American Indian and Alaska Native Mental Health Research
Journal published by the Centers for American Indian and Alaska Native Health
Colorado School of Public Health/University of Colorado Anschutz Medical Campus (www.ucdenver.edu/caianh)

BOARDING AND PUBLIC SCHOOLS: NAVAJO EDUCATIONAL ATTAINMENT, CONDUCT DISORDER, AND ALCOHOL DEPENDENCY

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Abstract: Many critics of United States government operated boarding schools for American Indians have asserted that the boarding school experience has lasting deleterious effects on personality development. Specifically, it has been suggested that a boarding school education is likely to lead to problems with alcohol in adulthood. To examine that assertion, data from interviews with over 1000 Navajos are analyzed concerning schooling, conduct disorder and the history of alcohol use. Consistent with data on the U.S. population generally, Navajo high school dropouts reported greater problems with alcohol than did graduates. Contrary to expectations, Navajos with a history of alcohol dependency were no more likely to have attended boarding schools than those who did not report patterns of alcohol dependency.

The effects of a boarding school education upon American Indian students has generated controversy over the years. Critics of the boarding school system have asserted that boarding schools break up families (DeJong, 1993) and "invariably set parents and children, home and school, to warring with one another" (Ortiz, 1972, p. 83). They further propose that the experience may have long term negative consequences for the personality development of the students (Leon, 1969). Moreover, boarding schools have long been criticized for depriving students of their own tribal cultures, which of course was an important reason for creating them in the first place.

Mental health workers have often expressed the view, generally on the basis of clinical impressions, that the boarding school experience was

very damaging. Leon (1969), a psychiatrist, suggested that the parental separation associated with residential schooling of young children led to serious, irreversible psychological damage. Bergman (1969), a psychiatrist in the Indian Health Service in the 1960s, wrote:

> Among the young adults who are the first generation of Navajos in which the majority went to school, there are many severe problems. The problems that occur with excessive frequency are ones involving the breakdown of social control: drunkenness, child neglect, and drunken and reckless driving. Alarming numbers of people have lapsed into an alienated, apathetic life marked by episodes of delinquency and irresponsibility…. It seems a reasonable hypothesis that their having been placed by their own parents in an impersonal institution contributes to such attitudes, and it is noticeable that the boarding schools provide children and adolescents with little or no opportunity to take care of other children or even of themselves. (p. 1126)

More recently, Topper (1985) has observed that "among the Navajo… employment and boarding school experiences are major contributors to the development of the problems many young Navajos have in relating to strangers and to the recent increase in the levels of socio- and psychopathology…" (p. 237). He notes that many factors, such as genetic history and quality of parenting, are important in understanding why specific individuals become alcohol abusers. Apart from family life, he continues, the "boarding school experiences" and employment conditions have the greatest "impact on the development of psychopathology and maladaptive behavior" (p. 237). In a subsequent paper, Topper and Curtis (1987) point to the values inculcated by "Western education" in "agency-town schools" (p. 337), (which could be either boarding or public) as contributing to a form of social pathology ("synergistic dual anomie depression") among Navajo male adolescents. In several places they indicate that boarding school experience is more detrimental than public school in generating this mental health problem (Topper & Curtis, 1987, pp. 339, 343-344).

A study of Inuit (Eskimo) students in Alaskan boarding schools in the 1970s indicated high levels of psychological disturbance. The extent of the problems varied from one boarding school environment to another, but Kleinfeld and Bloom (1977) posited that, generally, Indian boarding school environments "can contribute to the development of long-standing character pathology" (p. 411). In a study of Canadian boarding school students during the 1960s, Hobart (1974) found that students from families more involved in the subsistence economy had greater problems than those from families relying primarily on wage work. Krush, Bjork, Sindell, and Nelle (1966) found a high level of emotional disturbance among Indian students at a

Bureau of Indian Affairs (BIA) boarding school in South Dakota. Dick, Manson, and Beals (1993) claim that "Alcohol use/abuse has approached near epidemic proportion in Native American boarding schools" (p. 172). They go on to say that it was the observation of an association between "high levels of dysfunction, notably substance abuse and depression," in "this type of environment" that "fueled the decentralization of educational resources and increased local control of schools" (p. 172).

In the late 1960s a U.S. Senate subcommittee, after hearings on the BIA boarding school system, concluded that off-reservation boarding schools had "generally become dumping grounds for Indian students with severe social and emotional problems" but also included students who simply "had no other school available to them" (U.S. Senate, 1995, p. 2). One critic counseled that "finding viable alternatives to boarding schools for the young is undoubtedly the biggest and most urgent challenge facing the Subcommittee" (Ortiz, 1972, p. 84).

There was not complete unanimity in condemning boarding schools, however. The Navajo Tribal Council, discounting the claimed link between boarding schools and emotional problems, requested that the BIA expand the boarding school program "working closely with the Navajo tribe" (Fuchs & Havighurst, 1972, p. 223). Moreover, studies of specific boarding schools have emphasized their positive aspects. Trennert (1988) noted that "those who passed through the system [the Phoenix Indian School] generally praised it," believing "that the brand of education and strict discipline associated with the school developed moral character, a sense of responsibility, and integrity" (p. 297). Writing about the Dakota Sioux, Erikson (1963) claimed that the boarding school environment was generally more physically comfortable than the home environment and the times spent at the schools were among "the pleasantest years in the child's life—and yet the great majority of students who enter high school do not graduate; they sooner or later play truant and finally quit for good" (p. 159). Frisbie (1996) has analyzed published accounts of the boarding school experiences of 16 Navajos who attended such institutions in the decades prior to 1940. Recognizing that these "narrations are affected by selective memories, audiences," as well as other factors (p. 171), she notes that several individuals "end up assessing their experiences as positive, although perhaps too harsh and difficult" (p. 166). She cautions against "simplistic interpretations of the significance and lasting reverberations of boarding school experiences in today's world, and monolithic generalizations about agents, particulars, and extent of cultural destruction" (p. 169).

Not only are there differences of opinion about the damage done by boarding schools, the alternatives have also been criticized as well. Based on work among Navajo children in the early 1940s, Leighton and Kluckhohn (1947) wrote:

> [t]he psychological conflicts and stresses which are perhaps the most momentous for the personality formation of Navaho children taught by white teachers… arise from two features of white culture: (1) the great stress upon competition between individuals; (2) the lack of definite status for the child at each age level…. It is frequently observed that Navaho children who leave the hogans calm and well-poised return at the end of the first school year nervous and tense. This is less true of children attending the present Indian Service day and semi-boarding schools. (p. 68)

More recently, some analysts of Indian education note that "public schools serving Indian children… present a picture which is little better" than the boarding schools (Ortiz, 1972, p. 84). Both "the Public and Bureau of Indian Affairs schools have failed Indian children, parents, and communities" (Otis, 1972, p. 71). Teachers in schools both on and off the reservations "lack understanding" of students and their culture (Otis, 1972, p. 72). Thus, "in the cultural conflict between school and home, children, by the time they reach adolescence, have often developed an 'Identity-Orientation' psychosis so acute that conflict is resolved only by complete withdrawal and alienation from self and society" (Otis, 1972, p. 72).

Of all American Indian tribes, the Navajo have the largest reservation and the greatest number of tribal members residing on reservation. The availability and structure of educational experiences have differed to some degree from those of other tribes. The educational system on the Navajo Reservation was one of the least extensive and developed. By the end of World War II, only 32% of Navajo children were enrolled (Johnston, 1966). The federal government responded in 1946 with a unique, off-reservation boarding school program for Navajo adolescents: "the Navajo special education program." The goal was to provide students, in a five year course of study, with "a salable skill, sufficient fluency in English to get and hold a job and as much academic education as each individual could acquire in the years left to him for formal education" (Thompson, 1975, p. 90). In 1950 Congress further expanded educational opportunities with the passage of The Navajo-Hopi Long-Range Rehabilitation Act (PL 81-474). The act appropriated $25 million for school construction (Young, 1961). Enrollment of school age children rose to 57% in 1954 and 89% in 1958, followed by a slight decline through the early 1960s (Thompson, 1975; Johnston, 1966).

During the 1960-61 school year 29,611 Navajo students were attending school. Over a third (35.8%) were enrolled in 54 boarding schools located on Navajo lands. About 8% were housed in BIA administered "peripheral dormitories," located in towns near the reservation ("border towns"). These "border dorm" students attended local public schools. Nearly one-fifth (19.4%) were at one of the 11 distant off-reservation BIA boarding schools. Thus nearly two-thirds of all students were in some type of "boarding"

environment while pursuing their education. The remainder attended public schools (25%), BIA day schools (4%) or mission and other schools (nearly 5%) (Young, 1961, pp. 60-61).

These figures indicate that in any one year Navajo students could be found in many different types of schools. Thompson (1975) asserts that "the quality of educational services for Navajo children had suffered in the interest of getting children in school in the emergency effort of the 1950s" (p. 148). The rapid expansion of facilities and programs seems to have led to a certain instability in the educational experience and emphasized boarding school experience for most students at some point in their school career, but increasingly day schools were built to replace boarding schools and allow students to remain at home.

Public school districts, established under state law, were formed within the reservation beginning in the 1950s (Thompson, 1975). By the 1970s, with nearly all Navajo children enrolled in school, and over half in public schools, concern among Navajo educators shifted from getting young children into school to keeping older ones from dropping-out. In the mid 1980s the Navajo Area Student Dropout Study found an overall drop-out rate of about 31%, and an annual transfer rate of about 30% (Brandt, 1992). In 1992 nearly 70% of students within the Navajo Nation attended public schools and 21% attended BIA administered schools (some as day students) (Navajo Nation, 1993). Some students still attend boarding school for part of their education and there is a great deal of movement by students among schools of different types.

Despite the high dropout rate, the general educational level of the population has increased substantially. The U.S. Commission on Civil Rights, citing 1970 census figures, "disclosed that most Navajo adults complete an average of 5 school years" and "that 80% of the over 25 age group had dropped out of school before reaching grade 12" (Brandt, 1992, p. 49). These were accurate aggregate statistics for the time, but the figures obscure the age cohort effects. In 1970, a third (32.8%) of Navajos, born approximately between 1934 and 1945 and prior to the massive push for education, had completed high school. Only a quarter (24.3%) of this 25-34 year old cohort had less than 5 years of school, whereas over half (53.1%) of all adult Navajos residing on the reservation had less than 5 years of schooling (U.S. Bureau of the Census, 1973). By 1990, two-thirds of Navajos ages 25-34 (those born approximately between 1954 and 1965) were high school graduates. Overall, the 1990 census reports that 51% of all Navajos over 25 had graduated high school and only 28.2% had less than a 9th grade education. The aggregate statistics for the entire population change slowly as cohorts age, but this masks the profound changes in educational attainment that have occurred in a single generation.

The changes in educational attainment described above would be expected to be associated with changes in alcohol use and abuse. Alcohol consumption has been widely observed to be associated with educational

attainment. In the U.S. population "those with the lowest levels of education have the highest rates of heavy drinking" with "a consistent fall in these percentages as educational level rises" (Helzer, Bucholz, & Robins, 1992, p. 86). Between 1967 and 1984 symptoms of alcohol dependence increased "somewhat disproportionately among those with less income and less education" (Room, 1991, p. 157). Similar observations have been made among American Indians. Reporting on data from three widely separated tribes, Manson, Shore, Baron, Ackerson, and Neligh (1992), found that people with at least some college were slightly less likely to have alcohol problems than those with less education.

Complicating the picture is the observation that antisocial personality disorder (ASPD) is strongly associated with alcohol dependence (Hesselbrock, Meyer, & Keener, 1985; Kadden, Getter, Cooney, & Litt, 1989; Litt, Babor, DelBoca, Kadden, & Cooney, 1992; Ross, Glaser, & Germanson, 1988; Rounsaville, Dolinsky, Babor, & Meyer, 1987). In the population-based Epidemiological Catchment Area Study (ECA), for instance, the odds ratio for people with ASPD being alcohol dependent was 21, higher than for any other co-morbid condition (Regier, et al., 1990). Among the criteria for ASPD is conduct disorder before age 15, which is a significant risk factor for alcohol dependence in the Navajo population (Kunitz et al., in press). Because conduct disorder is manifested in truancy and other school related behaviors, it is important to consider whether the school experience exerts an independent effect on alcohol dependence or whether the effects, if any, are mediated through conduct disorder.

This review of the existing literature suggests that one would expect: (a) an inverse association between age and educational attainment, (b) an inverse association between education and alcohol dependence, (c) a higher proportion of boarding school alumni among alcohol dependent than non-alcohol dependent people, and (d) that the associations between educational experience and alcohol dependence would be explained by the presence of conduct disorder.

Methods

This study uses a case-control design to investigate risk factors for alcohol dependence among Navajo who were between 21 and 67 years of age in 1992-95. It was carried out in two of the eight Indian Health Service (IHS) service units on the Navajo reservation:

1. Shiprock, the most populous service unit in the Navajo Nation had a 1990 population of 26,710 American Indians (overwhelmingly Navajo) residing on Navajo Nation lands.
2. Tuba City, had a 1990 population of 15,800 American Indians (mostly Navajo but including over a thousand Hopis and some Southern Paiutes).

Each service unit also serves the American Indian population residing in

neighboring off-reservation locations. While the Tuba City hospital is 75 miles from the nearest off-reservation towns ("border towns"), five border towns are located within 50 miles of the Shiprock hospital.

Cases residing in each service unit were drawn from alcohol treatment programs. Controls were matched by age, sex, and community of residence and were drawn from lists provided by the IHS hospitals in Tuba City and Shiprock. The names were of all people seen in an IHS facility between 1982 and 1992 who gave an address in either of the two service units. They were not only in-patients but children seen for school physicals, adults seen for food handler examinations, and so on.

All Shiprock male cases were interviewed while they were in-patients in one of several residential treatment programs. About half the female cases from the Shiprock Service Unit were also interviewed while in the same programs. Due to an insufficiency of such cases, others were selected from lists of patients provided by the Navajo Nation's out-patient substance abuse treatment program.

In Tuba City 82% of the male and 79% of the female cases came from the tribal out-patient program. The different case selection procedures in the two service units were required because of the sizes of the two populations, differences in service unit and tribal program referral practices, and the relative isolation of the Tuba City population from residential treatment facilities.

A stratified random sampling procedure was used to obtain controls in each service unit. In the Shiprock Service Unit the communities were grouped into twenty geographic areas, sixteen of which were chapters (or combinations of chapters)[1] while the remaining four were off-reservation areas. Within each geographic stratum, there were nine age categories in five year intervals for those born between 1927 and 1972, yielding 360 sampling strata, equally divided by sex. In Tuba City, eight chapters were used as the sampling areas as well as one off-reservation area, yielding 162 sampling strata, again equally divided by sex.

Within each sampling stratum in Shiprock the names were randomized and controls were sought by working down the list. Estimates of the success with which individuals were first located and then interviewed range from 30% for the youngest age cohort to 65% for the oldest, and from about 30% in the off-reservation communities to over 80% in a number of rural on-reservation chapters.[2] Interviews were conducted until a non-alcohol dependent control was located. It was not always possible to find such an individual.

In Tuba City a random number table was used to select four potential controls to match each case. Interviewing from these lists of four potential controls occurred until a non-alcohol dependent control was identified or the list was exhausted. When a list was exhausted, a new list of potential controls was randomly drawn and interviewed until a non-alcohol dependent control was found. Response rates in Tuba City were similar to those in

Shiprock. Similar to Shiprock, in Tuba City non-alcohol dependent matches were not found for all cases.

The population was sampled for controls within strata defined by locality, age and sex. To adjust for the demographic effects of these sampling strata, they are included in the regression analyses. We have grouped respondents into three types of "localities" based upon their community of residence: (a) border town, (b) agency town, and (c) rural reservation. We dichotomized the sample by age: (a) less than 50 years of age, and (b) 50 or more years of age. We report the effects of these strata only if they are significant because they are not the topic of the present paper. They are introduced principally to adjust for possible differences between strata, as is common in the analysis of stratified samples.

Corresponding to each case (CAS), interviews were conducted with demographically similar respondents until a non-alcohol-dependent control (NADC) was found or until too many (3-4) alcohol-dependent controls (DEP) had been encountered. In the dichotomous logistic regression analyses presented below, the resulting three samples are treated pairwise: CAS vs. NADC and DEP vs. NADC.

In studying the results of any multiple logistic regression the effect tests of each variable were examined first. If a variable was significant, the effects of its individual levels were tested at the (5/k)% level. This is the Bonferroni method with k being the number of levels of the variable. If a variable had a non-significant effect test, its individual levels were not examined. This procedure avoids the pitfalls of multiplicity, i.e., of flagging a few results as significant merely because many tests were done.

The interviews were very extensive and included the questions from the Diagnostic Interview Schedule (DIS) designed for the ECA Study (Robins & Regier, 1991). The items included allowed for the diagnosis of both Alcohol Dependence and Conduct Disorder. The sexual content of many of the ASPD items were regarded as inappropriate in the Navajo context, especially in field interviews. That and our focus on early manifestations of problems led us to exclude that scale and include only the items relevant to Conduct Disorder. The version of the DIS we used had been revised to match the criteria in DSM-III-R.

To diagnose alcohol dependence a series of twenty-six questions from the DIS was used. In DSM-III-R the number of symptoms reported is considered a measure of severity. The various criteria do not need to have occurred at the same time. Some may have occurred sequentially over several years. It was also possible for people who were alcohol dependent to be in remission by the time they were interviewed. Nonetheless, in the analyses that follow they are treated as having a lifetime history of alcohol dependence.

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Although according to DSM-III-R Conduct Disorder can occur at any age, in this study the focus is upon the behaviors which manifested themselves before age 15 (Robins, Tipp, & Pryzbeck, 1991). As with alcohol dependence, the number of affirmative answers to the items in the DIS is considered a measure of severity. The variable ASYES is the total number of affirmative answers which, because of its skewness (most values being zero) has been transformed into log (ASYES+1). In this paper, conduct disorder is treated as a continuous rather then a dichotomous variable and logASYES is used in the analyses.

There were also extensive questions having to do with family, occupational, marital, substance use, and drinking histories, and most relevant to this paper, educational background and attainment. Interviewing occurred between May 1993 and September 1995. Interviews ranged in length from two to four hours. Interviewees were requested to sign a consent form which had been approved by both the University of Rochester's Institutional Review Board (IRB) and the IRB comprised of representatives of both the Navajo Tribe and the IHS. A Certificate of Confidentiality had been obtained to protect informants should they have reported any illegal activities. At the end of the interview each informant was paid $30.

Results

As expected, for each sex and within each sample, age and number of years of schooling were inversely and negatively correlated (see Table 1). Older people have substantially less education than younger.

The regressions of years of education onto age reveal a related point, illustrated in Figure 1, for each sample (men and women are combined because the results are similar for both sexes). While all the regressions are significantly negative, the one for NADC has the steepest slope and that for CAS the least steep. This means that the youngest NADC are the

Table 1
Correlations of Age and Years of Schooling by Gender and Sample

Sex and Sample	R	*p*
Women:		
NADC	-.44	0.0000
DEP	-.23	0.0357
CAS	-.25	0.0010
Men:		
NADC	-.53	0.0000
DEP	-.47	0.0000
CAS	-.36	0.0000

best educated and the oldest the least educated among the three samples. These results suggest that the meaning of education has changed over several generations. In the past people who did not attend school seem to have had fewest problems with alcohol. More recently, education has been associated with reduced levels of difficulties with alcohol.

Years of education treated as a continuous variable is a useful measure, but it is also important to consider education as a series of stages, the successful completion of each being necessary for passage to subsequent stages. We collapsed years of education into six levels of schooling: (a) a small percentage of respondents who had never attended school; (b) those who had attended only grade school [through eighth grade]; (c) those who had attended, but had not completed, high school [grades nine through twelve]; (d) high school graduates; (e) those who had some college experience; and (f) college graduates.

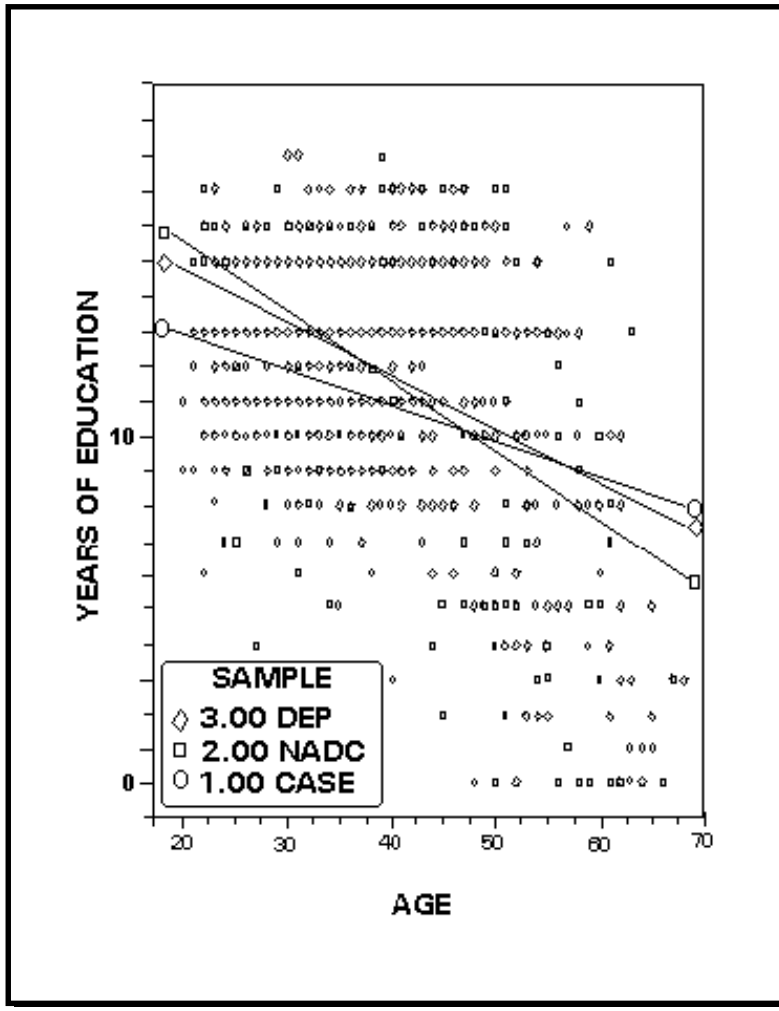
The failure to complete an important stage of the educational process may thus be associated with increased difficulties both contemporaneously and subsequently. Table 2 shows that for men and women NADC were less likely to be high school dropouts and more likely to be high school graduates than both CAS and DEP. They were also more likely not to have attended school at all, which is a reflection of the age pattern displayed in Figure 1.

Table 2
Highest Level of Schooling Achieved (in%)

Level	Male			Female		
	CAS	DEP	NADC	CAS	DEP	NADC
None	1.0	0.5	5.7	1.3	1.7	2.8
Grade School	14.4	11.3	15.3	10.1	5.0	7.0
Some High School	34.2	29.9	14.0	49.3	33.3	22.4
High School Graduate	32.7	36.1	40.1	18.9	18.3	20.3
Some College	17.8	18.9	21.7	18.2	40.0	42.7
College Graduate	0	3.2	3.2	2.0	1.7	4.9
N	202	371	157	148	60	143
X^2		42.327			35.027	
d.f		10			10	
p		<0.0001			<0.0001	

Because some components of conduct disorder involve problems related to schooling (such as truancy and delinquent acts leading to suspension and expulsion), it is possible that being a high school drop-out is simply a proxy for having conduct disorder. Table 3 displays two dichotomous logistic regressions of samples onto school level, logASYES,

Figure 1
Regressions of Years of Education onto Age, by Sample



and the stratification factors of age, sex, and locality (community type). It is clear that school level has independent effects in addition to those of log ASYES, and that conduct disorder is not the underlying cause which explains both dropping out of school and alcohol dependence.

As described previously, the school experience has been said to be a punishing one that causes psychological distress, including alcohol abuse and dependence. Table 4 displays the types of grade schools and high schools attended by those informants who attended any school at all.

Table 3
Multiple Logistic Regressions of Sample onto School Level: logASYES, and the Stratification Factors of Age, Sex, and Community Type

A. DEP vs. NADC

Effect Test:

	D.F.	Wald Chi square	*p*-value
School level	5	15.9896	0.0069
log ASYES	1	31.1861	0.0000
Community type	2	2.5220	0.2834
Age	1	0.2623	0.6085
Sex	1	78.3619	0.0000

Estimate of Effects from Mean

	Estimate	Std. Error	Chi square	*p*-value	Odds Ratio
School Level					
No school	-1.34	0.6	4.97	0.0258	0.07
Grade school	0.193	0.265	0.53	0.4683	1.47
Some H.S.	0.839	0.219	14.65	0.0001	5.36
H.S. grad.	0.175	0.206	0.72	0.3964	1.42

Estimate of Effects from Mean

	Estimate	Std. Error	Chi square	*p*-value	Odds Ratio
School Level					
Some college	0.183	0.219	0.70	0.4031	1.44
College grad.	-0.053	0.420	0.02	0.8994	0.90
logASYES	0.857	0.154	31.19	<0.0001	5.95
Sex (females)	-0.9	0.102	78.36	<0.0001	0.17

B. CAS vs NADC

Effect Test:

	D.F.	Wald Chi square	*p*-value
School level	5	34.1341	0.0000
log ASYES	1	84.8086	0.0000
Community type	2	0.0547	0.9730
Age	1	0.1230	0.7258
Sex	1	0.0223	0.8811

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Table 3 Continued
Multiple Logistic Regressions of Sample onto School Level: logASYES, and the Stratification Factors of Age, Sex, and Community Type

Estimate of Effects from Mean

	Estimate	Std. Error	Chi square	*p*-value	Odds Ratio
School Level					
No school	-0.65	0.553	1.39	0.2379	0.27
Grade school	0.725	0.27	7.22	0.0072	4.27
Some H.S.	1.025	0.225	20.81	<0.0001	7.77
H.S. grad.	0.186	0.228	0.67	0.4144	1.45
Some college	-0.19	0.236	0.63	0.4257	0.69
College grad.	-1.1	0.583	3.54	0.0598	0.11
logASYES	1.443	0.157	84.81	<0.0001	36.10

Respondents' grade school experience was coded for eight types based upon the category of school attended: (a) a boarding school on the reservation administered by the BIA; (b) a border town public school while being housed at a dormitory administered by the BIA; (c) a BIA administered on-reservation day school; (d) a public school on the reservation [without the experience of living in a dormitory as a component of the education]; (e) a public school in an off-reservation community, usually a border town [again without any residential dormitory experience]; (f) attendance at an off-reservation school while placed with a family through a placement program of the Mormon Church, or attendance at a Mission boarding school; (g) a BIA administered boarding school off the reservation; and (h) any experience that involved a combination of one or more of the first seven types. Most frequently those in the "combination" category had experience in both a boarding and a non-boarding educational setting. The categories are the same for high school experience except that there were no BIA day school attendees and we have assigned all those who were enrolled in the five year program at off-reservation boarding to a distinct category because nearly all were adolescents at the time they were first enrolled in this program.[3]

There is no difference among samples with regard to grade schools. There is a significant difference among men but not women at the high school level. The difference is accounted for entirely by the men who attended the special five year programs, which existed for only about two decades following World War II.

The people who were in this program were among the oldest informants; they averaged 53 years of age, about 15 years older than the average age of all the samples. Because male cases were on average

Table 4
Types of Schools Attended, by Sample and Sex (in%)

	Men			Women		
	CAS	**DEP**	**NADC**	**CAS**	**DEP**	**NADC**
Type of Grade School						
BIA Boarding on Reservation	25.2	25.9	25.0	23.9	22.4	18.7
BIA dorm, off Reservation	0.5	0.5	0.7	0.7	1.7	0.7
Public School						
BIA on Reservation day	3.5	2.1	4.7	3.4	1.7	2.1
On Reservation public school	17.3	14.5	13.5	27.4	17.2	23.7
Off Reservation public school	10.4	10.8	11.5	6.8	10.3	10.1
Mission or Mormon placement	2.5	4.0	2.7	2.7	5.2	3.6
BIA off Reservation boarding	2.9	1.9	8.8	2.7	1.7	3.6
Combination	37.6	40.1	33.1	32.2	39.7	37.4
N	202	371	148	146	58	137
p-value		0.1159			0.9306	
Pearson's chi square		20.47			7.12	
df		14			14	
Type of High School						
BIA Boarding on Reservation	8.0	5.8	5.3	5.2	3.6	3.8
BIA dorm, off Reservation	2.9	3.3	5.3	2.2	9.1	3.8
On Reservation public school	26.3	29.2	18.8	29.1	32.7	41.2
Off Reservation public school	24.6	19.1	27.8	20.1	18.2	18.3
Mission or Mormon placement	2.9	5.8	7.5	.7	3.6	3.1
BIA off Reservation boarding	12.0	15.5	11.3	9.7	3.6	4.6
Combination	20.0	19.5	15.0	29.9	29.1	22.1
5-year program	3.4	1.8	9.0	3.0	.0	3.1
N	175	329	133	134	55	131
p-value		.009			.256	
Pearson's chi square		29.43			17.01	
df		14			14	

about two years younger than male DEP and NADC, age confounds the comparison. In Table 5 two logistic regressions are displayed of sample onto high school type, logASYES, and the stratification factors of age, sex, and community type. School type is not significant once age is included in the analysis.

Discussion

Case-control designs are subject to significant selection and recall biases. The former has to do with the way in which both the cases and the controls are chosen. If, for example, the people in treatment programs were

Table 5
Logistic Regressions of Sample onto High School Type, LogASYES, and the Stratification Factors of Age, Sex, and Community Type

A. DEP vs. NADC

Effect Test:

	D.F.	Wald Chi square	*p*-value
High school type	7	12.1573	0.0955
logASYES	1	32.6577	0.0000
Age	1	0.7610	0.3830
Sex	1	73.4369	0.0000
Community Type	2	1.1624	0.5592

Estimate of Effects from Mean

	Estimate	Std. Error	Chi square	*p*-value	Odds Ratio
Sex (female)	-0.9	0.105	73.44	<0.0001	0.16
logASYES	0.924	0.162	32.66	<0.0001	6.83

B. CAS vs. NADC

Effect Test:

	D.F.	Wald Chi square	*p*-value
High school type	7	10.6662	0.1539
logASYES	1	85.0638	0.0000
Age	1	0.9894	0.3199
Sex	1	0.1496	0.6989
Community Type	2	0.1380	0.9333

Estimate of Effects from Mean

	Estimate	Std. Error	Chi square	*p*-value	Odds Ratio
logASYES	1.48	0.16	85.06	<0.0001	39.10

Note: Estimates are provided for only those variables for which the results of the Effect Test were significant.

selected in some way that was associated with their educational background that differentiated them from the rest of the population, a spurious association (or lack of one) could result.

There is no evidence of that in the data. The availability of alcohol dependent controls is useful in demonstrating this, for there is a regular decline among both men and women in the proportion of high school dropouts: high among cases, intermediate among alcohol dependent controls, low among non-alcohol dependent controls.

With regard to recall bias, it is possible that people in treatment learned, as a result of the treatment experience itself, to describe their childhood misbehaviors more fully than the controls. To explore this potential bias, we have compared logASYES scores among alcohol dependent controls who were once in treatment with those who were never in treatment. There is no difference between them, and we conclude that this sort of recall bias is not a significant problem.

Another limitation in this study is that synchronic areal surveys, such as this one which focuses on a segment of the Navajo population residing on or near the reservation, cannot account for the processes of selective mortality and differential out-migration. It could be that a significant proportion of people who have attended boarding school and who develop alcohol dependency leave the population through untimely deaths or migration to distant urban areas. This is an empirical question that might best be examined through the study of a cohort of boarding school attendees.

That dropping out of high school is an independent risk factor for alcohol dependence is consistent with what has been observed in the ECA study, in which dropping out of any school program instead of completing was also associated with alcohol dependence (Helzer, Burnam, & McEvoy, 1991). It is not clear what the explanation is, but clearly it is different from the dimension tapped by the questions dealing with conduct disorder.

That alcohol dependence is in general associated with lower levels of school attainment is also consistent with studies in the general population. These results are complicated, however, by the finding that men who did not attend school or who attended the special five year program were disproportionately found among the NADCs. Men in these categories were older than other respondents. This finding may be the result of a different experience among previous generations, in which not attending school or attending a five year program as a teenager without ever having completed, or even attended, grade school was in fact protective against the development of alcohol dependence. That type of educational experience is no longer possible, and among younger people failure to complete high school is associated with an increased risk of alcohol dependence.

Perhaps more surprising in light of the observations cited previously is the fact that the type of school attended is not associated with alcohol dependence. There are two points to be made. The first is that boarding schools, which have generally been the focus of criticism, have also been cited by many of their former students as having effectively taught them skills needed for survival in an Anglo-dominated world (Levy & Kunitz, 1974). Some informants, indeed, claim that going to boarding school got them out of very disrupted and abusive home situations. Frisbie (1996) has reached similar conclusions from her analysis of Navajo reflections upon boarding school experiences in late 19th and early 20th centuries. Thus, while the

Journal published by the Center for American Indian and Alaska Native Health
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experience must have been devastating for many, it was not universally so, and the variability helps to account for the fact that it is not a risk factor for alcohol dependence.

Second, the large public school complexes that arose to replace the boarding schools of an earlier era, especially those located in the large and relatively densely populated agency towns such as Tuba City and Shiprock, have proven to be fertile soil for the development of a new youth culture which includes heavy drinking as one of its major attributes (Henderson, 1997). This is a relatively new pattern and suggests that other sorts of school environments than boarding schools may also produce behavior which predisposes to alcohol dependence.

Navajo experiences with boarding schools may differ significantly from the experiences of members of other tribes. Based on many of the generalizations about the devastating consequences of boarding schools upon the adult behaviors of individuals, we expected to find that a boarding school education would have a direct relationship to the development of alcohol dependency in adulthood. Although the overall level of educational attainment is directly related to a history of alcohol dependency, the type of institution in which one attains that level is not.

That we have been unable to demonstrate a simple association between boarding schools and alcohol dependency among the Navajos in two regions of Navajo Country does not mean, of course, that boarding schools may not operate to affect alcohol use by more circuitous routes. For example, Beauvais (1992) has speculated that "boarding school drug use can be a source of 'infection' for Indian youth in general" because, when those who have been exposed to "the boarding school drug culture" return to their home communities, they may transmit elements of the drug subculture to "their friends, creating the potential for high levels of drug involvement by other youth as well as in the youth who attended boarding school" (p. 52). The hypothesis, as well as other means by which the boarding school may indirectly lead to substance abuse problems, are worth testing empirically.

Finally, recalling the narrow focus of our analysis, we have not claimed that boarding school experiences are, in general, psychologically or socially positive, although they clearly were for some people. Nor have we argued that they were the product of a humane American Indian policy. What we have found among a large sample of individuals from one tribe, however, is that the type of educational institution attended is not associated with subsequent alcohol dependence.

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American Indian and Alaska Native Mental Health Research
Journal published by the Centers for American Indian and Alaska Native Health
Colorado School of Public Health/University of Colorado Anschutz Medical Campus (www.ucdenver.edu/caianh)

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Author Note

This paper is based on research supported by the United States Public Health Service, National Institute of Alcoholism and Alcohol Abuse (PHS Grant No. AA09420). We have benefited from the comments on earlier drafts by Dr. Thomas Hill and from the anonymous reviewers for the Journal, and from discussions with many members of the Navajo Nation, especially Wilson Howard, Ariel Howard, and Tom Chee.

Notes

1. A chapter is the smallest unit of Navajo government.

2. The degree to which potential controls identified in the IHS records could actually be found and interviewed is another potential source of bias. Most of the failures in interviewing a person whose name appeared on the list were not refusals, but were the result of mistakes in the records themselves or the age of the records. People whose last visit to the hospital was ten years prior to the time of attempted interview were likely to have moved. This was especially true in the four Shiprock service unit border towns. Searching for more recent addresses in city directories and public utility connection lists allowed us to find only a few of these individuals.

It is possible that people known to the IHS system differ from those who are not. This is unlikely for at least three reasons. First, the IHS has been the major provider of health care to these two service unit populations for 40 years. Second, any level of contact, from a well child visit to an acute hospitalization, is sufficient to be listed in the record system. Moreover, a person visiting a non-IHS provider but who has a part of the bill reimbursed by IHS is listed in the system. Several border town interviewees reported never being treated by the IHS. Thus there is no reason to think that a major bias was introduced by using this source of controls. Third, in a previous study using this same technique more people were identified within the target age group and area than had been identified by the U.S. Census (Kunitz & Levy, 1991). Nonetheless, there is no way of being entirely certain that the people we could not locate were not significantly different from the people we could locate, nor that people unknown to the system are both

very numerous and significantly different from those who are known to the system.

3. The "Special Five Year Navajo Educational Program" was initiated by the BIA in 1946 with 290 Navajo students enrolled at the Sherman Institute (Riverside, California). At the time only about a third of Navajo children of school age attended school. The program was designed to provide Navajos between the ages of 12 and 18 (who had little or no previous schooling) with basic skills in English and with vocational training. The first three years focused on academic and English skills with bilingual instruction by a classroom teacher and a Navajo speaking "teacher-interpreter." By 1950 there were 3,431 Navajos enrolled at several off-reservation boarding schools. Enrollment peaked at 6,560 in 1957. The program was modified during the 1950s to accommodate students who had some prior schooling and was phased out during the 1960s. Between 1951 and 1961 the program graduated 4,347 students (Thompson, 1975, pp. 88-107; Young, 1961, pp. 44-66).