remainder of the study? If so, the representativeness of the sample quickly dissipates, since those participants who are under greater stress and are more troubled are likely to participate less consistently. However, a number of research participants are likely to move in and out of the research sample across the years, and we need to stay poised to include as many of those as we can *whenever* they may appear. Yet, many of the most commonly utilized statistical techniques are not well equipped to incorporate missing data points easily. Thus, we need to be creative about how to include these people. For example, we could discern how they differ from those who participate more consistently; we can then explore different ways to compensate with "substitute" data points based on data from those subgroups which most resemble those who have fewer data points. In addition, newer analytic strategies such as hierarchical linear modeling (Bryk & Raudenbush, 1992) — which models individual-level parameters of change rather than average change across subjects — holds promise in beginning to deal with such problems.

Inconsistent Answers

The more often people are asked the same questions, the more likely they are to give inconsistent answers. Within one data collection period, researchers have ways of assessing this: asking several questions about the same construct, statistics such as Cronbach's alpha help to determine the internal consistency of answers to that group of questions. Answering the same question *across time*, though, raises different issues. Within a longitudinal design, we hope to differentiate inconsistent answers from true change. Some inconsistencies in fact cannot be differentiated from change: consider a "not at all like me" to "very much like me" scale from 1 to 5; if a teen answers "5" at Time 1 and "1" at Time 2, is that an inconsistent answer or a sign that something in that youth's life has changed dramatically? Using quantitative research designs, we simply cannot know; we generally just accept the answers. However, some inconsistent answers cannot be as easily accepted: at Time 1, a teen says one of her parents died at some time in the past; at Time 2, she says that no parent has ever died. What might this mean? Perhaps she answered incorrectly at one of the time points; perhaps her family configuration changed, and she is simply thinking of different people the second time. As before, we can't know from her responses in a survey or interview. More importantly, though, what shall we do with her data? We could simply delete all of her information, and information from any other participant who answers any such questions inconsistently across time. Analytically, this approach is a conservative one, helping to reduce the potential instability of subsequent statistical tests. However, if answering inconsistently is related to other important variables — e.g., gender, age, poverty, family stability — such elimination introduces a number of new and equally serious biases threatening the generalizability of the results from the sample to the population of inference or to other populations. We again need to grapple with meaningful ways to try to keep such data in our models.

Cultural Relevance

The study described here has thoroughly utilized current empirical literature to select measures which are psychometrically strong within this Indian sample. In this way, the researchers have focused on culturally *appropriate* measures of constructs reported to be important in the general population. This is an absolutely critical first step, and the authors are to be commended for their work. However, a second step has not been taken: incorporating culturally *relevant* constructs and measures — those aspects of adaptive and maladaptive development which represent the "epicenter" or heart of satisfying, happy, and healthy life within Indian communities. For example, is "religiosity" the most relevant construct to capture the spiritual aspects of lives within an Indian community? Do questions about "religious affiliations" and "attendance at religious activities" capture the essence of what for many is likely to be a very rich, complex, and powerful aspect of

life? Perhaps “spirituality” is a better construct — one closer to what community members would recognize as a critical mediating process protecting against substance abuse. We need to utilize community members more integrally — through key informant interviews, or focus group discussions, or advisory committees — to help guide selection of the constructs of greatest relevance and to help determine the best ways to ask questions about those constructs.

Responsibilities to the Communities

Longitudinal designs require a research “presence” within a community over a long period; maintaining contact with participants across long periods of time cannot be accomplished by simply showing up on occasion, as the research design dictates. With longitudinal designs, the community is not simply another “laboratory”. To conduct longitudinal research within communities — any communities — we need to build and nurture relationships between researchers and community. For instance, we need to make special efforts to relay the importance of the research and findings that are emerging *as they emerge*. In community-based research, waiting until all of the data are collected, cleaned, analyzed, and interpreted is a luxury we can ill afford. Instead, we need to provide feedback in meaningful formats — formats that are responsive to the interests and needs of the community and the research participants, while not compromising needs of the research design. Such efforts rarely include the scientific manuscripts so central to the professional advancement of most researchers. Yet if we are thoughtful and sensitive about community involvement in a variety of aspects of the research process, we may also be offered chances to participate in special ways in the community itself. Without a doubt, such opportunities are the rare and precious rewards of a community researcher.

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**COMMENTARY
BY
FAY COHEN, PH.D.**

For almost two decades, the American Indian Research (AIR) team has been investigating the intricate and complex interrelationship between American Indians and alcohol abuse. This article, by R. Dale Walker, M. Dow Lambert, Patricia Silk Walker, Daniel R. Kivlahan, Dennis M. Donovan, and Matthew O. Howard, reports at the mid-point of the major prospective longitudinal study being conducted from 1987–1998. This ground-breaking study is gathering extensive information about two generations of urban American Indians in Seattle, Washington¹. Building on earlier studies which documented the severity and chronicity of the problems and the failure of existing treatment strategies, the current study directs attention towards the critical phases of personal history in alcohol use within a family setting. By documenting the experiences of youth and their primary caretakers over time, the study offers significant potential to increase our understanding about when Indian youth begin to drink and in what manner, about their families and home environment and about the other influences that effect alcohol use over time. The attention paid to alcohol abuse among Indian women and the analysis of risk factors are particularly important features of this research. Further, it presents an unique opportunity to learn from the experience of both Indian youth who abuse alcohol and those who do not develop alcohol-related difficulties. Insights gained from the study may stimulate the emergence of a new framework for prevention and intervention in the future.

“Alcohol Abuse in Urban Indian Adolescents and Women: A Longitudinal Study for Assessment and Risk Evaluation” provides a general overview of the research, its history and its rationale. Tables and figures describe characteristics of the sample, study timeline and protocol and some of the initial findings on alcohol use. It discusses challenges and decision points faced by the team. It also considers unique features of the research, particularly the lengthy and consistent record of cooperation between the researchers and the urban Indian community, which establishes the environment that assures the community of meticulous and sensitive conduct by the research team and that permits the research team to accomplish the research goals and carry out long term follow-up. The paper is thus an excellent introduction to this study for those who may not be aware of it. I hope that the journal will be distributed widely outside as well as within the United States. Many people will want to read it.

The paper also evoked memories for me. I was fortunate to have had the opportunity to work with Dale and Pat Walker and the AIR team

from 1978–81. During that time, we had many excellent discussions, discovered that critical feedback from our colleagues could either elate or deflate us in our early research efforts, and repeatedly revised the early studies' biographical questionnaire. We also began to work closely with the Indian community, particularly the Seattle Indian Health Board. Since my departure from the region, I have kept in touch with the project and have visited several times.

Thus it's clear that my comments are neither arms-length nor unbiased. I have continued to work on American Indian affairs, although in quite different contexts. My research has explored rights to harvest and manage natural resources in various countries. Recently, I have become increasingly intrigued by the interrelationship between indigenous rights to resources and society's responsibility for environmental rehabilitation and protection. Seemingly remote from the concerns of the article discussed here, several ideas from my current work are conceptually relevant to the study; this article prompted me to consider them more deeply. I wish to elaborate on two broad themes here: (a) the nature of environment that is the basis for the life experiences of the study population including alcohol use, and (b) the relationship between the researchers and the community, and particularly the importance of understanding the interactive nature of the research process.

The Environmental Context of the Study of Urban Indian Adolescents and Women

The AIR study focuses on an urban population of American Indians from many tribes. My current pre-occupation with environmental issues, broadly defined, leads me to think about the study within its larger environment. I am interested particularly in the impact of life in the city on the study group. Many of the parents and youth were born in the city. What role does the urban milieu play in the lives of these Seattle American Indian families? The authors comment that many tribal groups are represented in the study population; only a very small proportion, however, are affiliated with Northwest tribes. This suggests several possibilities including several raised by the authors. Seattle was a center for the BIA's relocation program in the 1950s, where Indians were relocated to urban centers far from their home reservations. Indians of Northwestern tribal ancestry may be more likely to reside on nearby reservations. Some may work or spend time in urban areas such as Seattle, Tacoma, Olympia, and Bellingham, but their children may attend schools that are closer to home. Possibly the Northwest Indian families may be more involved with the cultures' traditional economic pursuits such as fishing or with traditional ceremonies.

In my view, the study and its population raise interesting questions about the role of the urban environment, particularly for Indian people who — like many Seattle residents — are living far from the places of

their families' roots. The variety of lifestyles found in the city will also be of interest. For example, Table 2 indicates a very wide range of incomes. Many study participants live in poverty while others do not. These differences permit the researchers to consider the role of urban poverty in the larger picture as well as the possible role of having more secure livelihoods. The city also offers many diverse activities, some of which emphasize that the performance of the group demands healthy behavior from each member, such as team sports, bands, and youth orchestras. Alternately, certain city situations may cause difficulties for the Indian families, such as the possibility of facing prejudice in an urban school. It would be interesting to know how the study participants experience the urban setting and to understand their perspectives on the particular opportunities and challenges as well as risks that it may present in relation to their alcohol use.

The AIR study offers several paths to exploring these and related questions. The Biographical Questionnaire will provide information on links between urban and reservation life, about participation in Indian rituals and ceremonies and about participation in sports and other activities. Knowledge about the presence of caring and encouraging teachers, adult mentors for youths and supportive relatives and neighbors for the family may emerge from other parts of the protocol. At some appropriate point in the study, I hope that the researchers will also ask additional follow-up questions specifically related to the urban environment to explore these questions, and to facilitate comparisons with studies of alcohol use in the reservation environment.

Research as a Social Process

As a part of an undergraduate class in Social Relations at Harvard many years ago, I recall being advised to look for two key elements in the conduct of research: "elegance and relevance."² Certain studies have methodological elegance in their meticulous construction, attention to detail, reliability, validity, but may not necessarily be relevant to truly important issues in science and/or society. In contrast, other studies speak eloquently to important issues in society, but their relevance may be undermined by inadequate attention to rigorous methodology. In my view, the AIR longitudinal study contains both elegance and relevance. However, because of the nature of the study as part of a social process, some issues about the relationship of the study and the community are relevant here. These issues challenge the balance of elegance and relevance, and it will be important that they be taken into account as the research progresses.

The authors are well aware of the possibility that participation in the study through the yearly interview may function as an intervention that could potentially influence study findings. As well, it seems possible that

the communication of results through publications such as this one may become potential interventions. For example, a study participant who reads this journal or other reports (e.g., Walker, 1993; Walker et al., 1993) might perceive the research findings as a "wake-up call" to seek help and/or change behavior. Alternately, participants reading about risk factors could begin to see their futures as part of a "self-fulfilling" prophecy. This issue is not unique to the current study. It is ingrained in the combination of the longitudinal design and the obligation to disseminate important findings in a timely manner. The ethical and scholarly requirement to convey research results is important to the Indian community and to scientific and other audiences. The research team and its activities are part of this larger social process and thus it is important that the study document and take into account any possible impacts that both participation and publication may have on the findings.

The study is well-informed by current standards that emphasize partnerships between researchers and Indian communities³. Thus, when initial findings have potential relevance for treatment (e.g., Walker, 1993), the obligations of partnership suggest consideration of the desirability of initiating interventions with current or succeeding cohorts. Again, this is not a problem unique to this study, but the complexity of both the research focus on alcohol abuse and the relationship to the community over time makes it a particularly difficult issue. Stated differently, when will the researchers know enough to begin to venture into the prevention and intervention which is now seen as a long-term goal of the study? On the one hand, it could be argued that some study participants require immediate programs that address the problems identified through their participation in the research, even though the staff does provide resource material on available assistance and intervention was not the basis of the original consent procedure nor the research plan. On the other hand, however, it may be extremely difficult to evaluate and decide if results from early parts of a long-term multifaceted study provide sufficient basis to justify changing course before the entire study and its results can be assessed. Treatment centers in other locales will also have to give very careful consideration to recognizing the most appropriate time to utilize study results in designing their programs. Both premature use and delayed recognition of findings as they emerge could be costly in human terms.

Concluding Remarks

Recognition and discussion of the issues in fora such as this journal broaden the discussion and enrich the possibilities for addressing the issues. Continued sensitivity to the complexity of the study will assist in striving for a continued balance between elegance and relevance. In my view, the demonstrated competence and commitment of the AIR team will enable them to meet these challenges with the careful and appropriate

attention to the implications of the research that characterizes their work to date.

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Footnotes

1. I use the terminology “American Indians” primarily here, in keeping with the preferred usage in the article. In Canada, the term “First Nations” is often used, as is “aboriginal peoples”. Internationally, the concept of “indigenous peoples” has gained greater usage, particularly within the context of the United Nations.
2. It is not possible to provide clear attribution for the source of the class discussion at this time, however, it seems appropriate to credit psychologist Jerome S. Bruner as the inspiration, and possibly the actual source. The description here relies on my recollection over many years and passed on to students in my own classes. In my memory, I associated these ideas with the work of Dr. Bruner, which was discussed in Social Relations 150 in December 1962. However, recent review of my class notes indicates that the discussion of his ideas concerned somewhat different contrasts: eloquence and relevance in education; mechanistic and relevant approaches in research on cognition. I attempted to

resolve this discrepancy between recall and record in time for this article by contacting Dr. Bruner (he was abroad), and by consulting his publications, but without success.

3. The design of this research reflects the increasing recognition of the vital importance of developing new and more appropriate relationships between researchers and Indian people in recent years. The involvement of Indian people at all stages of the research is seen as very important in developing partnerships. For interesting descriptions of an innovative partnership approach to studying environment and health in native communities in Canada, called Project EAGLE (Effects on Aboriginals from the Great Lakes Environment), see Bird (1995) and Wheatley (1993).

COMMENTARY
BY
ROBERT F. KRAUS, M.D. and THOMAS MILLER, Ph.D.

Dr. Dale Walker and his research group have moved onto the methodological and conceptual high ground with their long term longitudinal study of substance abuse in American Native adolescents and women. The low ground has been well traversed in recent decades; however, the research has been of uneven quality. Studies have tended to be descriptive and anecdotal utilizing small reservation populations and have been synchronic in nature. The Walker research will allow assessment of biopsychosocial determinants of substance abuse and other psychiatric disorders and will offer the opportunity to evaluate the relative importance of various risk factors and their evaluation and additive effect over time.

The Populations Under Study

The selection of 523 urban Indian youth and 274 urban Indian women to participate in the study was particularly fortunate and appropriate. In a recent review of Native American Youth and alcohol, Lobb and Watts (1989) point out that the literature on Native American youth alcoholism is in its infancy, although Indian youth are defined as a high-risk group which is quite refractory to treatment. The existing data base deals with traditional issues in substance abuse research with a base largely in anthropology and sociology but also deals with issues specific to native youth such as child abuse and neglect, school problems, family dysfunction, fetal alcohol syndrome, rural versus urban factors. The Walker research will deal specifically with 16 such factors.

With respect to Native American women (Roeske, Spurlock, Kramer, & Patterson, 1985), the literature on gender is sparse and essentially undefined. These women also constitute a high risk population. The data suggests a course of illness characterized by early onset, rapid progression, a high incidence of medical complications of alcoholism, and poor response to treatment. Descriptive studies suggest that there are significant differences between Native Americans and non-Native American women alcoholics (Hurlburt & Gode, 1984; Webster, 1983). These factors are only beginning to be explored among these patients.

The Cultural Issue

Cultural identification and participation is one of the factors addressed in this study. That the etiology, phenomenology, course, treatment

and outcome of substance abuse disorders are all effected by cultures is widely held by researchers both on the international scene and among Native Americans (Everett, Waddell, & Heath, 1976; Heath, 1983; Kraus & Buffler, 1979; McAndrew & Edgerton, 1969). Other researchers report that the claim that cultural differences override individual pathology and personality differences is not supported. Alcohol is seen as overriding cultural influences and differences. Native Americans were described as more similar to other alcoholics (even those alcoholics who were non-native) than they were to non-alcoholic cultural peers (Flores, 1983). This quantified, longitudinal study offers the prospect of a definitive assessment of this complex relationship.

The Treatment Issue

A variety of studies suggest that the response of American Natives to treatment for alcoholism is poor and that this is especially so when the treatment offered adheres to modern Western models. Modern healthcare has been introduced in the Third and Fourth World using European-derived models. It was anticipated that indigenous medical systems would disappear; interestingly, this has not been the case, especially where psychosocial issues are involved. Jilek (1993) has recently reviewed traditional healing in the area of substance abuse in various areas of the world. Developments among American Natives are of particular interest in light of the Walker research.

Since the 1960s, there has been increasing interest in Amerindian groups in the Alcoholics Anonymous program as modified in different cultures to be more culturally acceptable and appropriate (Jilek-Aall, 1981). The Inupiaq speaking people of northwest Alaska have developed an Eskimo Spirit Movement based on traditional values to support sobriety in the face of differential social pressures that are excruciating in their speed and intensity (Mala, 1984; Mala, 1985). The Sweat Lodge Ceremonial (Hall, 1986) has become a Pan Indian symbol of Indian efforts to preserve their culture and combat substance abuse. One of the most important Pan Amerindian movements in the last 100 years has been the steady development and spread of the Native American Church and its associated Peyote rituals (Aberle, 1966; LaBarre, 1969). An important part of the "Peyote Road" is temperance.

Also, since the 1960s, certain Amerindian dance ceremonials have experienced a resurgence. Among these are the Sun Dance (Jorgenson, 1972), the Winter Spirit Dance (Jilek, 1974), and the Gourd Dance (Howard, 1976). This longitudinal research offers the opportunity to understand and, hopefully, to augment and strengthen these important Indian initiatives.

The Methodological Issue

The complex, quantitative, longitudinal model developed by Walker and his associates makes possible the understanding of human development in terms of person versus environment reactions. Human behavior, including substance abuse, is the sum of a series of adaptive or maladaptive responses to specific contextual demands and opportunities. Recent research in the area of drug and alcohol abuse and other deviant behaviors has emphasized the need for analysis of interrelationships between social environment and individual level development (Sampson & Lamb, 1992). Longitudinal data are commonly "clustered" along a number of dimensions. Individual measurements over time may be "nested" in a particular individual. In turn, the individual may be "nested" within a hierarchy of social groups of increasing complexity (Johnstone, 1994).

The breadth and complexity of data collected longitudinally from a large community sample of American Native families opens the door to a more sophisticated understanding of the role of multiple risk factors, both individual and social, and their evolution and interactions in producing substance abuse.

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**COMMENTARY
BY
JOSEPH E. TRIMBLE, PH.D.**

cetera desunt

No one is quite certain why people use psychoactive substances. And indeed no one is really certain what prompts youth to use and abuse drugs and alcohol. Folk explanations abound that range from appeals to genetic predispositions to “that’s what youth do these days to entertain themselves.” Similarly, the research community has generated numerous findings purporting to explain the overt and covert motivations pushing and pulling youth into the use of illicit and licit drugs. A review of the etiologic literature reveals that researchers have explored just about every causal possibility — deviancy, socialization, family, peer groups, sanctions, situational environments, cultural orientations, personality correlates, and educational achievement are some of the inquiry domains where some partial yet inconclusive explanations have emerged.

In recent years, researchers have placed an emphasis on exploring the influence of identifiable risk factors on drug use behavior. Youths’ behavioral problems are known to be influenced by exposure to multiple risk factors; and drug and alcohol use are considered to be strong predictors of delinquency, violence, and poor academic performance (Hawkins, Catalano, & Miller, 1992). The strength of the multiple risk factor findings has subsequently led researchers to explore the relationships among ethnic minority groups (Trimble, 1995a). The work of Dale Walker and his associates at the University of Washington exemplifies some of the important work occurring among American Indian youth, as much of their research seeks to explore the correlates between risk factors and drug use. Their article, “Alcohol Abuse in Urban Indian Adolescents and Women: A Longitudinal Study for Assessment and Risk Evaluation,” summarizes their important work. The article’s contents serve as the source for these comments — use of multivariate research designs, self-esteem, and ethnic self identification form the basic source for comment.

Perhaps owing to the power of data processing and the seemingly insatiable drive to find explanations for adolescent drug and alcohol use, many researchers are using multivariate research designs. As a result, most contemporary questionnaires and interview schedules in the field contain items that seek information on numerous psychosocial, behavioral, and situational variables. In searching for the presumed correct combination of multiple risk factors researchers are stuffing their instruments with scales; however, many new scales are often untested

and therefore suspect. Others maintain tradition by including popular variables that have been used in previous research such as locus-of-control and self-esteem in hopes that plausible results will emerge when combined with new variable sets. Most disturbing, though, is the finding that many of the research efforts are atheoretical — in fact, some will cast their design under a large net and call it “Risk Factor Theory” or “A Behavioral-Cognitive Theory” in hopes of capturing every conceivable nuance that might, however remotely, predict drug use. Pieces of the research design may include variables known to be associated with small, well-tested theories such as “Peer Cluster Theory,” but the mixture with atheoretical variables can obscure the overall intent and aims of the research.

The design of Walker and associates’ research falls into the latter category. The research team attempted to predict alcohol use and abuse by relying on 23 variables and using 36 instruments and scales. Seventeen variables are ordered according to adolescent risk factors. While some of the risk factor variables are known to be causally related to alcohol, such as peer influences, sensation seeking, conduct disorder, and psychopathology, other variables in the set, such as self-esteem, poverty, and cultural identity have questionable value. In fact, self-esteem and cultural identity measures have little demonstrated predictive value in explaining adolescent drug use. The latter half of this article will explore this contention more thoroughly.

Multivariate Research is Like a Pot of Stew

While Walker and his associates should be applauded for studying Indian youths’ alcohol use over time their design raises serious methodological and analytic concerns. The design reminds me of the stew hobos used to make in their encampments along the byways of the nation’s railroad tracks. A large cooking pot served as the focal point of the camp as it contained an every-simmering broth. From time to time, hobos would drop in whatever vegetable or other edible foodstuff they managed to scrounge up. With each new addition the camp followers would assume that the stew’s flavor was enhanced. Occasionally, someone would dip into the pot to savor the broth; rarely would one frown for fear that he/she would never eat from the pot again. The American Indian Research (AIR) team has a large pot containing 36 instruments and an untold number of individual items that presumably will advance our understanding of Indian adolescent alcohol use. But, based on the content of their article, the remaining parts of the stew are absent (*cetera desunt*); only a few results are presented in their article and no analysis is offered describing the procedures that will be used to test hypotheses.

Many multivariate research approaches resemble the hobos’ pot. Add as many variables as one can even if they are not linked to theory and then subject the data to all sorts of sophisticated and complex statistical

treatments hoping that the flavor will improve with each run. So we can expect the AIR team to use MANOVAS, multiple regression models, and likely variants of structural equation modeling to make sense out of their very large data set. Variables will be added to a statistical routine guided by some reasonable hunch; the analysts will then pore over the results hoping to find significance. Not only is this procedure suspect, it is not very good social and behavioral science research. A research design should be tied to theory and the design should dictate the analytic strategies; statistical procedures should not dictate a research plan.

Are Self-Esteem and Cultural Identity Covariates and Predictors?

Walker and associates claim that levels of self-esteem and cultural identity are risk factors and therefore likely predictors of alcohol use and abuse. Yet their justification for including these ostensibly important variables is thin at best and their claim that they are risk factors is unfounded.

The Elusive and Wily Self-Concept

The research findings on self-esteem levels for American Indians are very mixed and, if anything, suggest that mean levels are no different from other populations regardless of the self scale used in the research (see Trimble, 1987; Trimble & Bagwell, 1995). Moreover, there is little evidence that self-esteem and its derivatives are predictors of drug and alcohol use. In fifteen years of research using self measures in epidemiologic drug studies we have yet to find a causal relationship with Indian youths' drug use patterns and motives (Bobo, Gilchrist, Cvetkovich, Trimble, & Schinke, 1988; Cvetkovich, Schinke, Gilchrist, & Trimble, 1987; Gilchrist, Schinke, Trimble, & Cvetkovich, 1987; Schinke et al., 1986; Schinke et al., 1988). Specifically, using data from 846 self-identified American Indian youth (the "drop-out" study) collected by the staff at the Tri-Ethnic Center for Prevention Research at Colorado State University, we found that a seven item measure of global self-worth produced correlations ranging from .0064 to .0604 with 15 measures of alcohol use (e.g., ever tried, last month use rates, drinking style, passing and blacking out, behaviors while drunk, type of drinker). Our findings are consistent with others who hypothesized similar relationships.

To measure self-esteem Walker and associates used Susan Harter's Self-Perception Profile for Adolescents (SPA). The scale is a revision of Harter's Self-Perception Scale for Children and contains 45 items that tap 9 subtests; one of the subtests is a measure of global self-worth (Harter, 1988). The self-worth items are comparable to the items we used at the Tri-Ethnic Center. Our seven items have been normed with large samples of Indian youth over a ten year period. However, there is

little evidence to suggest that Harter's SPA has been used with Indian youth; there are no SPA normative data available for Indians regardless of developmental stage. Nonetheless, the SPA has been successfully used in other countries (e.g., Ireland, France, Germany, the Netherlands, Portugal, and Scotland) and has been translated into Dutch, French, and German. Thus, we can conclude that the SPA may have some cross-cultural equivalence and reliability.

Self-esteem is a very popular measure as numerous researchers from a variety of fields have attempted to establish its relationship with countless outcome variables. In the substance, alcohol, and drug abuse field the variable can be found as part of numerous treatment, prevention, and epidemiologic research plans. Community-based prevention programs, too, appear to be enamored with the construct. Yet very few studies purport to find any significant relationship between the construct and measured outcome variables. Self-esteem has a magical grip on the research field and it somehow or other manages to avoid the chopping block. Compelling evidence now exists to place it next in line to be hauled off to the graveyard of confounds and artifacts.

Embedding Culture in Respondent Selection

The AIR research team is to be commended for carefully measuring the degree of cultural identification of their samples — in fact, they are one of three national level American Indian research groups striving to improve on the conventional use of the “ethnic gloss” in cross-cultural sample selection procedures (Trimble, 1991, 1995b). They carefully selected their respondents using rigorous Indian identification and certification procedures to assure ethnic authenticity and supplemented that with ethnic identity and traditional Indian activities measures. Use of the procedure was appropriately justified in their article. A short description of their findings convincingly shows that indeed “not all Indians are alike” as their respondents spanned the ethnic identity spectrum from “all or nearly all Indian” (28%) to “not at all Indian (6%). But unfortunately the analysis stops there and therefore *cetera desunt*.

Some of the AIR ethnic identity items were borrowed from the work of Oetting and Beauvais (1991). Thus it might be helpful to illustrate the ethnic identification patterns we uncovered in our analysis of the “drop-out” data mentioned above since we used the items, too. Figure 1 shows the percentage of respondents' degree of identification with American Indian and other ethnic groups. About 71% identified “all” or “nearly all” with the American Indian group. The results also indicate that some of the Indian self-identified youth identified to some degree with other groups — about 9%, for example, indicated that they “mostly or nearly all” identified as Anglo-White and 7% did so for the Spanish-American group. Also, some

11% indicated that they identified “little” or “not at all” as American Indian, yet these respondents initially self-identified nominally as American Indian.

Perceived ethnic identification of one’s parents strongly influences levels and degrees of ethnic identification among offspring. Figures 2 and 3 show the percentage responses of the youths’ perception of their parents’ ethnic identity. Results are not as distinct as those in Figure 1 in part because the ethnic background of one or both parents varied. Sixty-nine percent of the youths’ mothers were seen as “all or nearly all” Indian as were 58% for the fathers. At the other extreme, some 9% of the mothers’ and 13% of the fathers’ identity was perceived as “not at all” Indian. An inspection of the middle choice alternatives, “most” and “little,” show varying degrees of the youths’ parents degree of ethnic identity with American Indian and other groups. Finally, the results revealed that 360 (43%) of the youth who “all or nearly all” identified as Indian indicated that their parents also were seen as identifying at the same level of intensity.

By no means are the findings definitive; nonetheless, they demonstrate that many self-identified Indian youth identify to some degree or not with other groups. The AIR team’s preliminary findings at a partial level mirror our findings. Results also support the fundamental principle of Oetting and Beauvais’ orthogonal cultural identification theory. The findings also complicate the search for plausible explanations for why people choose or not to identify as Indian; the choice is not a dichotomous one but rather multidimensional likely fueled by socialization, geographic location, reference groups, and the perceived tolerance for the sociocultural climate.

Walker et al. did not elaborate on their analytic plans for the cultural identification information but we can hope that their plans include a careful examination of the relationship between various levels of identity with other variables — certainly they must examine drinking patterns as a function of degrees of identity. Using our “dropout study” data we found that:

1. Levels of ethnic identity do not predict alcohol use and abuse (Trimble, 1995b).
2. The correlation between self-worth and ethnic identification is .004; we consistently find this relationship with similar measures of the same constructs.
3. The alcohol use and abuse rates for the high Indian identity youth (see above for description) were significantly different for those youth with moderate to low levels of identity.

This finding firmly substantiates the importance of clearly defining an ethnic or cultural respondent population along an orthogonal ethnic identity continuum. For example, if we treated the entire sample of 846 Indian youth the alcohol and drug use rate findings would be obscured by

Figure 1. Self-identified American Indian adolescents' degree of identification with own and other ethnic groups (n=846)

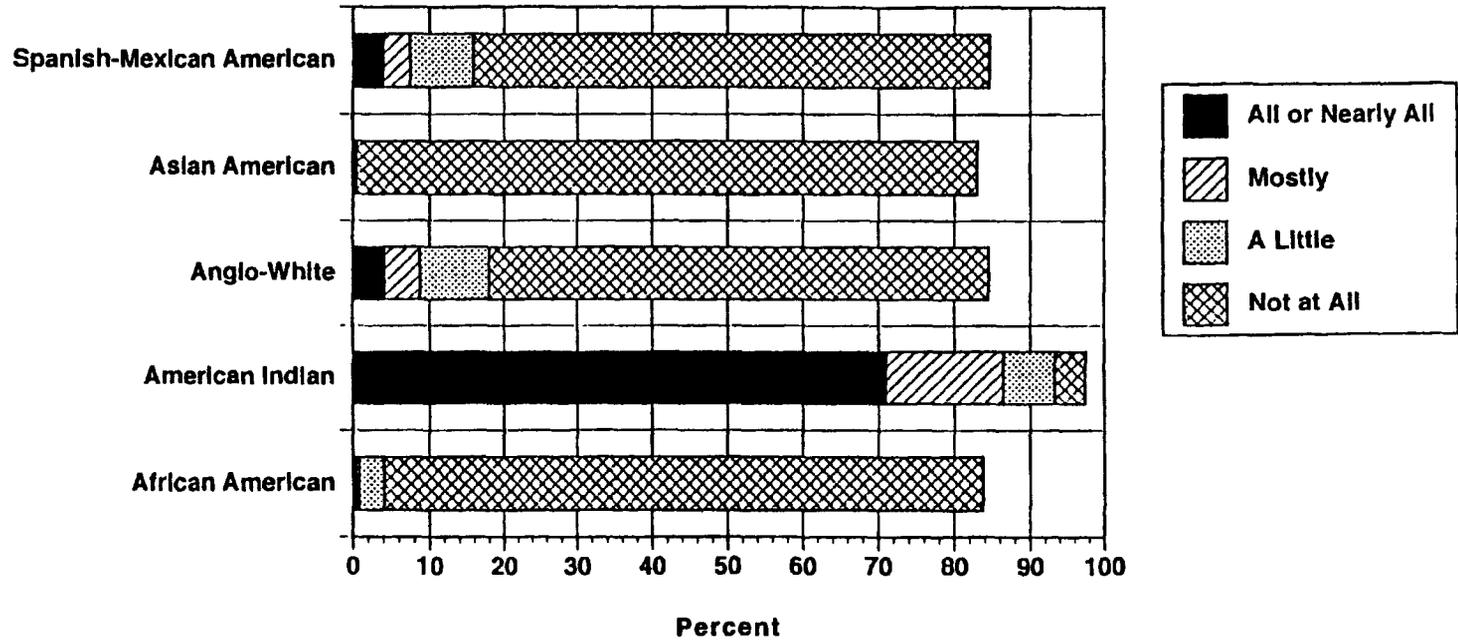


Figure 2. Self-Identified American Indian adolescents' perception of mother's degree of ethnic self-identification (n=846)

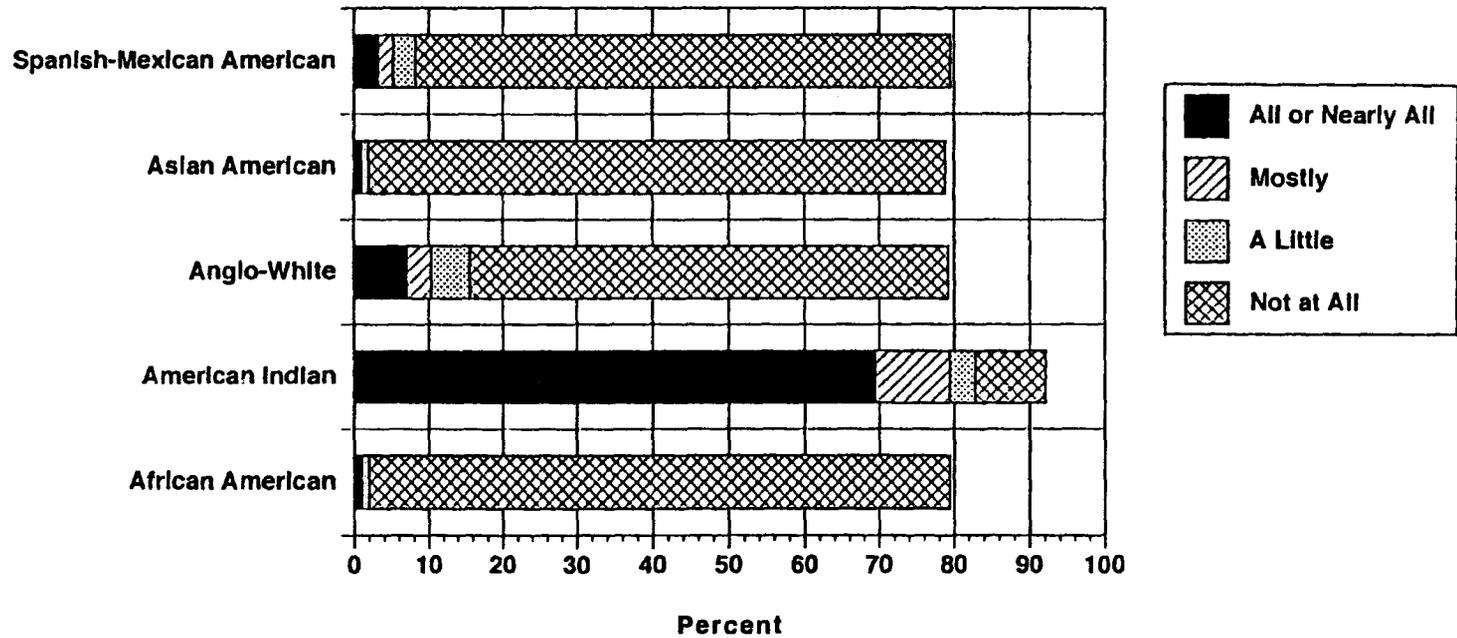
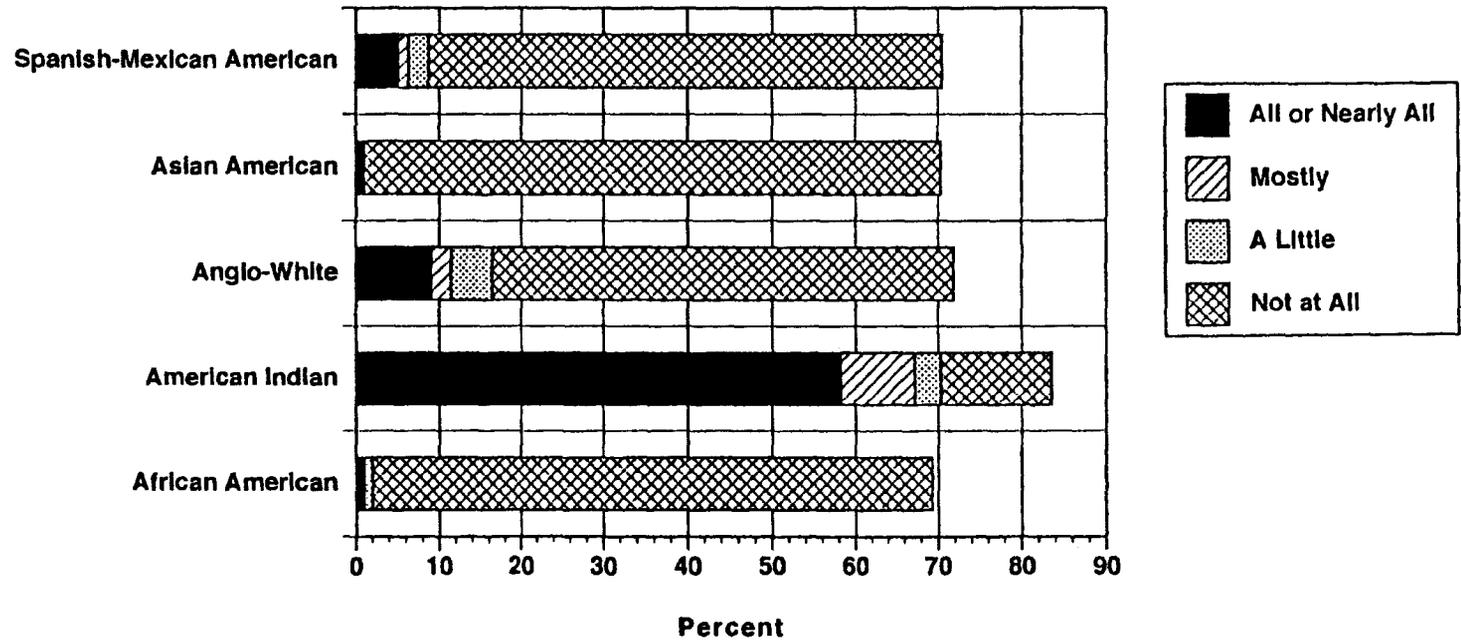


Figure 3. Self-identified American Indian adolescents' perception of father's degree of ethnic self-identification (n=846)



the within group identity variation. No doubt the AIR research team will find that use alcohol and drug use rates will vary as a function of identity.

Where is the Culture?

Most researchers conduct studies with different cultural and ethnic groups because they believe or not that the uniqueness of the group may or not influence cognition, emotion, and behavior. Interest in this domain of inquiry is increasing. Although the fields of transcultural psychiatry and cross-cultural psychology produce numerous findings about different cultural and ethnic groups, rarely do the researchers explore the deep-cultural meanings that influence deeper understandings of a groups' cognitions, emotions, and behaviors. The work of the AIR team is illustrative however many others are equally guilty if not more so. The Walker et al. article reports drinking patterns, as they should; however there is no attempt to attribute the findings to anything cultural. Consequently, from a cross-cultural perspective, what lifeways (ethos) and thoughtways (eidos) contribute to the drinking styles? There is little evidence in their research design to suggest that they will be able to sufficiently answer the question.

Even though the AIR team advanced respondent selection procedures, their study and design will produce no more than conventional alcohol and drug use findings. While the findings may be useful at an epidemiologic level, they will not advance our much needed knowledge about the deep-cultural correlates and causes of substance abuse. Until we generate culturally enriched information and interpretations our treatment and prevention strategies will be marginally resonant at best with groups who are deeply enmeshed with their traditional culture.

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**COMMENTARY
BY
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One is struck by two outstanding features of this study. The first observation is that it is an ambitious undertaking fraught/pregnant with theoretical complexities and potential empirical outcomes in a much needed area of research, as well as being exemplary in maintaining strong subject participation in a longitudinal investigation. The second observation is the apparent paucity of empirical data that has been reported to date. I will attempt to expand on both these observations in as balanced a fashion as possible, a prospect which I also find difficult to do for two reasons. One concerns my profound appreciation for the difficulties involved in the conduct of longitudinal studies of any type, let alone one that is designed to be conducted over fifteen years. The other stems from an impatience with our collective (i.e., we researchers) inability to generate urgently needed data with which to design and implement far more effective treatment and prevention programs to counter the devastating effects of substance abuse among the current generation of American Indian and Alaska Native adolescents.

The background review that informs the selection of variables and choice of instruments for this study of risk factors for substance abuse among urban American Indian adolescents and women is among the best in the literature. It will almost certainly become one of the most commonly cited sources by researchers who subsequently undertake studies in this area. The description of the psychosocial risk factors, as well as the hypothesized mediating and moderating variables for adolescent alcohol abuse provides a rich array of theoretical concepts and empirical variables with which to develop predictive models that can inform both treatment and preventive intervention efforts, as is the intent of the longer term outcomes of this study. The prospects for evaluating youth and parents at multiple assessment points across a diversity of risk factor domains marks it as a watershed event in studies among Indian and Native populations. The intergenerational composition of the subject pool will also permit empirical examination of potentially powerful predictive relationships that have heretofore been primarily speculative or only supported by meager empirical data. Although perhaps not intended as a focal issue of the study, there is also a unique opportunity to conduct a prospective study of "Indianness" insofar as the shaping of Indian identity among adolescents can be examined both in terms of the predictive power of such variables in determining late adolescent and young adult drinking patterns, as well as the influence of adolescent drinking patterns

this report is only intended as the introduction for a series of rapidly ensuing manuscripts that will provide greatly expanded coverage of the empirical outcomes and interpretation of such data within the rich theoretical context that is made possible by the study design.

One of the specified aims of the study has been to develop and test an additive risk factor model for predicting adolescent alcohol abuse. It would have been informative to have the casual model specified, if not evaluated for at least one change period. A risk model need not be fully developed theoretically to examine T1 to T2 changes for some of the more presumptively powerful predictor variables of drinking behavior for adolescents. Alternatively, appropriate regression analysis would have provided some preliminary empirical data related to the psychosocial risk factors for drinking behaviors in the current sample. The ultimate outcomes of a longitudinal study need not be fully reported and confirmed before disseminating data that may be useful for developing potentially efficacious treatment or prevention strategies for substance abuse among Indian and Native adolescents. Although specification of causal mechanism(s) for negative health outcomes may be highly desirable, they are not an absolute requirement for preventive interventions to have positive effects for high risk populations.

While fully appreciating the difficulties and complexities of longitudinal research, one nonetheless grows impatient for more and better data with which to inform the design of treatment and prevention programs that will be more effective in controlling and reducing the devastating effects of substance abuse among Indian and Native adolescents. Considering the stakes, there would seem to be a certain urgency in the earliest possible reporting of any relevant information consistent with reasonable caution for the adequacy, appropriateness, and integrity of the data. This study holds that promise and one looks forward to a more complete presentation in the near future of what will undoubtedly prove to be both theoretically and pragmatically valuable outcomes.

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RESPONSE
BY
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Wado ("Thank you," in Cherokee) to the colleagues who critiqued our manuscript. We are delighted that the *Journal* chose to publish our description of the American Indian Research (AIR) Project and to solicit responses from experts in the area. Each of the reviewers are members of a small pool of researchers who devote a significant proportion of their professional careers to Indian health issues.

It is important to reiterate that the aim of our manuscript was to introduce readers to AIR goals, methods, and activities. We hoped to provide researchers who want to replicate or better understand our work with methodological details of the study and discussed important issues in conducting longitudinal research with urban Indians. As Sack, Dinges, and Thompson noted, this kind of "how to" paper, though invaluable, is seldom published. Demographic and prevalence data were included in the paper to provide readers with a preview of some of the work underway. Subsequent manuscripts will be far more data-intensive.

Many of the reviewers emphasized the importance of longitudinal research with American Indian populations, particularly with groups that are important but often neglected in other studies (Mail; Mitchell). Thompson, Dinges, and Mail noted that selection of risk factors and measures was guided by a comprehensive review of the literature. Westermeyer and Thompson observed that the project is methodologically rigorous and comprehensive, including longitudinal and cross-sectional cohorts (Sack; Mitchell) and comprehensive assessment (Thompson; Dinges).

Thompson accurately noted that longitudinal research will be more difficult in the current funding environment; thus, this project will serve an increasingly important role in understanding alcohol use and dependence among American Indians. Because participants are community members evidencing a diversity of drinking patterns this project may help dispel the stereotype that no Indians drink moderately (Mail) and may contribute to more effective prevention and intervention efforts (Mail; Westermeyer; Cohen). Our follow-up rate supports the conclusion that we have established positive relationships with our subjects (Beauvais), that they support the mission of our work (Sack), and continue to participate because they are making a contribution to the common good (Mail). Because the project is comprehensive in its assessment, methodologically rigorous and attentive to its subjects, the resulting data set is rich (Mail; Westermeyer; Mitchell; Dinges; Cohen; Sack).

Several reviewers (Westermeyer; Thompson; Mitchell; Cohen) recognized the quandaries that data accumulation creates and offered suggestions for getting the most out of the data set as quickly as possible (Westermeyer). Discussions of analytic issues, including missing data points (Mitchell), data reduction (Thompson), and theory driven analyses (Dinges) enriched the reader's understanding of the intricacy of longitudinal data management and analysis.

AIR has a primarily exploratory focus (Thompson), given that the etiology of adolescent drug and alcohol abuse is not well established in American Indian or any other population. Exploratory research generates and tests hypotheses rather than testing hypotheses derived from rigorous theoretical models. Within the context of exploratory work, multiple regression serves useful roles in data reduction and answering preliminary questions about risks associated with outcome. Further, data analyses in longitudinal research attend to and utilizes evolving statistical approaches rather than relying on a single strategy.

We selected and assessed risk factors predictive of problem outcomes in at least three previous studies and decided to err on the side of inclusiveness in risk factor selection. We want to assure Beauvais and Thompson that we are attentive to issues of instrument reliability and validity for American Indian's samples. To date, we have found that the scales have good-to-excellent internal consistency reliability.

Beauvais' concern that a risk factor orientation may skew results to development of pathology is astute. We, too, find the concept of protection inherently more satisfying than that of risk. However, the question of what constitutes protection is itself debated in the public and mental health fields. Protection is *not* merely the absence of risk. Individual vulnerability and resilience are included in the absence of problem or disease outcome. A focus on protection is worthy of another manuscript, including such questions as: "How does one operationalize protection?"; and once conceptualized, "How does one measure protection?". Further, how does one analyze the data to support the conclusion that protection occurs?

Clearly, colleagues are eager to see AIR results. Several also commented that they would have liked this manuscript to include more discussion of data analysis plans. Westermeyer, Dinges, Mitchell, and Cohen suggested that researchers have an obligation to disseminate study findings as quickly as possible in order to improve the quality of prevention and intervention. We are eager to move to publication though we worry about premature publication of "preliminary findings". Cohen and Mitchell recognized that struggle and addressed it briefly. When and how does one distribute results without biasing the sample or compromising the project? Unlike cross-sectional surveys that obtain data in a short time frame and publish results soon after data collection is complete, prospective longitudinal projects must wait years for outcomes.

Further, we are concerned with “labeling” and stereotyping youth with premature publication of data. Use of alcohol and some legal and illegal drugs is prevalent in this and other Indian and non-Indian youth samples. Not all of those who initiate use will continue to escalate their use. Timing of data analysis is also a critical element of longitudinal research. Half of our longitudinal cohort crossed the threshold of 12th grade in 1994–95 and the other half is there this (1995–96) school year. Therefore, it is only at the completion of this interview year that we will be able to compare our youth to the larger national and regional cross-sectional surveys on prevalence of use. Finally, our group is measuring problem outcomes, and the youth in this project are now entering young adulthood. It is in this and coming years that sufficient numbers of subjects will develop problems in ways that can be scientifically investigated.

Onset, prevalence, incidence, and recency of alcohol and substance use will be observed over time. That kind of data is not available for Indian populations and is only obtained through longitudinal work. Unlike most cross-sectional surveys, this project investigates drinking beyond initiation and simple use to the development of alcohol problems. We assure Beauvais that our outcomes are not limited to simple categories of drinkers. We selected both continuous variable measures of problems and dichotomous alcohol abuse/dependence diagnosis as outcome.

At the time we initiated this project, Oetting and Beauvais had not developed their “cultural identity” questionnaire. Although we subsequently incorporated their items, our manuscript stated that we will test whether cultural identity or participation mediate or moderate problem alcohol use. There is nothing in the scientific literature that says culture predicts alcohol abuse or dependence. Mitchell’s point that community participation is important in the development of instruments to measure culture specific concepts is an important one. Our “culture participation” items were developed in the late 1970’s using input from community members, including elders and spiritual leaders. The items were translated into a Native language and back translated to English by two separate readers and speakers of that language. The resulting “scale” has very good internal consistency and cross-informant reliability. “Spirituality” is conceptually distinct from both Indian identity and the extent of participation in one’s culture, although the three may be related in practice. The concept of “spirituality” and its measurement is currently being explored at the University of Washington by Dr. Walt Hollow with input from community leaders, elders, and spiritual leaders. Dr. Hollow is also exploring the relationship between the three concepts (e.g., identity, cultural participation, and spirituality).

The question of culture brings us to our final comment regarding this manuscript and the commentaries. At its heart, this project is guided by a mission: to address issues related to American Indians in a sensitive, positive manner without compromising scientific rigor in the selection and

evaluation of instruments, in data analytic strategies or in our interactions with participants. We (faculty, staff, and participants) believe in the benefits of such an approach and Thompson, Sack, and Mail recognized the significance of that mission and the high follow up rate that results.

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