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SEASONAL DIFFERENCES IN SUICIDE BIRTH RATE IN ALASKA NATIVES COMPARED TO OTHER POPULATIONS

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Abstract: Seasonal differences in suicide birth rates among Alaska Natives and for populations at different latitudes (residents of the Yukon, Saskatchewan, Montana, Wyoming, and Pennsylvania) were investigated. Seasonal birth rates for the general population were similarly examined. Suicide birth rates showed small seasonal variations for Alaska Natives with summer births showing more suicides. However, at lower latitudes, suicide birth rates among other populations showed no seasonal differences. Hours of daily sunlight at the summer and winter solstice correlated with the proportion of suicide victims born during those seasons. Seasonal differences in birth rates of suicide victims correlated strongly with latitude and seasonal differences in daylight. General population birth rates did not show significant seasonal differences, and did not correlate with differences in latitude or sunlight length at the summer or winter solstice.

Examining the season of birth of those with psychiatric disorders is not a new idea. It has long been recognized that patients suffering from schizophrenia are more likely to be born in the first three months of the year (Barry & Barry, 1961; Editorial,1978; Hare & Price, 1968; Pulver, Stewart, Carpenter, & Childs, 1983; Torrey, Torrey, & Peterson, 1977). Similar data is available showing a higher winter birth rate for those with Bipolar Disorder (Barry & Barry, 1961, Hare & Price, 1968; Hare, Price, & Slater, 1973) and for those with mental retardation (Knobloch & Pasamanick, 1958). Because 44% (Robins, Murphy, & Wilkinson, 1959; Roy, 1982) to 64% (Barraclough, Bunch, Nelson, & Sainsbury, 1974) of all suicide victims suffer from depression, and an additional fraction ranging from 2% (Barraclough et al.,

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1974; Robins et al., 1959) to 38% (Roy, 1982) suffer from schizophrenia, the authors were interested to see if a seasonal difference in birth rate exists for suicide victims.

Previous work on month of birth of suicide victims produced inconsistent results. Two studies showed an excess of summer births in suicide victims. Pokorney (1960) in a survey of only 44 suicide victims showed a marked increase in a July birth month. Lester, Reeve, and Priebe (1970) showed no significant difference in month of birth of suicide victims, but found a slight excess of summer births. However, others did not find a seasonal difference. Sanborn and Sanborn (1974) found no significant differences in month of birth of suicide victims, and Beck and Lester (1973) found no significant differences in month of birth of suicide attempters. All of these studies examined suicide birth month at only one location. We examined suicide birth rates in different seasons among Alaska Natives.

Seasonal suicide rates for Alaska Natives were initially examined because of high suicide rates for that population—both compared to the general U.S. population as well as to suicide rates for the Alaska state population as a whole. The non-native population of the state is relatively transient and would have been far less likely to be born in Alaska compared to Alaska Natives who were born and lived in their native state. So the authors did not examine birth dates of non-native Alaskan suicide victims since they were less likely to be born in Alaska.

To study seasonal differences in suicide birth month, however, it would clearly be most advantageous to study suicide birth rates at different locations, at different latitudes, where seasonal influences would vary. More northern latitudes have larger differences between seasons than more southern latitudes. Should any seasonal difference in suicide birth rate occur, the effects should be most prominent where seasonal differences are most prominent. Accordingly, these differences should gradually decrease as latitude and intensity of seasonal differences decrease.

Others have suggested that seasonal effects on mood vary by latitude. Rosenthal et al. (1988) demonstrated different seasonal changes of mood at different latitudes. Latitude may even influence the cortisol response in depression. Dexamethasone suppression test (DST) results show a positive relationship between degree of latitude and rate of abnormal DST response in Europe (Rihmer, 1987) and in the United States (Stokes et al., 1984). Rihmer (1987) observed the further north the patient lived, the more abnormal the DST.

To explore the question of seasonality of suicide birth in Alaska Natives and for other populations, we examined suicide birth data for all four seasons at a variety of locations in North America.

Material and Methods

Birth date of suicide victims was obtained for Alaska Natives, and residents of the Yukon, Saskatchewan, Montana, Wyoming, and Pennsylvania from death certificate data furnished by each jurisdiction. Population in the arctic and subarctic is relatively small, and so data was collected for both the Yukon and for Alaska Natives even though these two areas are at the same latitude. Representatives of the government of the Northwest Territories in Canada could not furnish us with suicide data.

As stated in the introduction, we are examining birth date of suicide victims only for Alaska Natives for that state since other state residents would be unlikely to be born in Alaska. At other locations there is a more stable population, and fewer Native peoples, so suicide rates for all its citizens are examined.

Death certificates of all Alaska Natives who died between 1979 and 1984 were examined, revealing 90 suicides. For comparison, the offices of Vital Statistics of other locations were asked for suicide data for the latest five year period available. They furnished us with the following information: month of birth for all 39 suicide victims in the Yukon from 1983 to 1987 was obtained. Data for Saskatchewan for 1982 through 1987 revealed 837 suicides. Montana data from 1984 to 1988 revealed 768 suicides. Wyoming data from 1984 to 1988 revealed 480 suicides; month of birth for 6,859 Pennsylvania suicides between 1981 and 1985 was examined as well. While the information listed comes from different time periods for different locations, there is no reason to suspect that suicide data from a few years earlier or later would be any different.

Total number of suicide victims born in the three months surrounding the summer solstice (May-July), the winter solstice (November-January) as well as the fall (August-October) and spring (February-April) equinox was summed for each state or province. The percentage of all suicide victims for each state or province born in each season was then calculated.

To serve as a control, data for all births for each jurisdiction was similarly divided according to season. The office of vital statistics for each state or province was asked to provide *all available* monthly birth data from their computer records. Birth date for all residents was obtained as chronologically far back as the state or province maintained computer records. For Alaska Natives, data on 24,447 births between 1978 and 1987 was obtained in this way. Included were 8,935 births in the Yukon from 1968 to 1986, as were 318,482 births from Saskatchewan for the same period. Data for 485,720 births for Montana from 1954 to 1987, and data for 74,591 births in Wyoming from 1981 through 1988 were studied. Finally, 4,581,616 births in Pennsylvania from 1961 through 1986 were included in the analysis.

Seasonal differences, including light, temperature, and severity of climate clearly vary by latitude. To examine differences between latitude and seasonal suicide rate, we compared the seasonal suicide rate and general

birth rate for each state or province with the latitude of the largest city in each locale. In this way, the latitudes for Anchorage, Alaska (61 degrees), Whitehorse, Yukon (61 degrees), Saskatoon, Saskatchewan (52 degrees), Great Falls, Montana (47 degrees), Casper, Wyoming (43 degrees), and Philadelphia, Pennsylvania (40 degrees) were compared to seasonal differences in suicide birth rates and general birth rates.

Seasonal differences among these locations include temperature, rainfall, length of daylight, as well as other variables. We sought to determine the relationship between daylight length for season of birth and the suicide birth rates (and for general birth rates as a control) at each location. To do this, data was obtained about the length of daylight for the largest population center for each state or province for the summer and winter solstice and spring and fall equinox from the U.S. Naval Observatory.

The percentage of suicide victims born during each season at each location was then paired with latitude, and the length of daylight for each location. As a control, the percentage of all births for the same periods was also paired with latitude or daylight length in the same manner. The pairs were statistically evaluated with Pearson correlation coefficients, using one-tailed analysis. $P = 0.05$ was chosen as the level of significance for analysis.

Results

Alaska Natives did show seasonal differences in suicide birth rate. Month of birth of suicide victims in other locations showed small seasonal differences which reached statistical significance. These differences were strongest at the highest latitudes where great seasonal differences occurred. At lower latitudes, no strong seasonal differences in suicide birth rate occurred.

To examine the effect of available sunlight at birth, the authors examined suicide birth rates for those born at the time of greatest possible sunlight—the summer solstice (June 21) to those born at the time of least possible sunlight—the winter solstice (December 21).

Small but opposite effects of suicide birth rates were found surrounding the summer solstice, the period of greatest sunlight and for the winter solstice, the period of least sunlight. General population birth rates showed no such trend. Birth rates for suicide victims were slightly higher for the time surrounding the summer solstice than for the winter solstice at each location regardless of the latitude.

The further north, the greater are the seasonal differences. To see if there were greater seasonal differences at higher suicide rates, we compared the proportion of suicide victims born at each season with the latitude.

The proportion of suicide victims born surrounding the summer solstice at each location did not quite significantly correlate with latitude of each population center ($r = .67$, $p = 0.07$). The correlation for the proportion of suicide victims born surrounding the winter solstice is roughly equivalent in magnitude, but opposite in direction ($r = -0.76$, $p = 0.04$). The seasonal difference in suicide births between summer and winter at each location very strongly correlated with latitude ($r = 0.93$, $p = 0.004$).

No significant seasonal correlation was found for general birth rates at these locations. The proportion of all births born surrounding the summer solstice at each location was not related to latitude ($r = 0.03$, ns). The same was true for the proportion of all births surrounding the winter solstice ($r = 0.17$, ns), and for the seasonal difference in general birth rates ($r = 0.11$, ns).

Hours of sunlight available at the time of birth did correlate with the numbers of suicide victims born at that time. The seasonal differences in suicide birth rates at each site correlated with the seasonal difference in daylight length at each location ($r = 0.96$, $p = 0.001$, Figure 1). See Table 1 for the seasonal distribution of suicides at each location. The proportion of suicide victims born around the summer and winter solstice correlated with the hours of sunlight at the summer ($r = 0.74$, $p = 0.04$, Figure 2) and winter ($r = 0.78$, $p = 0.03$, Figure 3) solstice at each location.

Figure 1
Seasonal Change in Light and Suicide Birth Rate
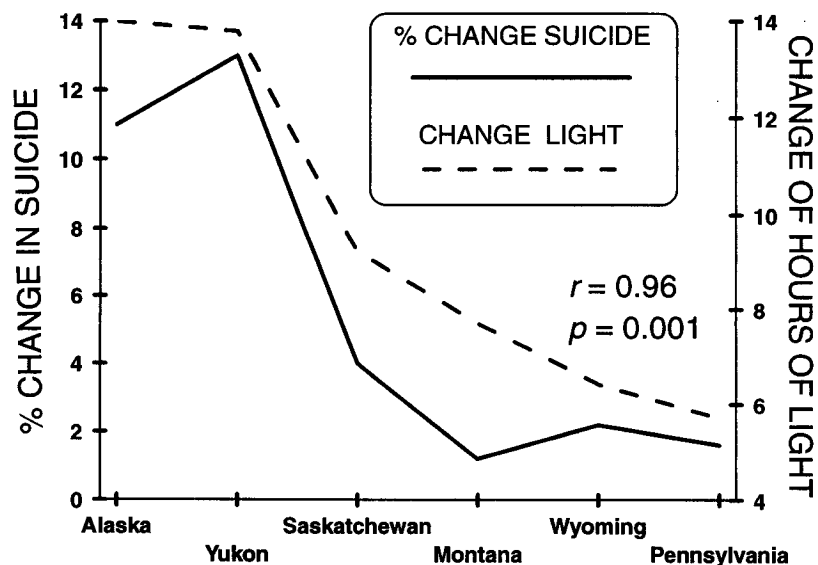
Figure 2
Summer Solstice
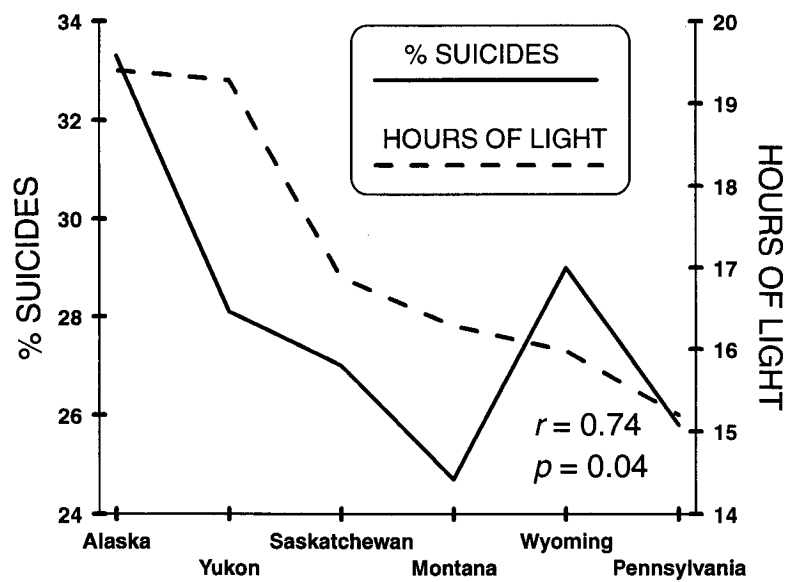
Figure 3
Winter Solstice
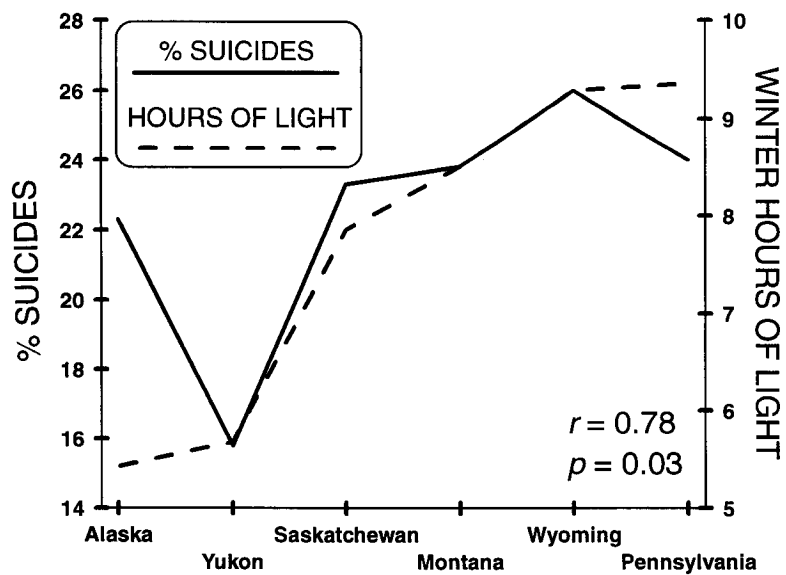
Table 1
Seasonal Difference in Suicide Birth Month

	Summer	Fall	Winter	Spring
Alaska 61°				
Suicides (%)	33.3%	21.2%	22.2%	23.4%
Hours of light	19.4	12.2	5.5	12.2
Yukon 61°				
Suicides (%)	28.2%	25.7%	15.5%	30.7%
Hours of light	19.2	12.2	5.6	12.2
Saskatchewan 52°				
Suicides (%)	26.8%	23.7%	22.9%	26.5%
Hours of light	16.8	12.2	7.7	12.2
Montana 47°				
Suicides (%)	24.6%	24.8%	23.7%	27.0%
Hours of light	16.0	12.2	8.5	12.2
Wyoming 43°				
Suicides (%)	28.3%	23.6%	26.1%	22.0%
Hours of light	15.7	12.4	9.3	12.4
Pennsylvania 40°				
Suicides (%)	25.5%	25.6%	24.1%	24.8%
Hours of light	15.0	12.1	9.3	12.1

General population seasonal birth rates did not correlate with differences in daylight length at the summer ($r = -0.03$, ns) or winter ($r = -0.25$, ns) solstice. Seasonal difference in general birth rates did not correlate with differences in seasonal daylight length ($r = 0.26$, ns) (Table 2).

Large differences in suicide birth month are not seen at the spring or fall equinox at any location. These times, which get equal amounts of sunlight, show roughly equal frequencies of suicide birth.

Small, but significant differences in birth month of suicide victims were evident at higher latitudes, but this effect disappears at lower latitudes where the seasonal difference in available daylight also diminishes.

Discussion

The data in Table 1 shows that in the continental United States, there is no clear difference in seasonal suicide birth rate. However, in Alaska Natives, and in the Yukon, the summer and spring evidence slightly higher

Table 2
Seasonal Difference in General Population Birth Month

	Summer	Fall	Winter	Spring
Alaska	25.6%	25.5%	24.7%	24.3%
Yukon	25.9%	25.7%	23.5%	24.9%
Saskatchewan	25.8%	25.0%	24.1%	25.1%
Montana	26.2%	25.5%	24.0%	24.3%
Wyoming	26.3%	25.3%	23.3%	25.1%
Pennsylvania	25.2%	26.2%	24.3%	24.3%

suicide birth rates than other seasons. It is possible, of course, that this effect simply is the result of a smaller population producing more variability in birth rates. However, because both Alaska Natives and the Yukon Territory show higher suicide birth rates in the spring and summer than in the winter and fall, we must consider possible reasons for this difference besides simple statistical variability. In the arctic, seasonal changes bring harsh environmental differences including changes in weather, temperature, different cultural practices as well as the differences in daylight length. Of all of these differences, in considering suicide, light may well be the key variable. Light is already an established treatment for seasonal affective disorder, and light is being investigated as a treatment for other rhythm disturbances.

Seasonal differences in available sunlight vary by latitude, and differences in available sunlight, especially above the arctic circle can be quite extreme. In the arctic at the summer solstice, light is present 24 hours per day, and at the winter solstice, sunlight is absent for the entire day. This extreme difference in available sunlight is present only in the arctic, but it is in the arctic and subarctic where the most extreme seasonal differences in suicide birth rate occur.

Exposure to large amounts of sunlight at birth may increase risk for suicide decades later in life. Alternatively, exposure to very small amounts of sunlight at birth may be protective against death from suicide. This suggests that light exposure in the birth environment, or pre-natal environment may play a role in later behavior leading to suicide.

Therefore, one can postulate that being born in a setting with large amounts of available sunlight would affect the still developing brain to predispose those individuals to suicide later in life. This effect could occur at birth, or earlier in prenatal brain development where maternal exposure to light could affect the still developing brain.

If light is the environmental agent that causes this change, a variety of factors could mediate it in brain development. The eyes, as an extension of the brain, would be the likely mediator of the effect. Hormonally, these effects may be mediated by melatonin. Light affects the production of melatonin and functioning melatonin receptors have been found in the proposed "biologic clock" in the suprachiasmatic nuclei even in fetuses (Reppert, Weaver, Rivkees, & Stopa, 1988).

No real seasonal differences in suicide birth rate occur at lower latitudes which are more populated. However, small seasonal differences in suicide birth rate do occur in the arctic and subarctic. These seasonal differences in suicide birth rate occur where the seasonal differences climatically are the most harsh. In these settings any effect on the seasonal suicide birth rate may be mediated by amount of available light.

Suicide is a final behavior with many biological, psychological, and social precipitants. Much available data lists the importance of depression, substance abuse and social change in the genesis of suicide. This paper examines the environmental variables of latitude and available sunlight at birth on suicide rates. The data shows that areas that have large seasonal differences in available sunlight may have larger seasonal differences in birth rates of suicide victims.

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References

Barraclough, B., Bunch, J., Nelson, B., & Sainsbury, P. (1974). A hundred cases of suicide: Clinical aspects. *British Journal of Psychiatry, 125,* 355-373.

Barry, H., & Barry, H. (1961). Season of birth—An epidemiological study in psychiatry. *Archives of General Psychiatry, 5,* 100-108.

Beck, A. T., & Lester, D. (1973). Attempted suicide and month of birth. *Psychological Reports, 33,* 506.

Editorial: Seasonality of birth in schizophrenia. (1978). *Lancet, i,* 481-482.

Hare, E. H., & Price, J. S. (1968). Mental disorder and season of birth: Comparison of psychoses with neurosis. *British Journal of Psychiatry, 115,* 533-540.

Hare, E. H., Price, J. S., & Slater, E. (1973). Mental disorder and season of birth. *Nature, 241,* 480.

Knobloch, H., & Pasamanick, B. (1958). Seasonal variation in the births of the mentally deficient. *American Journal of Public Health, 48,* 1201-1208.

Lester, D., Reeve, C., & Priebe, K. (1970). Completed suicide and month of birth. *Psychological Reports, 27,* 210.

Pokorney, A. (1960). Characteristics of forty-four patients who subsequently committed suicide. *Archives of General Psychiatry, 2,* 314-323.

Pulver, A. E., Stewart, W., Carpenter, W. T., & Childs, B. (1983). Risk factors in schizophrenia: Season of birth in Maryland, USA. *British Journal of Psychiatry, 143,* 389-396.

Reppert, S. M., Weaver, D. R., Rivkees, S. A., & Stopa, E. G. (1988). Putative melatonin receptors in a human biological clock. *Science, 242,* 78-81.

Rihmer, Z. (1987). The geography of DST. *Biological Psychiatry, 22,* 1043-1052.

Robins, E., Murphy, G. E., & Wilkinson, R. H. (1959). Some clinical consideration in the prevention of suicide based on a study of 134 successful suicides. *American Journal of Public Health, 49,* 888-899.

Rosenthal, N. E., Targum, S. D., Docherty, J. P., Hoffman, H. A., Hamovit, J. R., Bryant, M. J., & Kasper, S. F. (1988). Seasonal changes in mood at three latitudes. In: Program and Abstracts of the 141st Annual Meeting of the American Psychiatric Association; May 7-13. Montreal, Canada.

Roy, A. (1982). Risk factors for suicide in psychiatric patients. *Archives of General Psychiatry, 39,* 1089-1095.

Sanborn, D. E., & Sanborn, C. J. (1974). Suicide and months of birth. *Psychological Reports, 34,* 950.

Stokes, P. E., Stoll, P. M., Koslow, S. H., Maas, J. W., Davis, J. M., Swann, A. C., & Robins, E. L. (1984). Pretreatment DST and hypothalamic-pituitary-adrenocortical function in depressed patients and comparison groups. *Archives of General Psychiatry, 41,* 257-267.

Torrey, E. F., Torrey, B. B., & Peterson, M. R. (1977). Seasonality of schizophrenic births in the United States. *Archives of General Psychiatry, 34,* 1065-1070.

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USE OF COMPUTERIZED PRENATAL INTERVIEWS FOR ASSESSING HIGH-RISK BEHAVIORS AMONG AMERICAN INDIANS

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Abstract: The objectives of this study were to determine the prevalence of risk factors for adverse pregnancy outcomes among American Indians and to compare self-reported information collected under two computer interview conditions: an "anonymous" (N=183) versus a "confidential" (N=210) format. Results indicated that under 10% in both groups reported either use of cigarettes or other drugs of abuse, 16% reported risky drinking, 39% reported psychological distress, and 8% reported physical abuse during the current pregnancy. We concluded that confidential computer interviews were appropriate vehicles for obtaining risk information in this population.

The prenatal medical visit provides an opportunity to identify women at high psychosocial and behavioral risk for adverse pregnancy outcomes. Information regarding a pregnant woman's psychosocial problems, dietary and smoking habits, and use of alcohol and other abused substances, allows the primary prenatal caregiver to develop a holistic picture of the patient's health status and a problem-oriented approach to her prenatal care. At the same time, aggregated, population-based prevalence data are needed by health-care providers, as well, to estimate the nature and quantity of specialized services needed by the populations served. Presently, most prenatal screening is achieved either by asking the patient to complete paper-and-pencil questionnaires or by a personal interview. However, computer interviews are increasingly being recognized as an attractive alternative to these methods. Most patients like the computer interview format (Lapham, Henley, & Kleyboecker, 1993; Lapham, Kring, & Skipper, 1991), and clinicians have found the computer to be a time-saving aid in obtaining sensitive information (Paperny, Aono, Lehman, Hammar, & Risser, 1990).

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The Pregnancy Information Program (PIP) is a computerized, prenatal screening program designed to assess behavioral risk factors known to contribute to adverse pregnancy outcomes, such as prematurity and low birth weight (Lapham et al., 1991). The computer interview asks about pregnant patients' perceived life stressors, including physical abuse, diet, and use of cigarettes, alcohol, and other drugs. The PIP also provides on-screen and printed individualized "feedback"—educational information regarding behaviors that promote optimal pregnancy outcomes.

The PIP has undergone pilot-testing on over 450 women receiving care in an HMO-based prenatal clinic (Lapham et al., 1991) and a Public Health Service (PHS) Hospital (Lapham et al., 1993). These pilot studies have demonstrated high patient approval ratings and a high level of concurrence between reports to the computer regarding recent smoking, alcohol, and drug use, and results of urine cotinine and drug testing. However, the pilot studies were conducted under an informed consent protocol, and patients were told that the interview results would not be given to providers. In their evaluations of the PIP, many women reported that they would be less honest if their answers were shared with their providers (Lapham et al., 1991; Lapham et al., 1993), raising the question of whether computerized assessments, such as the PIP, should be administered anonymously to increase response validity. In the present study, the PIP was administered both anonymously and as a confidential interview to comparable groups of American Indian women receiving prenatal care at a PHS hospital clinic. The objectives were to determine the prevalence rates of psychosocial problems and behavioral risks for adverse pregnancy outcomes among American Indians and to compare self-reported information collected under two computer interview conditions, an "anonymous" versus a "confidential" format.

Method

During this study period (October 6, 1991, to March 31, 1993), staff implemented the PIP as part of routine care at a PHS prenatal clinic serving an urban population of American Indians in the Southwest U.S. Women considered eligible for the study included all patients who received prenatal laboratory blood tests within the study period and who returned for at least two subsequent prenatal clinic visits before delivery. Patients were asked to complete the PIP during their appointed hospital laboratory visits. Patients' physicians also encouraged participation. The project associate maintained a list of all women who received prenatal blood tests but did not complete the PIP. These patients' physicians were notified; however, patients were not required to complete the program.

During the first phase of the study, the PIP was administered anonymously. Patients were told to enter a first name, nickname, or false name into the computer. The name was used to personalize feedback from

the program. Patients were told that it was not possible to identify them or link their answers to their names or medical record numbers. During the next phase, women were administered a confidential version of the PIP, in which their names and medical record numbers were entered into the computer. These women were told that the information they provided would not be placed in their medical records, but a summary of their responses to the interview would be sealed in an envelope and delivered to their primary care physicians. Many of these providers had not been previously involved in the subjects' medical care. During the last month of the study, the anonymous version was again administered to equalize the number of women in the two groups.

Behavioral risk information was compared between the two groups using contingency tables. The two study groups were compared with respect to demographic characteristics, psychosocial stress variables, and reported behaviors. Psychosocial stress variables included whether the baby was wanted, evidence of psychological distress, reported level of stress, whether the patient reported someone was available for help, substance abuse by the baby's father, and history of physical abuse in the past year and during the current pregnancy (Table 1). Behaviors examined included information regarding substance use and diet. The PIP queries cigarette smoking during the pregnancy, number of cigarettes smoked, use of any alcohol during the pregnancy, number of drinks consumed per week, maximum number of drinks consumed at a time, CAGE score (for the year before the pregnancy began), and use of marijuana, cocaine, stimulants, opiates, peyote, and other hallucinogens, minor or major tranquilizers, and inhalants. The CAGE is a four-question screening instrument to detect alcoholism (Mayfield, McLeod, & Hall, 1974). Unbalanced diet was defined as two or fewer daily servings from the meat and other protein, breads and cereals, fruits and vegetables, or dairy groups. This definition was used because the Dietary Guidelines for Americans recommended at least three or more servings daily from each food group (U.S. Departments of Agriculture and Health and Human Services, 1990).

Results

The study population consisted of 183 women who completed the anonymous version of the PIP and 210 women who completed the confidential version. Participation rates were 64% for both the anonymous and confidential portions of the study. There were no differences between the two study groups with respect to age, number of previous pregnancies, marital status, income, or level of education (Table 2). The mean age of subjects was 24.1 years, and mean number of previous pregnancies was 1.0.

There were no statistically significant differences in rates of self-reported psychosocial and behavioral risk factors for adverse pregnancy

Table 1

Questions From the Pregnancy Information Program (PIP) Defining
Psychological and Behavioral Risk Factors of Interest

Factor	Question from the PIP	Response Indicating Risk
Psychosocial Stressors		
Pregnancy unwanted by mother	Would you say your pregnancy was . . . (1) wanted by me and the baby's father (2) wanted by me but not by the baby's father (3) wanted by the baby's father but not by me (4) not wanted by either of us and came at a good time (5) not wanted by either of us and came at a bad time	3, 4, 5
Psychological distress	Are fears or phobias a big problem in your life? Since you became pregnant would you say you feel . . . (1) happy most of the time? (2) sometimes happy, sometimes sad? (3) unhappy most of the time? (4) very unhappy or depressed most of the time?	yes OR 3 or 4 OR
	Would you say you feel . . . (1) relaxed most of the time? (2) sometimes relaxed, sometimes nervous? (3) nervous and anxious most of the time? (4) you have anxiety attacks?	3 or 4
Stress	What is your stress level now? (1) very low; (2) low; (3) medium; (4) high; (5) very high	4 or 5
No one to go to for help	Do you have someone you can go to for help?	no
Behaviors		
Cigarette use	Do you smoke cigarettes now?	yes
Alcohol or drug use	Do you ever drink alcoholic drinks like wine, beer, or liquor now? Do you drink (beer, wine, liquor) at least once per week/month now?	yes AND yes OR
Alcohol or drug use	Think of the last time you drank the most beer, wine, or liquor at any one time since you knew you were pregnant. How many total drinks did you have then?	1 or more (current drinker) 3 or more (risky drinker)

Table 1 (Continued)
Questions From the Pregnancy Information Program (PIP) Defining
Psychological and Behavioral Risk Factors of Interest

Factor	Question from the PIP	Response Indicating Risk
Alcohol or drug use	When was the last time you used marijuana, cocaine or crack, stimulants, tranquilizers, hallucinogens, sedatives, opiate pain killers, inhalants (examples and street names also provided for each substance)	after I knew I was pregnant
Unbalanced diet	How many servings do you eat per day from the meat and other proteins group?	2 or fewer OR
	from the breads and cereals group?	2 or fewer OR
	from the fruits and vegetables group?	2 or fewer OR
	from the milk group?	2 or fewer

outcomes between the two groups (Table 3). Yet there was some indication that in the anonymous group several risk factors were reported more commonly: a somewhat higher percentage of these women gave two or more positive responses to the CAGE alcoholism screening test (36% vs. 28%); reported that the pregnancy was not wanted by the mother (32% vs. 26%); and reported they had been physically abused in the past year (27% vs. 19%), as compared to the confidential group.

Because the prevalence rates of the variables of interest were statistically similar between the two groups, data were combined. Overall prevalence rates and 95% confidence intervals were calculated for the entire population (Table 3). Over one-quarter of the population surveyed reported that they had not wanted this pregnancy. Married women were more likely to report they wanted the baby (83%) than single women (66%) or those with other marital status (72%) (x^2, $p<.01$). Wantedness also was related to the mother's age. For example, among those aged 14-19, only 59% wanted the pregnancy compared to 75% of women aged 20 or older ($p<.05$). Wantedness, however, was not related to parity.

About 40% reported being bothered by fears, depression, or feeling anxious (Table 3). Almost one in ten reported inadequate psychosocial support, defined as having no one to go to for help, and 8% reported having experienced physical abuse during the current pregnancy. Smoking did not appear to be a significant public health problem in this population. Only 7% of subjects reported any cigarette use during the current pregnancy; the

Table 2
Demographic Comparisons Between Women Administered the
Anonymous and Confidential Versions of the PIP

Factor	Anonymous N=183		Confidential N=210	
	N	%	N	%
Age*				
14-19	34	23%	42	20%
20-29	90	60%	132	63%
30 +	26	17%	36	17%
Parity				
first pregnancy	88	48%	96	46%
second	43	24%	56	27%
third or more	52	28%	58	27%
Years of Education				
<12	50	27%	56	27%
12	73	40%	80	38%
>12	60	33%	74	35%
Married				
yes	43	23%	61	29%
never married	117	64%	133	63%
other	23	13%	16	8%
Income				
<$10,000	70	38%	63	30%
$10,000-$19,999	36	20%	53	25%
$20,000 +	22	12%	21	10%
refused to answer	55	30%	73	35%

*Age is unknown for 33 women in the anonymous group. None of the differences between the groups is significant statistically.

mean number of cigarettes smoked per day among smokers was five. However, a much larger percentage reported alcohol use during the current pregnancy with 16% reporting having consumed three or more drinks on at least one occasion since pregnancy was confirmed, and almost one-third having a positive CAGE score for the year before their pregnancies. A very small percentage (3%) reported other drug use.

Table 3
Responses to the PIP by Women Completing the Anonymous and
Confidential Formats

Topic	Anonymous N=183 % (95%CI)		Confidential N=210 % (95%CI)		Total N=393 % (95% CI)	
Psychosocial Stressors						
Pregnancy not wanted by mother	32%	(25-39)	26%	(20-32)	29%	(25-33)
Psychological distress	38%	(31-45)	40%	(33-47)	39%	(34-44)
Stress high or very high	17%	(12-22)	16%	(11-21)	17%	(13-21)
No one to go to for help	9%	(5-13)	9%	(5-13)	9%	(6-12)
Hit or physically abused in past year	27%	(21-33)	19%	(14-24)	23%	(19-27)
during current pregnancy	9%	(5-13)	8%	(4-12)	8%	(5-11)
Partner has alcohol problems	12%	(7-17)	15%	(10-20)	13%	(10-16)
Partner uses illegal drugs	3%	(1-5)	2%	(0-4)	3%	(1-5)
Behaviors During Pregnancy						
Cigarette use (any)	5%	(2-8)	9%	(5-13)	7%	(4-10)
3+ alcoholic drinks on at least one occasion	17%	(12-22)	14%	(9-19)	16%	(12-20)
CAGE score 2+ year before pregnancy	36%	(29-43)	29%	(23-35)	32%	(27-37)
Use of drug other than alcohol	4%	(1-7)	5%	(2-8)	5%	(3-7)
Unbalanced diet	45%	(38-52)	35%	(29-41)	40%	(35-45)

None of the differences between the groups is significant statistically.

Forty percent of the women who completed the PIP reported an unbalanced diet i.e., intake of two or fewer servings of food each day from one of the four food groups. Unbalanced diet status was not related to age (14-19, 20-29, 30+), parity, education (<12 years, 12 years, or >12 years), income, or months pregnant (0-3, 4+).

Discussion

Computer interviews are an attractive alternative to paper-and-pencil or personal interviews in obtaining health-risk information from pregnant women. The computer interview format obtains complete information, is well accepted by patients, and is reliable, always asking the same questions in the same way (Fawdry, 1989; Kinzie, Schorling, & Siegal, 1993; Lapham et al., 1991; Lapham et al., 1993; Paperny et al., 1990; Skinner, Allen, McIntosh, & Palmer, 1985). In addition, two previous pilot studies conducted among pregnant women have demonstrated increased reporting of high-risk behaviors on computers, compared to questionnaires (Lapham et al., 1991; Lapham et al., 1993). Another study of nonpregnant female and male teenagers demonstrated significantly more reporting of sexual behavior in the computer interview than in a written questionnaire. There was comparable reporting of risk behavior, whether or not respondents were told that the information from the computer interview would be made available to a clinician (Paperny et al., 1990).

In the present study, responses to the PIP regarding substance use by patients or their partners during pregnancy were statistically similar whether or not the computer interview was completed anonymously. However, the percentages of women reporting certain sensitive information, notably a positive CAGE and physical abuse in the past year, were higher in the anonymous group. These results suggested that there may be some trade-off using either format. To determine whether these are real differences in reporting, a study with a larger sample size should be undertaken. For example, a sample size of 431 in each group would be needed to determine that the rates of 27% vs. 19% for the "physical abuse in the past year" are statistically different between the two groups, with a power of 80% and a two-tailed alpha of .05 (Borenstein & Cohen, 1989).

A confidential computer interview format wherein responses are shared with health-care providers is appealing to providers because it enables routine, individualized screening, and an opportunity to initiate dialogue with patients about important issues. But in settings where the main interest is in defining the prevalence rates of high-risk behaviors, the use of an anonymous computer interview will maximize reporting accuracy. Clinicians contemplating the administration of programs such as the PIP must thus decide the most appropriate format in the settings under which they provide prenatal services. Another question evoked by this study is: Why is it easier for patients to report these risk factors to a machine than to write this

information on a piece of paper? Perhaps patients feel that a computer interview is more anonymous or they are motivated to be more open in order to obtain the feedback provided by the computer interview.

Few published studies of American Indian women have examined factors that were investigated in the present study. Direct comparisons are limited because of differences in population demographic profiles, study methodology, and questions asked of the subjects. The most direct comparisons can be drawn from studies of the PIP in other populations. A previous study of the PIP was conducted in 1989-1990 among 265 urban American Indian women; urine samples were analyzed to validate self-reported information (Lapham et al., 1993). This population was similar in mean age, mean parity, and years of education to that in the present study, but a lower percentage was unmarried (63% vs. 74%). The prevalence rates of cigarette smoking, alcohol use, drug use, and victimization through domestic violence reported by participants of that study were similar to those of the present study.

Another 1989 study administered the PIP to a population of 201 White and Hispanic middle-income women (C'de Baca, Lapham, Skipper, & Watkins, 1997). Compared with American Indians in the present study, this population was about half non-Hispanic White and half Hispanic women, had a higher mean age (27 vs. 24.1 years), and a higher percentage (91% vs. 73%) had at least 12 years of education. A much higher percentage of this population was married (75% vs. 36%). Compared with this non-American Indian population, American Indians were as likely to report high or very high stress levels, with 17% of patients in both studies reporting this risk factor, but were more likely to report psychological distress (38% vs. 21%, respectively) (chi-square $p<.05$) (C'de Baca et al., 1997). This finding merits further study. In addition, 9% of American Indian women in this study reported inadequate psychosocial support, defined by a negative response to the question, "Do you have someone you can go to for help?" This compared to 6% of the women in the 1989 study (C'de Baca et al., 1997). Several previous studies have shown that pregnant women who reported such a lack of psychosocial support had higher rates of adverse pregnancy outcomes, compared with women who did not report this risk factor (Blake & McKay, 1992; C'de Baca et al., 1997; Williamson & LeFevre, 1992). Smoking rates (15% vs. 7%) were higher in the non-American Indian population, and rates of drinking and drug use (20%) were similar to those reported by American Indians (16% consumed 3+ drinks and 5% reported use of other drugs).

American Indians also were almost twice as likely as Hispanics and non-Hispanic Whites to report an unbalanced diet (45% vs. 23%, respectively) (Lapham et al., 1991). This finding was especially of concern, as a follow-up study found that infants born to women reporting an unbalanced diet, on average, weighed 273 gm less than infants born to women reporting a more balanced diet (C'de Baca et al., 1997). Because American Indians

suffer from a higher rate of obesity and diabetes than the total U.S. female population (Rhoades, Hammond, Welty, Handler, & Amler, 1987), this finding underscores the need for nutrition education in prenatal clinics serving American Indians.

A few additional studies have examined the prevalence rates of some of these factors in pregnant American Indians. As an extension of the 1988 National Maternal and Infant Health Survey (NMIHS), American Indian mothers who had recently given birth to live infants were sampled and mailed a questionnaire regarding their pregnancies (Sugarman, Brenneman, LaRoque, Warren, & Goldberg, 1994). The response rate for this survey was low (52%) and included 763 American Indian respondents (over half were from Arizona and California). Compared with the sample in the present study, the American Indians in the NMIHS survey were more likely to be married (40% vs. 36%), had a higher mean parity (2.9 vs. 1.0), and were less likely to have at least 12 years of education (67% vs. 73%). The mean ages were similar in the two samples (25.1 vs. 24.1 years).

Our survey revealed that 32% had a positive alcoholism screening test during the year before their pregnancies. In the NMIHS survey, 45% of American Indians reported drinking some alcohol in the 12 months before their pregnancies. Among the 35% of women who reported smoking cigarettes in the year before delivery in the NMIHS population, the average number of cigarettes smoked per day was 6.8 compared with an average of 5 cigarettes smoked per day among the 7% of pregnant women in our study population who smoked.

A study examining smoking among American Indians and Alaska Natives in Washington State found that 30% of those giving birth to live infants from 1984 through 1988 smoked during pregnancy (Davis, Helgerson, & Waller, 1992). A population-based study of urban and rural American Indians and Alaska Natives in eight counties of Washington State reported that 59% were single mothers, 20% consumed alcohol during pregnancy, and 38% smoked cigarettes during pregnancy (Grossman, Krieger, Sugarman, & Forquera, 1994). These smoking prevalence rates were much higher than those reported by the population in the present study (7%). However, it has been reported that rates of smoking were exceptionally high among Northern Plains Indians and Alaska Natives, compared with other Native populations (Morbidity and Mortality Weekly Report, 1987).

Few published studies have examined the prevalence of psychosocial stressors among pregnant American Indian women. The prevalence of physical abuse during pregnancy in this study, 8%-9%, also equaled the 8% rate obtained from a random sample drawn from public and private U.S. prenatal clinics and rates between 7% and 11% obtained in nonrandom samples from a university obstetric clinic (Newberger et al., 1992). McFarlane, Parker, Soeken, and Bullock (1992) used a three-question

screen in public prenatal clinics in Houston and Baltimore and found a much higher prevalence rate (17%), but this included physical and sexual abuse during pregnancy.

About 30% of the American Indians reported that they had not wanted the pregnancy. Comparable statistics for other American Indian/ Alaska Native populations were not available. One large study conducted among 8,823 married women receiving prenatal care at Kaiser clinics defined pregnancies as unwanted if in the first trimester interview the mother reported that either she or her husband was unhappy, resentful, or upset about the pregnancy, the pregnancy was mistimed, or if either parent did not want the pregnancy (Bustan & Coker, 1994). In that study 14.4% of the pregnancies were classified as unwanted. Another small survey conducted in a family practice center in Tennessee reported that 9% of the pregnancies were "unwanted", but the specific question(s) used to determine this were not provided (Rosenfeld & Everett, 1996). In our study, unwantedness was associated with unmarried marital status and young age, underscoring a national need for improved family planning services.

In conclusion, data from this study suggested that our previous findings of increased risk reporting to the computer, compared with paper-and-pencil questionnaires, was more likely attributable to the computer interview itself, than to its anonymous administration. Prevalence rates of smoking were low, but alcohol use, suboptimal prenatal dietary intakes, and psychosocial problems appeared to be prevalent public health concerns in this American Indian population.

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References

Blake, R., & McKay, D. A. (1992). A single-item measure of social supports as a predictor of morbidity. *Journal of Family Practice, 22,* 82-84.

Borenstein, M., & Cohen, J. (1989). *Statistical power analysis.* New York, NY: Lawrence Earlbaum Assoc., Inc.

Bustan, M. N., & Coker, A. L. (1994). Maternal attitude toward pregnancy and the risk of neonatal death. *American Journal of Public Health, 84*(3), 411-414.

C'de Baca, J., Lapham, S. C., Skipper, B. J., & Watkins, M. L. (1997). Use of computer interview data to test associations between risk factors and pregnancy outcomes. *Computers and Biomedical Research, 30,* 232-243.

Davis, R. L., Helgerson, S. D., & Waller, P. (1992). Smoking during pregnancy among Northwest Native Americans. *Public Health Report, 107*(1), 66-69.

Fawdry, R. (1989). The development and evaluation of a computerized antenatal questionnaire. *International Journal of Gynecological Obstetrics, 28,* 229-235.

Grossman, D. C., Krieger, J. W., Sugarman, J. R., & Forquera, R. A. (1994). Health status of urban American Indians and Alaska Natives. *Journal of the American Medical Association, 271*(11), 845-850.

Kinzie, M. B., Schorling, J. B., & Siegal, B. A. (1993). Prenatal alcohol education for low-income women with interactive multimedia. *Patient Education Counseling, 21,* 51-60.

Lapham, S. C., Henley, E., & Kleyboecker, K. (1993). Prenatal behavioral risk screening by computer among Native Americans. *Family Medicine, 25*(3), 197-202.

Lapham, S. C., Kring, M. K., & Skipper, B. J. (1991). Prenatal behavioral risk screening by computer in a health maintenance organization-based prenatal care clinic. *American Journal Obstetric Gynecology, 165*(3), 506-514.

Mayfield, D. G., McLeod, G., & Hall, P. (1974). The CAGE questionnaire: Validation of a new alcoholism screening instrument. *American Journal of Psychiatry, 131,* 1121-1123.

McFarlane, J., Parker, B., Soeken, K., & Bullock, L. (1992). Assessing for abuse during pregnancy. *Journal of the American Medical Association, 267*(23), 3176-3178.

MMWR. (1987). Progress in chronic disease prevention: Indian Health Service facilities become smoke-free. *Morbidity and Mortality Weekly Report, 36,* 348-350.

Newberger, E. H., Barkan, S. E., Lieberman, E. S., McCormich, M. C., Yllo, K., Gary, L. T., & Schechter, S. (1992). Abuse of pregnant women and adverse birth outcome. *Journal of the American Medical Association, 267*(17), 2370-2372.

Paperny, D. M., Aono, J. Y., Lehman, R. M., Hammar, S. L., & Risser, J. (1990). Computer-assisted detection and intervention in adolescent high-risk health behaviors and attitudes. *Journal of Pediatrics, 116*(3), 456-462.

Rhoades, E. R., Hammond, J., Welty, T. K., Handler, A. O., & Amler, R. W. (1987). The Indian burden of illness and future health interventions. *Public Health Report, 102,* 361-368.

Rosenfeld, J., & Everett, K. D. (1996). Factors related to planned and unplanned pregnancies. *Journal of Family Practice, 43*(2), 161-166.

Skinner, H., Allen, B. A., McIntosh, M. C., & Palmer, W. H. (1985). Lifestyle assessment: Just being asked makes a difference. *British Medical Journal, 290,* 214-216.

Sugarman, J. R., Brenneman, G., LaRoque, W., Warren, C. W., & Goldberg, H. I. (1994). The urban American Indian oversample in the 1988 national maternal and infant health survey. *Public Health Report, 109*(2), 243-250.

U.S. Departments of Agriculture and Health and Human Services (1990). Nutrition and your health: Dietary guidelines for Americans, 3rd ed. Washington, DC, Home and Garden Bulletin No. 232.

Williamson, H. A., & LeFevre, M. (1992). Tangible assistance: A simple measure of social support predicts pregnancy outcome. *Family Practice Research Journal, 12*(3), 289-295.

Author Note

AMERICAN INDIAN ADOLESCENT INHALANT USE

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Abstract: Inhalant use and use patterns, decision-making pertaining to inhalant use, cognitive capacity, cognitive egocentrism, and adherence to traditional ways were studied in a sample of male and female American Indian adolescents residing in a boarding home. Significant differences were not found for gender. Inhalant use group differences were found for only one variable, participation in tribal activities. For males, cognitive ability, cognitive egocentrism and participation in tribal activities were significant predictors of inhalant use/non-use. For females, tribal activities was the only significant predictor.

Substance abuse in the American Indian population is a persistent and longstanding problem (Beauvais & LaBoueff, 1985; Dozier, 1966; Indian Health Service Task Force on Alcoholism, 1970; Segal, 1975). American Indian alcoholism and other drug abuse is not just an adult problem. An early study by Oetting and Goldstein (1979) reported a high incidence of alcohol use among American Indian children. These authors found that, compared to non-Indian youth, American Indian youth had higher rates of use of drugs other than alcohol. A later study by Beauvais (1992) confirmed these findings, indicating that drug use among American Indian youth is a continuing problem. In addition to these studies documenting higher rates of drug use in a specific time frame, Weibel-Orlando (1984) identified a trend over time of increasingly rapid escalation of drug use.

Gender differences in drug use have also been of interest. It is commonly believed that males have higher rates of drug use than females (Penning & Barnes, 1982). Two studies suggest that this expectation of gender differences in substance abuse does not hold true for American Indian youth. Beauvais, Oetting, Wolf, and Edwards (1989) found only four significant gender differences in lifetime prevalence rates; compared to males, females evidenced higher levels of cigarette use and lower levels of use of

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cocaine, sedatives, and smokeless tobacco. Additionally, Beauvais (1992) found that American Indian females use drugs at the same rate as their male counterparts, with the exception of cocaine and smokeless tobacco.

Beauvais and LaBoueff (1985) identified yet another problem. Not only do American Indians start abusing substances at an earlier age than their Anglo counterparts, but the younger the children are when they begin abusing substances, the more likely it is that the substance used will be inhalants. Though extremely limited information is available, adolescent inhalant use appears to be a salient problem in the American Indian population. Adolescent users are being referred to therapists in increasing numbers (Dyer, 1984). Dyer (1982) reported that when American Indian adolescents were admitted into the Oklahoma mental health/substance abuse treatment system, inhalants were mentioned as the primary drug in 73% of the cases. This was compared to 6% for admitted non-Indian adolescents. Inhalant use appears to decline as other substances such as marijuana and alcohol become more accessible (Beauvais & LaBoueff, 1985). Thus, although inhalants may not appear to be the adolescent drug of choice, their low cost and ubiquitous presence make them very available.

Early studies (Cohen, 1973; Korman, Trimboli, & Semler, 1980) demonstrated higher rates of inhalant use among males than females in delinquents and psychiatric patients. The National Senior Survey (Johnston, O'Malley, & Bachman, 1985) indicated that, in high school, 18% of male respondents had tried inhalants compared to only 11% of female respondents. Edwards and Oetting (1995), however, reported that overall lifetime prevalence rates reflect male use higher than female use, for sixth-graders, boys use inhalants somewhat more than girls, but the difference decreases across the seventh through ninth grades.

It is obvious that inhalant use is a serious problem among American Indian adolescents. Given the magnitude of the problem, it would be important to obtain information pertaining to the etiology of this behavior. Although research has been replete on causal factors of substance abuse, the majority of studies have focused on identification of pertinent etiological factors leading to adult alcohol use/abuse. The identification of such factors in adolescent alcohol use/abuse is less clear than that for adults. Given the focus of such research on adults and generally related to alcohol, only possible etiological factors for adolescent substance abuse per se can be considered. Yet another factor to be considered are regional differences as well as rural and urban. Beauvais (1992) has provided a thorough report on factors related to reservation, rural and urban adolescent substance use patterns.

One possible etiological factor posited by Jessor and Jessor (1975) relates to "expectations" placed upon adolescents in their development into adulthood. America is a society that associates the use of alcohol with adult status; therefore, the onset of drinking constitutes a significant event that reflects and patterns the course of development through adolescence

to adulthood. Consistent with this view, Beauvais and LaBoueff (1985) have speculated that, with adult alcoholism so prevalent, it would be highly likely that children would tend to emulate such behavior. Such a pattern could exist among American Indian adolescents, possibly due to emulation of either the majority culture or their own culture.

In fact, some researchers have suggested that traditional American Indian culture is a causal factor in drinking behavior and drug use (Ackerman, 1971). However, though some psychoactive substances may be used in various American Indian tribal ceremonies and in the Native American Church, none of these institutions encourage or sanction recreational or illicit use of drugs. Researchers have also suggested that drug use is a result of acculturation stress, the stress of identifying with both the majority culture and the American Indian culture (Mail & McDonald, 1980).

In traditional models of acculturation, cultures are viewed as residing on opposite ends of a continuum; thus, it is difficult for an individual to identify with more than one culture. Oetting and Beauvais (1989) have advanced a theory of orthogonal cultural identification. In this model, cultures are viewed as orthogonal to each other, as independent continua; thus, the individual can successfully identify with more than one culture. According to Oetting and Beauvais (1989), the orthogonal model allows for high cultural identification with one's culture of origin. When successful identification with one's culture of origin is maintained, positive outcomes are likely and drug use is less likely. When cultural identification fails, negative outcomes are likely and "illicit" or culturally inappropriate substance use may occur. Oetting and Beauvais suggested that inhalant dependent adults may have been those who were considered culturally marginal, regardless of the culture with which they had tried to identify.

A second and related possible etiology focuses on adolescent peer groups. Both peer influence and peer pressure appear to be significant factors in the decision to use or not use alcohol and drugs (Beauvais, Oetting, & Edwards, 1985; Cockerham, 1975; Oetting & Beauvais, 1986; Oetting & Goldstein, 1979; Weibel-Orlando, 1984). Oetting and Beauvais (1989) suggested that youth lacking a strong cultural base may seek to identify with "deviant" subcultures. Oetting, Edwards, and Beauvais (1989) suggested that young inhalant users are likely to have more emotional problems than non-drug users or young marijuana users. Because of the feelings of alienation that occur, they tend to affiliate with groups that have similar feelings and also use inhalants.

A third possible etiology is related to the assumption found in recent literature that adolescent risk-taking is preceded by decision-making (Beyth-Marom, Fischhoff, Jacobs, & Furby, 1989; Irwin & Millstein, 1991). Horan (1979) suggested that classical decision theory provides a more suitable basis for drug education programs than frameworks presently being used for such programs, e.g., avoidance of future use, the "dos and don'ts," etc. Irwin and Millstein (1991) and Levitt, Selman, and Richmond (1991) put

forth models that divide factors involved in the risk-taking decision-making process into two major categories: contextual and structural. The contextual factors include peer and parental influences as well as the influences of culture. These factors are consistent with the etiological factors presented above: (a) cultural and developmental expectations placed on adolescents and (b) the influence of peer groups.

Structural factors can be further divided into three main categories: biological/physiological, dispositional, and cognitive. Of specific relevance to the present study is the cognitive category. One of the critical elements in adolescent decision-making is the ability to exhibit aspects of adolescent reasoning. These are: thinking abstractly, thinking about possibilities, thinking through hypotheses, thinking about thinking, and considering the perspective of others (Hoffman, Paris, & Hall, 1994). That these skills are developed in the period from preadolescence through adolescence is supported by the literature (Keating, 1980).

The achievement of adolescent reasoning ability does not guarantee maturity in decision-making. According to Peel (1971), mature decision-making capacity may be dependent on both the level of cognitive development and cognitive egocentrism. The capacity for considering the perspective of others may lead to a form of egocentrism. According to Elkind (1985), the capacity to infer what other people are thinking may lead to the adolescent's inference that other people are thinking about him/her; this type of egocentrism is characteristic of early adolescence.

Two aspects of egocentrism were identified by Elkind (1967); these are the imaginary audience and the personal fable. The first aspect, the imaginary audience, was based on the premise that, in social situations, adolescents assume that others are as obsessed with them as they are with themselves. In a sense, adolescents are constantly playing to, or responding to, an imaginary audience. In the second aspect, the personal fable, adolescents believe they are of such importance that they come to regard themselves as special and unique. Furthermore, adolescents' belief in their own personal uniqueness can lead to a conviction that they are invulnerable. While negative consequences may happen to others, it is their belief that such will not happen to them.

In an American Indian boarding home sample, the present study examined the following variables: inhalant use and use patterns, decision-making in inhalant use, cognitive capacity, cognitive egocentrism, and adherence to traditional ways. Males and females were included as subjects. Given the literature cited above and anecdotal information from the American Indian boarding home in which the subjects resided, hypotheses were that: (a) males would exhibit higher levels of drug use than females, and (b) differing drug use patterns would be observed in males and females. As there is some evidence of potential gender differences in specific measures of cognitive capacity and cognitive egocentrism (to be discussed in the methods section), further hypotheses related to gender were that: (a) males

would perform significantly better on the cognitive ability measures [Displaced Volume, Puns, Problems, and Word Problems], and (b) that males would score higher on the personal fable subscale of Rules and Impulsivity, but that females would score higher on the personal fable subscale of Magical Thinking and the two imaginary audience subscales. As no evidence exists in the literature pertaining to gender differences in adherence to traditional Native activities, no prediction was made for gender differences on these measures.

Subjects using and not using inhalants were included in the present study. As the literature suggests that inhalant use may be related to cognitive capacity, cognitive egocentrism, decision-making capacity, and the extent of identification with one's traditional culture, we hypothesized that, compared to nonusers, inhalant users would exhibit: (a) lower cognitive capacity, (b) higher cognitive egocentrism, (c) lower decision-making capacity, and (d) less adherence to traditional ways.

Combinations of these variables were used in predicting inhalant use. Based on the assumption that cognitive capacity and cognitive egocentrism influence decision-making and, thus, risk taking, we hypothesized that cognitive ability, cognitive egocentrism, and decision-making variables would be significant predictors of inhalant use. Furthermore, based on the literature emphasizing that positive outcomes are related to identification with one's culture of origin, we predicted that adherence to traditional ways would be predictive of inhalant use.

Method

Subjects

Subjects were 87 American Indians ranging in age from 10 to 18 years. The average age of the subjects was 13.5 (SD = 1.93); the average grade placement was 7.6 (SD = 1.88). These subjects were recruited from an American Indian boarding home facility located in a rural area of the southwestern part of the United States.[1] A boarding home environment was selected as opposed to a classroom in an effort to maintain a one-quarter minimum American Indian blood quantum rather than utilize subjects who were self-identified but with much lower blood quantums. All students in grades five through twelve were invited to participate in the study. Of the 92 children eligible to participate, all agreed to do so. However, data from one subject were discarded due to incomplete information, and data from four subjects were discarded as they identified themselves through self-report as inhalant users but were not identified by the Counselors in the boarding home as ever having been involved in an inhalant use incident. This distinction was necessary in order to ensure that youth did not report

use just to get out of class to participate in a novel experience. Further, by being counselor identified, at least experimental use was firmly established.

The population of this home consisted of students who were one-fourth or more degree of American Indian blood. Most of the students were from rural areas and small towns in the state, though approximately 25% came from metropolitan areas with populations exceeding 300,000. Of the participants in this study, 68% were 3/4 or more American Indian, 37% spoke their tribal language, and 59% indicated that they regularly participated in traditional activities.

The 87 subjects were divided into four groups: (a) male inhalant users [n = 25]; (b) male nonusers [n = 25]; (c) female inhalant users [n = 14]; and (d) female nonusers [n = 23]. Placement into the user group was based on identification by the boarding home counselor as a student who had been caught in at least one sniffing incident on residential grounds. Those subjects who were identified as users by school staff also identified themselves as users on the inhalant-use behavioral measure. (No chronic abusers and polydrug users were in residence at the home; the practice of the home was to refer such individuals to treatment centers.) The groups did not differ significantly in age or grade placement.

Materials[2]

Demographic Questionnaire. A 16-item questionnaire was used to assess socioeconomic status, age, grade, tribe, degree of American Indian blood, adherence to traditional ways, and familial demographic information.

Inhalant-Use Behavioral Measure. Based on the inhalant-use literature, a 19-item inhalant-use questionnaire was developed. The questionnaire assessed: previous use; frequency of use; age of first use; substances inhaled; methods used when inhaling; use of inhalants with other drugs or alcohol; and whether inhalants are used alone, with a friend, or in a group. Additionally, the questionnaire included seven true/false questions on inhalant use.

Cognitive Measures. Four pencil-and-paper measures were selected to assess specific aspects of adolescent reasoning. One measure (Displaced Volume) was a test often used in the literature for which reliability and validity have been established. A second measure (Proverbs) was a component of a standardized test. Use of an item from a standardized test was based upon the philosophy of criterion testing. The third measure (Word Problems) was a measure used often in adolescent research to ascertain formal operational thinking. The fourth measure (Puns) was developed by the second author and colleagues. Reliability and validity data are available for this measure. Jones and Green (1991), using a multiethnic sample of students in Catholic schools, grades 5 through 12, established the average grade level of attainment for three of these measures. The Displaced Volume test

was mastered at the sixth-grade level. While not compared to the other three measures, using a Job Corps sample, Frank, Green, and McNeil (1993) found the Word Problems task was a significant predictor of problem-solving behavior.

The Displaced Volume test (Linn & Pulos, 1983), measuring the ability to hypothesis test, included eight problems with multiple-choice answers. Each required subjects to identify the relevant variables and then mentally manipulate them in order to predict their effect upon the water level in a pictured container.

The Word Problems task consisted of two problems involving deductive reasoning abilities (e.g., "Helen is taller than Mary, and Mary is taller than Jane; who is the tallest of the three?"). Subjects were required to solve the two problems.

The Proverbs task, measuring abstract reasoning, consisted of three proverbs drawn from the three adult levels of the Stanford Binet Test of Intelligence (Terman & Merrill, 1973) (e.g., "We only know the value of water when the well is dry"). Subjects were required to explain the meaning of each proverb.

The Puns task, measuring the ability to take more than one perspective, involved the presentation of three puns for which subjects were required to explain two alternative meanings of the phrase (e.g., "Wrestling is a sport which gets a hold on you"). Scoring was established along the lines of the Proverbs task by Jones and Green (1991). For all measures, correct solutions/higher scores were indicative of higher levels of cognitive ability.

Jones and Green (1991) did not find gender differences for the Puns or Proverbs tasks, but did find gender differences for the Displaced Volume test. Compared to females, males exhibited significantly more cognitive ability on this test. Frank et al. (1993) did not find gender differences for the Word Problems task.

Cognitive Egocentrism Measures. The Imaginary Audience Scale - IAS (Elkind & Bowen, 1979) presented 12 dilemmas designed to directly involve the subject in a potentially embarrassing situation. Six of the dilemmas involved situations which are momentarily embarrassing (the Transient Self Scale - TS), and the other six reflect more permanent possibly embarrassing aspects of self (the Abiding Self Scale - AS). For TS and AS, higher scores indicated higher levels of concern with the imaginary audience. Elkind and Bowen found gender differences on the TS and AS scales. Females had significantly higher scores than did males.

The Personal Fable Questionnaire - PFQ (Green, Morton, Starr, Jones, & Jaynes, 1992) contained 43 items. Subjects were asked to respond to each item using a five-point, Likert-like scale ranging from strongly agree to strongly disagree. In the study by Green et al., using a fifth through twelfth grade normative sample, psychometric properties and factorial structure were assessed. Five factors were identified: Rules/Impulsivity,

Egocentrism, Uniqueness, Magical Thinking, and Independence. Twenty-five items had salient loadings on one of these five factors. The five factors were scored as five scales. For four of these, high scores reflected higher cognitive egocentrism; for the Independence scale, high scores reflected thoughts regarding independent action. The scale scores represented the average response to all items on that scale. As the factors have been found to be independent, no combined score was used. Green et al. found gender differences for two of the scales. Males exhibited higher scores on Rules/Impulsivity, females on Magical Thinking.

Decision Making Abilities Measure. The Applied Dilemmas task (Lewis, 1981) for adolescents consisted of three open-ended decision making dilemmas with follow-up questions. Two neutral dilemmas employed by Lewis were used, the first dealing with parental divorce, the second concerning trust of a parental figure who is a lawyer. The third dilemma, developed by the first author, dealt specifically with inhalant use (i.e., "Some of my friends want to try drugs or alcohol but can't afford to buy any. However, one guy said that he heard that you could sniff paint and get just as high as you want. I heard about another guy at school that sniffed some paint and had to be put in the hospital—he got really sick. I don't want my friends to think I'm a sissy, and I do want to be one of the crowd, but I just don't know what to do. What should I do?") For each dilemma, the following were scored: (a) awareness of risks, (b) awareness of future consequences, (c) number of people consulted, and (d) consultation with a peer, an adult, or a professional. The three dependent measures used were the total combined scores for each of the three dilemmas. The dilemmas were scored by two individuals unaware of group membership. Scoring followed criteria set by Lewis (1981). Interrater reliability was .99.

Procedure

Consent was first obtained from the boarding home administration. Prior to obtaining consent from the subjects, the experimenter (the first author) spent time at the home to develop rapport. All subjects were tested individually. Tests were completed by the subjects in the presence of the experimenter; due to apparent literacy problems, the test questions were read to approximately 70% of the subjects. The tests were given in the following order: PFQ, IAS, cognitive tasks, the behavioral measure, the demographic questionnaire, and applied dilemmas.

During testing, the experimenter was blind as to group assignment. A school counselor kept a master list of subject code numbers matched with appropriate group identification. This information was provided to the experimenter only after all testing and scoring were completed.

Results

Gender and Use - Group Differences

Data were arranged in a 2x2 factorial design containing group dimensions (inhalant-user and -nonuser) and gender dimensions (male and female). Analyses were carried out to assess gender differences, use-group differences, and interaction effects. Depending upon the type of data, either multivariate analyses of variance (MANOVA) or Chi-square analyses were used. No interaction effects were found.

Gender Differences

A Chi-square test, used to assess gender differences in inhalant-use group placement, was not significant. A MANOVA, used to assess gender differences in responses on the behavioral questionnaire for the user group only, was not significant. A MANOVA, used to assess gender differences in the equal interval scaled demographic measures, was not significant. Three separate MANOVAs were used to assess gender differences in the dependent measures grouped as follows: (a) cognitive ability variables, (b) cognitive egocentrism variables, and (c) decision-making variables. No significant differences were found. Chi-square tests, used to assess gender differences in the two measures of adherence to traditional ways: participation in tribal activities (yes/no) and speaking the tribal language (yes/no), were not significant. In summary, no significant gender differences were found for any of the measures used. Additionally there were no gender differences in inhalant use *per se*, or patterns of inhalant use.

Use-Group Differences

A MANOVA, used to assess inhalant-use group differences in the equal interval scaled demographic measures, was not significant. Three separate MANOVAs were used to assess inhalant-use group differences in the dependent measures grouped as follows: (a) cognitive ability variables, (b) cognitive egocentrism variables, and (c) decision-making variables. No significant differences were found. Chi-square tests were used to assess differences between the two use-groups for the two measures of adherence to traditional ways. No significant difference was found for the variable speaking the tribal language. A significant difference was found for the variable participation in tribal activities, $X^2 = 21.34$, $p < .0001$. Of the 48 nonusers, 39 were involved in traditional activities; of the 39 users, 12 were

involved in such activities. In summary, the only significant use-group difference found for the measures used was for the variable, participation in tribal activities.

Predictors of Inhalant Use/Non-use

Stepwise multiple regression analyses were employed to determine if specific sets of predictor variables were significantly predictive of the outcome variable inhalant-use group placement ("use/non-use"). Analyses were performed separately for males and females.[3] For all analyses, the confidence level for inclusion was set at .05. The cognitive variables (Puns, Word Problems, Proverbs, and Displaced Volume), the cognitive egocentrism variables (Imaginary Audience Scale, TS, and AS, and the five Personal Fable Questionnaire scales), the three decision-making variables (total scores for Applied Dilemma-Divorce, Applied Dilemma-Trust, and Applied Dilemma-Inhalant Use), and the two traditionalism variables (participation in tribal activities and speaking the tribal language) were employed as predictors of the outcome variable of "use/non-use". For the female group, only one variable, tribal activities, was found to be a significant predictor of the outcome variable, $R^2 = .504$ (1,35), $F = 35.55$, $p<.0001$. The ß value for this variable was -0.72. For the male group, three variables were found to be significant predictors of the outcome variable, $R^2 = .341$ (1,48), $F = 11.90$, $p<.001$. The variables, ß values, and partial correlation coefficients (R^2) were as follows: tribal activities, -0.39, 0.20; the cognitive variable Proverbs, 0.14, 0.07, and the cognitive egocentrism variable PFQ Rules/Impulsivity, 0.28, 0.07.

Discussion

Findings in the present study did not support the hypotheses that males would exhibit a higher level of inhalant use than females and that the inhalant use patterns of males and females would differ significantly. Two studies in the literature reported gender differences in inhalant use by youth (Korman et al., 1980; Johnston et al., 1985). Additionally, boarding school personnel reported gender differences. (In fact, prior to initiation of the study, school administrators stated that there was no inhalant use by females in residence. Yet, counselor information documented 14 female users.) There are two likely explanations for the lack of significant findings. One, the hypotheses were incorrect: gender differences should not be expected in this type of sample; given the boarding home environment, adolescents of both genders are as likely to use inhalants. Oetting and Beauvais (1989) identified higher rates of drug use in boarding home environments. They speculated that higher rates may occur because of developmental isolation from parental sustenance and sanctions and increased dependence on peers for emotional and social support. Consequently, adolescents are likely to

serve as the primary role models for one another. In the boarding home situation, it is possible that such modeling occurs across gender and occurs in both males and females. Two, as residents exhibiting problem use were referred to treatment centers and did not participate in this study, the inhalant use group was really a minimal-using or experimental-use group. Perhaps in such a group, gender differences should not be expected.

Likewise, no significant gender differences were found in inhalant use patterns; males and females in this sample reported quantitatively similar patterns of use. However, an examination of the qualitative data reflected one interesting difference. More males reported using paint or gasoline; although females reported some use of paint, more of the females reported use of fingernail polish and correction fluid. Overall, the present findings are most important in pinpointing both male and female drug inhalant involvement for a sample of American Indian youth residing in a boarding home.

The hypotheses predicting gender differences in cognitive capacity, cognitive egocentrism, and decision-making were not supported. The prediction of gender differences was based on studies using multiethnic samples (Elkind & Bowen, 1979; Green et al., 1992; Jones & Green, 1991). It is possible that such gender differences are not present in American Indian groups. As some documented gender differences are thought to have their etiology in socialization (see Maccoby & Jacklin, 1974 for a general discussion), it is not surprising that such findings are not replicable using samples of single ethnic groups that may experience different socialization. Also, the lack of significant findings in the present study could be explained by the shared demographic characteristics of the subjects and/or the similarity of their daily lives and educational experiences. If males and females from any cultural group share similar backgrounds and present environments, it is likely that their cognitive capacity, cognitive egocentrism, and decision-making capacity would be very similar.

No literature exists defining gender differences in participation in tribal activities. Yet, it would appear that American Indian adolescents, both males and females, are often limited in their opportunity to develop identification with either their American Indian culture or the non-Indian culture. Certainly, research is needed on gender differences related to cultural identification, especially within the context of a view that lack of cultural identification leads to problem behaviors.

One focus of this study was to assess differences between user and nonuser groups. The hypotheses predicting differences in cognitive capacity, cognitive egocentrism, and decision-making were not supported. There are at least two possible explanations for the lack of significant findings. First, subjects had difficulty responding to the cognitive measures and decision-making measures; they frequently verbalized problems in understanding the instructions for the decision-making measures. Recall also the measures had to be read to approximately 70% of the subjects. This difficulty was reflected in the overall low scores on the decision-making

measures as compared to those found in the Lewis (1981) sample (middle class adolescents living with parents) and the overall low scores on the cognitive measures as compared to those found in the Jones and Green (1991) study. The comparatively lower scores for subjects in the present study may have partially resulted from the testing situation: they were tested in the early evening following a full school day. Many expressed fatigue and appeared distracted at times. It is possible that this lower level of performance was a more important factor than their inhalant use differences. In a sample of Job Corps youth, Frank, Green, and McNeil (1993) found cognitive ability to be a significant predictor of problem solving behavior, while substance use was not found to be a significant predictor; this group also performed more poorly on cognitive measures as compared to a more advantaged group. Second, it is important to remember that this sample did not include chronic users. Therefore, the lack of significant findings might be due to the comparison of nonusers and minimal- or experimental-users.

A significant difference between the two user groups was found for only one of the two measures of adherence to traditional ways. Participation in tribal activities was significantly greater for the nonusers than for the users. The fact that significance was found for this variable and not for the second, speaking the tribal language, may be related to the small sample size, coupled with the fact that only 37% spoke their tribal language, while 59% indicated they regularly participated in traditional activities. Nevertheless, this significant finding is consistent with the views of Oetting and Beauvais (1989) discussed earlier. It is likely that participation in tribal activities is indicative of a positive cultural identification which in turn is related to positive behavioral outcomes and peer identification with noninhalant-users.

The central focus of this study was to assess the efficacy of using specific variables in predicting inhalant use/non-use. In predicting this outcome variable, the picture was clearly different for males and females. Although, because of small sample size, the regression analyses findings for the females should be considered preliminary, the difficulty of obtaining data on large numbers of subjects in the boarding home environment would make these data of interest to the research and practitioner communities. However, it is clear that females do differ from males in the significant predictors of inhalant use/non-use.

In predicting inhalant use for females, only one variable, involvement in traditional activities, was significant. The amount of variance accounted for was 50%. For males three variables, involvement in traditional activities, the PFQ scale Rules/Impulsivity and the cognitive variable, Proverbs, predicted inhalant use/non-use. The total variance accounted for was 34%.

The finding of Rules/Impulsivity as a predictor for the male group only is consistent with the gender differences finding from Green et al. (1992), that males were more likely to ascribe to breaking the rules/demonstrating

greater impulsivity than were females. Thus, the level of impulsivity/inclination to break the rules in males may be of importance to understanding inhalant use/non-use.

The finding that a cognitive variable was a significant predictor of risk-taking behavior is consistent with one previous study. In Johnson & Green (1993) performance on the puns task predicted risk taking, operationally defined by factorially combining several variables measuring sexual activity (risk of pregnancy) and contraceptive use patterns (correction for the risk). In the present study, risk-taking was operationally defined by a single dichotomous variable measuring having taken the risk. Future research should measure both types of variables in operationalizing inhalant-use risk taking. It is unclear why the finding occurred for males only. Perhaps the smaller sample size for females was a factor; perhaps a measure with greater variability including correction for the risk would yield significance for the female sample.

The finding for both male and female samples, that involvement in traditional activities is a significant predictor of inhalant use/non-use, is the most intriguing finding in the present study. The literature documents that, in families of Caucasian alcoholic parents, failure to maintain family rituals has been associated with the development of alcohol problems in children (Wolin, Bennett, Noonan, & Feitelbaum, 1980). This finding is consistent with the significant difference found between the user groups in participation in tribal activities and, as with that finding, is consistent with Oetting and Beauvais' (1989) view on the importance of positive cultural identification to substance use. That so much variance is accounted for, especially in the female sample, is a powerful finding.

In summary, results of the present study provide information on use of inhalants in this specific population and suggest possible factors that are important in risk-taking related to inhalant use/abuse. While only minimal- or experimental-users, not abusers, were studied, results indicated that inhalant use is likely occurring among some American Indian youth and supports previous literature that such use likely occurs at an early age.

For males only, results in the current study supported the assumption that cognitive capacity and cognitive egocentrism may be important in the prediction of inhalant use. Future research, however, should explore further the influence of these types of variables in predicting risk-taking related to inhalant abuse. Given the amount of variance accounted for in these prediction equations and the lack of significant findings for females, other possible etiological variables must be explored as well as other measures of these factors.

For purposes of preliminary exploration of other etiological variables, subjects were asked to respond qualitatively to queries about reasons why they had used inhalants. An examination of these data revealed two possible etiological factors. Peer encouragement to use was most often mentioned. Family problems were also mentioned frequently by the subjects. In addition

to cognitive ability and cognitive egocentrism variables, future studies should examine the influence of these variables upon inhalant use.

Probably one of the most interesting findings of the current study was that for both males and females, results supported the assumption that adherence to traditionalism is an important factor in the prediction of inhalant non-use. The decision to adhere to a traditional way of life is an integral part of adolescent development; likely, this choice is intertwined with decisions regarding the modeling of both adult and peer behaviors. It is essential that future research explore this process further for American Indian adolescents, especially as it relates to decisions to abuse substances.

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References

Ackerman, L. A. (1971). Marital instability and juvenile delinquency among the Nez Perces. *American Anthropologist, 73*(3), 595-603.

Beauvais, F. (Ed.). (1992). Indian adolescent drug and alcohol use: Recent patterns and consequences [Special Issue]. *American Indian and Alaska Native Mental Health Research, 5*(1), V-78.

Beauvais, F., & LaBoueff, S. (1985). Drug and alcohol abuse intervention in American Indian communities. *International Journal of the Addictions, 20*(1), 139-171.

Beauvais, F., Oetting, E. R., & Edwards, R. W. (1985). Trends in drug use of Indian adolescents living on reservations: 1975-1983. *The American Journal of Drug and Alcohol Abuse, 11*(3-4), 209-230.

Beauvais, F., Oetting, E., Wolf, W., & Edwards, R. (1989). American Indian youth and drugs: 1975-1987 - A continuing problem. *American Journal of Public Health, 79*(5), 634-636.

Beyth-Marom, R., Fischhoff, B., Jacobs, M., & Furby, L. (1989). *Teaching decision making to adolescents: A critical review.* Washington, DC: Carnegie Corporation.

Cockerham, W. C. (1975). Drinking attitudes and practices among Wind River reservation Indian youth. *Journal of Studies on Alcohol, 36,* 321-326.

Cohen, S. (1973). The volatile solvents. *Public Health Review, 2,* 185-214.

Dozier, E. P. (1966). Problem drinking among American Indians. *Quarterly Journal of Studies on Alcohol, 27,* 72-87.

Dyer, M. (1982, May). *Recommendations to the Department of Mental Health.* Paper presented to the Oklahoma Department of Mental Health, Oklahoma City, Oklahoma.

Dyer, M. (1984). Inhalant abusers: A neglected aspect in substance abuse treatment. *Grassroots, 1,* 1-2.

Edwards, R. W., & Oetting, E. R. (1995). Inhalant use in the United States. In N. Kozel, Z. Sloboda, & M. DeLaRosa (Eds.), *Epidemiology of inhalant abuse: An international perspective,* (NIDA Research Monograph No. 148). Rockville, MD: National Institute on Drug Abuse.

Elkind, D. (1967). Egocentrism in adolescence. *Child Development, 38,* 1025-1034.

Elkind, D. (1985). Egocentrism redux. *Developmental Review, 5,* 218-226.

Elkind, D., & Bowen, R. (1979). Imaginary audience behavior in childhood and adolescence. *Developmental Psychology, 15,* 38-44.

Frank, A., Green, V., & McNeil, D. W. (1993). Adolescent substance users: Problem solving abilities. *Journal of Substance Abuse, 5,* 85-92.

Green, V., Morton, K., Starr, B., Jones, F., & Jaynes, W. (1992). The personal fable in adolescence: The development of an instrument. Unpublished manuscript, Oklahoma State University, Stillwater.

Hoffman, L., Paris, S., & Hall, E. (1994). *Developmental psychology today* (6th ed.). New York: McGraw-Hill.

Horan, J. J. (1979). *Counseling for effective decision making: A cognitive behavioral perspective.* North Scituate, MA: Duxbury.

Indian Health Service Task Force on Alcoholism (1970). *A high priority problem.* Washington, DC: Department of Health, Education, & Welfare.

Irwin, C. E., & Millstein, S. G. (1991). Risk taking behaviors during adolescence. In R. M. Lerner, A. C. Peterson, & J. Brooks-Gunn (Eds.), *Encyclopedia of adolescence.* New York: Garland Publications.

Jessor, R., & Jessor, S. (1975). Adolescent development and the onset of drinking: A longitudinal study. *Journal of Studies on Alcohol, 36,* 27-51.

Johnson, S. A., & Green, V. (1993). Female adolescent contraceptive decision making and risk taking. *Adolescence, 28,* 81-96.

Johnston, L., O'Malley, P., & Bachman, J. (1985). Use of licit and illicit drugs by America's high school students 1975-1984. Rockville, MD: National Institute on Drug Abuse.

Jones, F. A., & Green, V. (1991). The Oklahoma Pun Test—Examining measures of cognitive development in adolescence. Unpublished manuscript.

Keating, D. P. (1980). Thinking processes in adolescence. In J. Adelson (Ed.), *Handbook of adolescent psychology* (pp. 211-246). New York: Wiley.

Korman, M., Trimboli, F., & Semler, I. (1980). A comparative evaluation of 162 inhalant users. *Addictive Behaviors, 5,* 143-152.

Levitt, M. Z., Selman, R. L., & Richmond, J. B. (1991). The psychosocial foundations of early adolescents' high risk behavior: Implications for research and practice. *Journal of Research on Adolescence, 1,* 349-378.

Lewis, C. (1981). How adolescents approach decisions: Changes over grades seven to twelve and policy implications. *Child Development, 52,* 538-544.

Linn, M., & Pulos, S. (1983). Male-female differences in predicting displaced volume: Strategy usage, aptitude relationships, and experience influences. *Journal of Educational Psychology, 17,* 86-96.

Maccoby, E. E., & Jacklin, C. N. (1974). *The psychology of sex differences.* Stanford, CA: Stanford University Press.

Mail, P. D., & McDonald, D. R. (1980). *Tulapai to Tokay: A bibliography of alcohol use and abuse among Native Americans of North America.* New Haven: HRAF Press.

Oetting, E. R., & Beauvais, F. (1986). Peer cluster theory: Drugs and the adolescent. *Journal of Counseling and Development, 65*(1), 17-29.

Oetting, E. R., & Beauvais, F. (1989). Orthogonal cultural identification theory: The cultural identification of minority adolescents. *The International Journal of the Addictions, 25*(5A-6A), 655-685.

Oetting, E. R., Beauvais, F., Edwards, R., Velarde, J., & Goldstein, G. (1982). *Drug use among Native American youth: Summary of findings (1975-1981).* Ft. Collins, CO: Rocky Mountain Behavioral Sciences Institute.

Oetting, E. R., Edwards, R., & Beauvais, F. (1988). Social and psychological factors underlying inhalant use. In R. A. Crider & B. A. Rouse (Eds.), *Epidemiology of inhalant use - An update* (Research monograph #85). Rockville, MD: National Institute on Drug Abuse.

Oetting, E. R., & Goldstein, G. (1979). Drug use among Native American adolescents. In G. Beschner & A. Friedman (Eds.), *Youth drug abuse: Problems, issues, and treatment.* Lexington, MA: Lexington Books.

Peel, E. A. (1971). *The nature of adolescent judgment.* New York: Wiley.

Penning, M. E., & Barnes, G. E. (1982). Adolescent marijuana use: A review. *The International Journal of the Addictions, 17,* 749-791.

Segal, J. (Ed.). (1975). *Research in the service of mental health: Report of the Research Task Force of the National Institute of Mental Health.* Rockville, MD: National Institute of Mental Health.

Terman, L. M., & Merrill, M. A. (1973). *Stanford Binet Intelligence Scale: Manual for the third revision, form L-M.* Boston: Houghton Mifflin.

Weibel-Orlando, J. (1984). Substance abuse among American Indian youth: A continuing crisis. *Journal of Drug Issues,* (Spring), 313-335.

Wolin, S. J., Bennett, L. A., Noonan, D. L., & Feitelbaum, M. S. (1980). Disrupted family rituals: A factor in the intergenerational transmission of alcoholism. *Journal of Studies on Alcoholism, 41*(3), 199-214.

Author Note

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Notes

1.   The agreement negotiated with the school prohibits publication of the name of the school and American Indian tribal affiliations. However, where appropriate, the authors will assist researchers in obtaining permission from the school for release of such data.

2.   The difficulty of finding tests that have been used with American Indian (AI) samples is an acknowledged problem. The cognitive and cognitive egocentrism measures have previously been used with multiethnic samples, including AI subjects, e.g., the Jones and Green (1991) and Frank, Green, and McNeil (1993) samples. The second author has a manuscript in preparation using multiethnic subjects, including AIs, and is presently involved in data collection with an AI college sample using three of the measures used in the present study: the Puns task and the cognitive egocentrism measures. Results and preliminary analyses reflect the continuing usefulness of these measures in examining decision making.

3.   When subjects are divided into male and female groups, for the female group, the regression equations to predict "use" violate the rule of thumb requiring 4-5 times the number of subjects as predictor variables. However, reducing the number of predictor variables by two (omitting two of the three decision making variables) allows for greater than 3 times the number of subjects as predictor variables. Results of these three separate regression analyses (each using only one of the decision making variables) do not differ from results using all of the decision making variables in a single regression equation.

A DESCRIPTION OF ALCOHOL/DRUG USE AND FAMILY HISTORY OF ALCOHOLISM AMONG URBAN AMERICAN INDIANS

Kathryn Gill, Ph.D., Michelle Eagle Elk, B.A., and R. A. Deitrich, Ph.D.

Abstract: The patterns of alcohol consumption, family history of alcoholism, and lifetime and current diagnoses of substance dependence were determined in a sample of American Indians (n = 105) living in Denver. Subjects were recruited through flyers, posters, and advertisements placed in local newspapers, the Denver Indian Center, and Denver Indian Health and Family Services. Subjects were interviewed regarding their education, employment, past and present drug and alcohol use (including frequency/quantity, beverage type, and pattern of intake) and family history of alcoholism. The drug and alcohol sections of the Diagnostic Interview Schedule were administered in order to determine lifetime and current prevalence of substance dependence. Although there are limits to the generalizability of these data due to the use of a non-random sampling method, the results indicate that approximately half of the sample (50.5%) were abstinent or irregular drinkers with moderate intake (3.3 drinks/occasion). Binge drinkers (3.8%) consumed large amounts of alcohol per occasion, with a mean of 21.6 drinks. Also, 45.5% of the sample were regular drinkers (at least once/wk) with a mean of 11 standard drinks/occasion. The rate of current alcohol dependence (33.3%) and other drug dependence (18.1%) was relatively high with cocaine and cannabis the primary drugs of abuse. The most striking aspect of the sample was the very high rate of family history of alcoholism (60.6% with at least one alcoholic parent) and only 11.1% with no primary or secondary alcoholic family members.

There is a great deal of diversity among American Indians living in urban areas in terms of cultural identity, preservation of traditions, living

circumstances and health status (Walker et al., 1996). Although more than 50% of the American Indian population currently lives within large urban areas there is very little known about their general health or problems with alcohol and drugs of abuse. In 1992, a large scale review of available information on the health of urban aboriginal natives was conducted by the Northern Health Research Unit, at the University of Manitoba (McClure, Boulanger, Kaufert, & Forsythe, 1992). The dominant theme in much of the literature reviewed was the negative impact of acculturation and adaptation to urban life on the health of the aboriginal community. However, there were very few sources of reliable statistics on the rates or causes of morbidity and mortality, or patterns of health services utilization among urban aboriginals.

Since accurate prevalence data are not available, the degree of alcohol/drug problems within any American Indian community is typically based on indirect estimates of mortality from various causes that are known to be alcohol or drug-related. American Indians appear to have higher rates of alcoholism and alcohol-related problems than any other minority in the U.S. (Rhoades, Hammond, Welty, Handler, & Amler, 1987). American Indian alcohol-related deaths occur at more than four times the age-adjusted rate of the general population due to increased incidence of liver disease and cirrhosis (Rhoades et al., 1987). From figures collected by the Indian Health Service (1995) it is apparent that alcoholism or substance "abuse" per se are not the only serious problems. Alcohol and substance "use" carry high risks for mortality—particularly due to accidents, suicides, and homicides. This high rate of mortality may relate to the pattern of consumption in certain American Indian communities—i.e., the tendency to sporadic, high dose binge drinking. In addition, drinking by American Indians appears to be typified by blackouts, as well as a high degree of violence and physical fights when intoxicated (Manson, Shore, Baron, Ackerson, & Neligh, 1992).

The best data we have on substance abuse among American Indians in Denver comes from the Alcohol and Drug Abuse Division (ADAD) at the Colorado Department of Health (1992). Substance abuse problems within specific areas of Colorado were ascertained by utilizing a variety of indices including survey data, mortality figures, emergency room and medical examiner's mentions, and arrests for driving under the influence. According to the 1990 census, American Indians comprised 0.9% of the population within the urban areas of Denver and Boulder. This population had a median age of 26.9 years and was divided equally between males and females. It is interesting to note that according to the ADAD statistics, the percentage of American Indian non-drinkers (49.8%) was higher than the state-wide level of abstention (32.6%). However, the number of "dysfunctional" alcohol users—defined as severe disruption of lifestyle including loss of job, family dysfunction or criminal involvement—was higher in Colorado's American Indian population (5.5%) than the overall state average (3.7%). While American Indians in the Denver/Boulder area comprised 0.9% of the

population, they were notably over-represented in publicly-funded treatment facilities (5.2%) as well in the justice system with tendency towards multiple prior arrests for both DUI (driving under the influence) and non-DUI offenses.

The data presented in the present paper are intended to provide a more thorough description of alcoholism and alcohol-related problems among a sample of American Indians (n = 105) living in Denver. These data were collected as part of a larger research program being conducted in the Alcohol Research Center at the University of Colorado. This program, aimed at further understanding of the development of alcoholism among American Indians, is focused on the characteristics of drinking patterns in relation to the family history of alcoholism, as well as self-reported and objectively measured responses to alcohol. Therefore, the present paper represents the first in a series of reports that will explore the characteristics of alcohol/drug abuse as well as alcohol metabolism and responsivity to alcohol among American Indians (see also Gill, Eagle Elk, Liu, & Deitrich, in press; Gill, Lucas, Menez, & Deitrich, 1997).

Subjects/Procedure

Subjects

Subjects were recruited through advertisements placed in local newspapers and newsletters as well as through notices placed at local colleges, drop-in centers, and American Indian service organizations (e.g., Denver Indian Center). Subjects were also recruited directly while attending events (e.g., American Indian Health Fairs) and clinics. The primary site for recruitment was Denver Indian Health and Family Services (DIHFS). The number of organizations targeted for advertising, and the geographical area covered were as large as possible in order to attract a representative urban American Indian sample into the study. Advertisements targeted individuals at least 21 years of age. Compensation ranging from $20-50 was provided for participation. Potential subjects were briefed concerning the procedures prior to the session by telephone. All participants were asked to sign an informed consent form that explained all procedures to be used, the rationale of the experiment, and the confidentiality of his/her data.

Procedure

Interviews were conducted at the DIHFS or at the Alcohol Research Center and University Hospital in the University of Colorado Health Sciences Center. Following briefing and signing of informed consent, a 30cc blood sample was taken by a nurse in vacutainer tubes containing EDTA. The results of tests performed on the blood samples are reported elsewhere

(see Gill et al., in press). Following the blood sampling each subject was extensively interviewed regarding education, employment, past and present drug and alcohol use (including frequency/quantity, beverage type and pattern of intake using a time-line follow back procedure) and family history of alcoholism. The drug and alcohol sections of the Diagnostic Interview Schedule (DIS) for DSM-III-R were administered by a trained interviewer. The family history section of the interview asked the subjects to rate family members (parents, grandparents, siblings) on three criteria: (a) drinking frequency and type of drinker [i.e., Abstainer, Irregular Drinker, Social Drinker-Light to Moderate, Social Drinker-Heavy without problems, or Problem Drinker]; (b) whether or not the family member had ever experienced major problems due to drinking such as loss of a job, broken marriages, accidents; and (c) whether or not they had ever received treatment for alcoholism. The rating of probable alcoholism for any family member was based on positive scores for two out of three criteria.

Results

The demographic characteristics of the sample are shown in Table 1. This convenience sample assembled via advertisements and word of mouth was distributed approximately evenly among males and females, was predominantly single (59%), and largely unemployed (only 32.2% stated they were currently students, professionals, or semi-skilled laborers). The sample was predominantly Sioux (54.3%) with the Navajo (19%) making up the next largest tribal affiliation.

A description of alcohol/drug related behaviors is presented in Table 2. It should be noted that approximately half of the sample (50.5%) were abstinent or irregular drinkers. Moderate drinking in the irregular drinkers is reflected in the low mean number of drinks/occasion (3.3 ± 0.69). The binge drinkers, representing 3.8% of the sample, consumed particularly large amounts of alcohol per occasion, with a mean of 21.6 ± 1.6 drinks. The rate of current alcohol dependence (33.3%) and other drug dependence (18.1%) was relatively high overall. It is interesting to note that when subjects were asked to rate their degree of problems with alcohol (on a scale of Abstainer, Irregular Drinker, Social Drinker-Light to Moderate, Social Drinker-Heavy without problems, or Problem Drinker), a full 28% identified themselves as problem drinkers. This is very close to the actual rate of alcohol dependence (33%) found with the DIS interview.

The characteristics of the sample diagnosed with current alcohol dependence according to DSM-III-R criteria are shown in Table 3. These individuals were largely single (74.3%), with lower educational achievement (31.4% elementary school only), fewer months of full-time employment, and considerably greater involvement with the legal system (76.5% had at least one drunken driving conviction), compared to the non-abusers of alcohol. Table 4 displays the individual symptom frequencies from the DIS in those

Table 1
Demographic Characteristics (N = 105)

Gender	54.3% Male
	45.7% Female
Marital	59.0% Single
	22.0% Married/common-law
	19.0% Separated/divorced
Living	25.7% Spouse/kids
	21.9% Friends
	17.1% Other (shelters)
	10.5% Parents
Education	70.4% High school graduates
	18.1% Elementary only
	11.4% College graduates
Jobs	20.0% Semi-skilled laborer
	9.5% Students
	5.7% Professionals
Quantum	77.1% 4/4
	19.0% 1/2 to 4/4
	3.8% < 1/2
Tribe	54.3% Sioux
	19.0% Navajo
	5.7% Cheyenne
	20.9% Other

individuals with and without a diagnosis of alcohol dependence. Blackouts were a very common occurrence in both groups (60.6% of those without and 100% of those with a diagnosis of alcohol dependence). Other significant characteristics of those with a diagnosis of alcohol dependence were drinking heavily at least once/week (97.1%), binge drinking (94.3%), as well as being arrested (80.0%), driving (74.3%), and engaging in physical fights (91.4%) while drinking. A large proportion of the sample reported at least one of several symptoms of physical dependence (82.4%) and 60.0% reported morning drinking to relieve withdrawal symptoms.

In terms of drug use, 83.8% of the entire sample had tried at least one psychoactive drug to get high over the course of their lifetime. Marijuana was the most frequently used substance (68.6% of the sample) followed by amphetamines (37.1%) and cocaine (23.8%). The use of opiates was very low in this sample with 3.8% having ever tried heroin, and 14.3% other

Table 2
Characteristics Related to Alcohol/Drug Intake

Drinking Frequency	3.8% daily
	41.9% 2-6 days/wk
	36.2% irregular
	3.8% binge
Drinks/Occasion	11.2 ± 0.91 (regular drinkers > = 1 day/week)
	21.6 ± 1.60 (binge drinkers)
	3.3 ± 0.69 (irregular drinkers)
Family History of Alcoholism	60.6% father or mother
	28.3% other 1° or 2° relatives
	11.1% none
Alcohol Dependence	40.0% none
	33.3% current
	26.7% lifetime
Other Drug Dependence	63.8% none
	18.1% current
	17.1% lifetime

opiates (i.e., pain killers). As shown in Table 5, current drug dependence (other than alcohol) was found in 18.1% of the sample according to DSM-III-R criteria. These individuals were slightly younger (28.3 years) than non-abusers (34.9 years) and 63.2% of them also received a diagnosis of alcohol dependence.

Discussion

More than 20 years ago Westermeyer (1976) described the typical environment for American Indian people living in large American cities. He stressed that there were overwhelming social and environmental issues such as child abuse, marital breakdown, alcoholism and drug abuse as well as a high degree of delinquency, school drop-out, and unplanned pregnancies. However, epidemiological data relating to these issues is lacking. The information required to make comparisons between the health and well-being of American Indians living inside cities versus those living on reservations is not available.

Large scale epidemiological studies have not been conducted in this population, partially due to the difficulty of random sampling in a transient minority population that is spread-out over the urban environment. With this

Table 3
Characteristics by Diagnosis of Alcohol Dependence

Alcohol Dependence	None (40%)	Current (33.3%)	Lifetime (26.7%)
Age	32.5 ± 1.3	32.0 ± 1.24	35.4 ± 2.1
Never Married	47.0%	74.3%*	57.0%
Elementary Education Only	9.5%	31.4%*	14.3%
# Months Full-Time Job (past year)	7.1 ± 0.73	4.4 ± 0.66**	6.8 ± 0.98
# Convictions (lifetime)	0.14 ± 0.5	1.72 ± 0.5**	1.28 ± 0.3
Jail Time (days)	2.27 ± 2.2	254.9 ± 106**	82.0 ± 64
% With Drunken Driving Conviction	17.9%	76.5%*	67.8%
Age First Drunk	17.1 ± 0.63	13.0 ± 0.68**	12.6 ± 0.71
Days Drinking/Month	3.9 ± 0.78	13.9 ± 1.53**	6.2 ± 1.3
Standard Drinks/Occasion	4.6 ± 0.91	12.3 ± 1.2**	6.2 ± 1.3
Any Binge Drinking (lifetime)	33.3%	94.3%*	67.9%
Any Detox (lifetime)	4.8%	60.0%*	35.7%
Current Substance Abuse	4.8%	34.3%*	18.5%
Treatment for Substance Dependence (lifetime)	7.3%	58.8%*	48.1%

* Significantly different from non-abusers by Chi-Square analysis, $p < 0.05$.

** Significantly different from non-abusers by t-test with Bonferroni correction, $p < 0.05$.

in mind it is important to note the limits to interpretation and generalizability of the results presented in this paper. The non-random sampling technique precludes any firm conclusions concerning the rates of alcohol and drug dependence. However, it should be noted that the percentage of abstinent or irregular drinkers (50.5%) surveyed in the present study is very close to that found in previous studies of urban American Indians (ADAD, 1992). This same caveat must be applied to very high rates of family history of

Table 4
Individual Symptom Frequencies Among Those With and Without an
Alcohol Dependence Diagnosis

Symptoms from DIS Interview	Proportion of Sample Who Endorsed Item (Rank)		
	Without Alcohol Dep.	With Alcohol Dep.	
Blackouts	60.6	100.0	(1)
Drinking once/week heavily	37.5	97.1	(2)
Binge Drinking	33.3	94.3	(3)
Family objected to drinking	30.0	91.4	(4)
Physical fights while drinking	30.0	91.4	(5)
Job troubles	10.0	82.9	(6)
Any physical dependence symptoms	16.7	82.4	(7)
Wanted to stop drinking but couldn't	22.5	80.0	(8)
Arrested while drinking	22.5	80.0	(9)
Trouble while driving	17.5	74.3	(10)
Friends objected to drinking	22.0	74.3	
Drinking every day for 2 weeks heavily	4.9	71.4	
Attempts to control drinking - rules	22.0	68.6	
Morning drinking	5.0	60.0	
Lost job	0.0	57.1	
Told physician about drinking problem	14.6	54.3	
Continued to drink despite health problems	6.1	45.7	
Couldn't work without drinking	3.0	45.7	
Health problems from drinking	6.1	20.0	

alcoholism detected in this study. In 60.6% of the sample either one or both parents were considered to be alcoholic, with only 11.1% having no primary or secondary alcoholic family members. Weisner, Weibel-Orlando, and Long (1984) previously demonstrated that heavy drinkers in an urban American Indian population were more likely to have had heavy drinkers in the family of origin. However, in the present study there was no relationship between family history of alcoholism and an increased likelihood of current or lifetime diagnosis of alcohol dependence. Regardless of current drinking status, a full 46.7% of the sample had alcoholic fathers, and 24% had alcoholic mothers. Responses to the DIS symptoms (Table 4) provide several interesting insights into the pattern of alcohol abuse and dependence in the portion of the sample consuming alcohol regularly. Blackouts, binges and physical fights were very common symptoms of alcohol dependence in this population. These same symptoms are those most frequently described in clinical studies of American Indian alcoholics (Westermeyer & Neider, 1984; Westermeyer & Peake, 1983). Similar data were reported by Manson et al. (1992) in a sample of American Indians from three geographically distinct

Table 5
Characteristics by Diagnosis of Drug Dependence

Drug Dependence	None (63.8%)	Current (18.1%)	Lifetime (17.1%)
Age	34.9 ± 1.3	28.3 ± 1.2**	31.6 ± 1.2
% With Current Alcohol Dependence	17.9%	63.2%*	61.1%
# Drugs Abused	0	1.54 ± 0.31**	1.8 ± 0.30

MOST FREQUENTLY ABUSED SUBSTANCES: CANNABIS, COCAINE

* Significantly different from non-abusers by Chi-Square analysis, $p<0.05$.

** Significantly different from non-abusers by t-test with Bonferroni correction, $p<0.05$.

areas of the U.S. Of particular note is the very high prevalence of symptoms of physical dependence (82.4%), as well as the inability to stop drinking (80.0%) despite attempts to quit or set rules (68.6%). This high incidence of morning drinking (60%) and other symptoms of physical dependence (e.g., shakes) is consistent with the large amounts of alcohol consumed per occasion as shown in Table 2.

There have been no exhaustive studies on the prevalence of alcoholism or "heavy" binge alcohol use in various tribal groups (Lex, 1987). In general, studies which do exist point to marked heterogeneity with clear differences between the sexes, as well as between tribes with regard to drinking patterns and the degree of alcohol-related mortality (Christian, Dufour, & Bertolucci, 1989; Heath, 1985; Weibel-Orlando, 1985). As noted in Table 1, the majority of the present sample were Sioux. Although tribal differences were not analyzed in the present study, there is research which suggests that the Sioux may be more prone to problems with alcohol than many other tribal groups. Most recently, Barker and Kramer (1996) examined the patterns of alcohol consumption in urban American Indians living in Los Angeles. The data was obtained from a convenience sample constructed around the administration of a community health survey (282 subjects). The results indicated that Sioux Natives living in the Los Angeles area consumed the highest amounts of alcohol compared to any other American Indian group. The tendency towards heavy alcohol consumption among the Sioux is also noticeable in data on regional alcohol-related mortality, alcohol abuse, and alcohol-induced cirrhosis collected by the Indian Health Service (IHS) during the period 1980 to 1987. The IHS estimates that there are large regional differences in the rates of alcohol-related disorder among its twelve

administrative districts. In the district of Aberdeen (predominantly Sioux), the death rate from alcohol-related causes is ten times higher than areas of Oklahoma where tribes such as the Cherokee and Seminole predominate (Hisnanick, 1992). In a well-documented study Stratton, Zeiner, and Paredes (1978) examined alcoholism and alcohol-related mortality among different tribal groups in Oklahoma. The Cherokee displayed a very low rate of alcohol-related deaths (6/100,000 population) and arrests compared to the Cheyenne-Arapaho (296/100,000). Their analysis of the history and current social organization of the two tribes supported the view that traditional cultural values, tribal institutions, social organization, and the presence or absence of strong community sanctions are important to an understanding of current drinking practices. Studies of cultural values and social organization among widely dispersed urban American Indian populations are non-existent. Given the large scale movement of American Indian populations into cities, the factors which promote as well as protect from the development of alcoholism in this new urban environment is worthy of analysis.

It is important to note that not all American Indians drink and not all who drink do so excessively. There has been a tendency to overgeneralize based on the drinking patterns observed in some American Indian groups (May & Smith, 1988). Negative stereotyping of drinking among American Indians has been perpetuated in the research literature and in the popular press. In the present study a large proportion of the sample were abstinent or irregular drinkers consuming moderate amounts per drinking occasion. A distorted and negative view of American Indian drinking is also evident among American Indians themselves. For example, the majority of Navajo respondents in a survey conducted by May and Smith (1988) stated that they believe that American Indians have a physiological or biological weakness for alcohol compared to other races. Similarly, Sage and Burns (1993) found the idea that heredity plays a significant role in American Indian alcohol use to be very prevalent. While there has been some research on alcohol metabolism among different ethnic groups (e.g., Segal & Duffy, 1992), it is important to note that research to date has not in fact found any firm evidence that American Indians are different in terms of their physiological responses to alcohol or their rate of alcohol metabolism. This subject will be the topic of other papers emanating from the research program at the University of Colorado (Gill et al., in press; Gill et al., 1997).

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References

Alcohol & Drug Abuse Division. (1992). *Substance Abuse Indicators Among Native Americans in Colorado.* From the office of Data Analysis Evaluation, Colorado Department of Health.

Barker, J. C., & Kramer, B. J. (1996). Alcohol consumption among older urban American Indians. *Journal of Studies on Alcohol, 57,* 119-124.

Christian, C. M., Dufour, M., & Bertolucci, D. (1989). Differential alcohol-related mortality among American Indian tribes in Oklahoma, 1968-1978. *Social Science Medicine, 28,* 275-284.

Gill, K., Eagle Elk, M., Liu, Y., & Deitrich, R. A. (in press). An examination of ALDH2 genotypes, alcohol metabolism and the flushing response in Native Americans. *Journal of Studies on Alcohol.*

Gill, K., Lucas, D., Menez, J. F., & Deitrich, R. A. (1997). *The relationship between ALDH, ADH and CYP450 genotypes and the rate of alcohol metabolism in Caucasians and Native Americans.* Manuscript in preparation.

Good, B. J. (1993). Culture, diagnosis and comorbidity. *Culture, Medicine Psychiatry, 16,* 427-446.

Heath, D. B. (1991). Uses and misuses of the concept of ethnicity in alcohol studies: An essay in deconstruction. *The International Journal of the Addictions, 25,* 607-628.

Hisnanick, J. J. (1992). The prevalence of alcohol abuse among American Indians and Alaska Natives. *Health Values, 16,* 33-37.

Indian Health Service. (1995). *Trends in Indian Health.* U.S. Department of Health and Human Service, Division of Program Statistics.

Lex, B. W. (1987). Review of alcohol problems in ethnic minority groups. *Journal of Consulting and Clinical Psychology, 55,* 293-300.

Manson, S. M., Shore, J. H., Baron, A. E., Ackerson, L., & Neligh, G. (1992). Alcohol abuse and dependence among American Indians. In J. E. Helzer & G. J. Cannino (Eds.), *Alcoholism in North America, Europe and Asia* (pp. 113-130). New York: Oxford University Press.

May, P. A., & Smith, M. B. (1988). Some Navaho Indian opinions about alcohol use and prohibition: A survey and recommendation for policy. *Journal of Studies on Alcohol, 49,* 324-334.

McClure, L., Boulanger, M., Kaufert, J., & Forsythe, S. (1992). *First Nations Urban Health Bibliography: A review of the literature and exploration of strategies.* Winnipeg, Manitoba, CAN: Northern Health Research Unit, University of Manitoba.

Rhoades, E. R., Hammond, J., Welty, T. K., Handler, A. O., & Amler, R. W. (1987). The Indian burden of illness and future health interventions. *Public Health Reports, 102,* 361-368.

Sage, G. P., & Burns, G. L. (1993). Attributional antecedents of alcohol use in American Indian and Euroamerican adolescents. *American Indian and Alaska Native Mental Health Research, 5(2),* 46-56.

Segal, B., & Duffy, L. (1992). Ethanol elimination among different racial groups. *Alcohol, 9,* 217-219.

Stratton, R., Zeiner, A., & Paredes, A. (1978). Tribal affiliation and prevalence of alcohol problems. *Journal of Studies on Alcohol, 39,* 1166-1177.

Walker, R. D., Dow-Lambert, M., Silk-Walker, P., Kivlahan, D. R., Donovan, D. M., & Howard, M. O. (1996). Alcohol abuse in urban Indian adolescents and women: A longitudinal study for assessment and risk evaluation. *American Indian and Alaska Native Mental Health Research, 7(1),* 1-47.

Weibel-Orlando, J. C. (1985). Pass the bottle, Bro!: A comparison of urban and rural Indian drinking patterns. *Alcohol Use Among U. S. Ethnic Minorities, NIAAA Research Monograph, 18,* 269-289.

Weisner, T. S., Weibel-Orlando, J. C., & Long, J. (1984). "Serious Drinking," White man's drinking" and "teetotaling": Drinking levels and styles in an urban American Indian population. *Journal of Studies on Alcohol, 45,* 237-250.

Westermeyer, J. (1976). Use of a social indicator system to assess alcoholism among Indian people. *American Journal of Drug and Alcohol Abuse, 3,* 447-456.

Westermeyer, J., & Neider, J. (1984). Depressive symptoms among Native American alcoholics at the time of a 10-year follow-up. *Alcoholism: Clinical and Experimental Research, 8,* 429-434.

Westermeyer, J., & Peake, E. (1983). A ten year follow-up of alcoholic Native Americans in Minnesota. *American Journal of Psychiatry, 140,* 189-194.

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