CULTURAL FACTORS ASSOCIATED WITH HEALTH-RISK BEHAVIOR AMONG THE CHEYENNE RIVER SIOUX

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Abstract: A field study was conducted to identify cultural factors — values, beliefs, and related characteristics — associated with health-risk behavior among adult members of the Cheyenne River Sioux Tribe. The Cultural Values Survey (CVS), an instrument for measuring cultural values and related characteristics, was developed and pilot tested in the study population. This instrument, along with the Health Risk Appraisal (HRA) (an instrument developed by the Centers for Disease Control to quantify major health-related behaviors), was administered to a random sample of 429 adults in the study community. Significant differences between females and males for both cultural characteristics and health-risk behaviors were found. Females had significantly higher HRA-calculated Health Index values than males, reflecting overall healthier behaviors. Females who scored higher on cultural factors consistent with more traditional Lakota Indian lifestyles (e.g., degree of Indian blood, Lakota language spoken in the home, traditional Lakota beliefs) had higher HRA Health Index values than females scoring lower in these characteristics. Males who scored higher in factors related to self-determination (e.g., hard work, personal control, industriousness, individual action) had higher Health Index values than those who scored lower in these areas. Further testing of the CVS instrument, as well as further research from both epidemiologic and social science perspectives is essential to elucidate the nature of the relationship between cultural factors and health-related behavior.

Epidemiologic research has identified the importance of behavior in the etiology of many diseases and in the achievement of health. Much of the seminal work in this regard has focused upon behavioral determinants of cardiovascular disease (e.g., Framingham Study, Alameda County Study), although the role of behavior in the etiology of various

infectious diseases, chronic non-infectious diseases, psychiatric illnesses, and substance abuse disorders also has been explored (Dunn & Janes, 1986). With this greater awareness of the behavioral dimension of health and disease has come a growing recognition of the various social and cultural factors that underlie health-related behavior within a complex causal web (Trostle, 1986).

Values, understood by the social sciences as culturally-determined, irreducible concepts of worth (Williams, 1970, 1979; Geertz, 1973) represent perhaps the most fundamental of such cultural factors governing human behavior and ultimately health. Ample sociological and psychological research has explored the relationship between values and various types of behavior (Rokeach, 1979). More recently, the influence of cultural values upon specifically health-related behaviors has begun to receive attention. Conroy (1979) and Kristiansen (1985a) examined the relationship between cigarette smoking behavior and an individual's adherence to fundamental values as measured by the Rokeach Values Survey. Using similar methods, Schwartz and Inbar-Saban (1988) demonstrated a relationship between successful weight-loss behavior and values, and investigated the possibility of altering health-related behavior by deliberately effecting changes in these values. Using the Rokeach Values Survey, Kristiansen (1985b) further attempted to demonstrate a relationship between cultural values and overall preventive health behavior.

The contribution of cultural values to health-related behavior and ultimately to health and disease is a subject that clearly has profound implications for preventive medicine, but has yet to be fully elucidated. The purpose of our study was to explore this relationship by examining cultural values and related characteristics associated with health-related behavior among members of the Cheyenne River Sioux Tribe in South Dakota. This is a community beset by major health problems — unintentional injuries, violence, cardiovascular disease, alcoholism, diabetes — that have traditionally been felt to have significant behavioral etiologies (Rhoades & Welty, 1987). These behaviors, in turn, may result from the loss of traditional cultural values, or may reflect value conflicts implicit in this community's existence as an isolated, politically and economically repressed ethnic minority population in the United States.

We developed a questionnaire instrument, the Cultural Values Survey (CVS), that could allow quantitative assessment of cultural characteristics. We sought to measure values as well as related characteristics such as degree of acculturation, language, and religion. This study was the pilot stage in the development of a valid and reliable instrument to extract such data in epidemiologic studies.

In turn, we sought to correlate the values and other cultural characteristics measured by our instrument with some quantitative measure of health-related behavior. For this behavioral measure we chose the so-called "Health Index," a numerical value estimating an individual's overall

health risk, as derived from the "Health Risk Appraisal" (HRA), an instrument developed by the CDC (Centers for Disease Control) to measure several health-related behaviors and other parameters. Our study was exploratory in nature; using these instruments, we attempted to demonstrate that health-related behaviors are related to values and other cultural characteristics. In this paper we report our preliminary experience and findings.

Methods

Instrument Development

The main study instrument, the Cultural Values Survey (CVS), was developed to measure cultural values, beliefs, and related characteristics. The first portion of the instrument consisted of questions assessing demographic data including sex, age, and degree of Indian blood. Additional questions were developed to capture data on religion and religiosity, language, and self-perceived traditional Lakota lifestyle.

Major value themes were identified from the theories of Williams (1970, 1979) and other social scientists (Rokeach, 1979). Additional important value orientations were identified through discussions with members of the Cheyenne River Sioux Tribe and its Community College, and with social scientists familiar with American Indian culture in general and Plains Indian culture in particular. The following general value orientations were identified: Personal Locus of Control; System Modifiability; Personal Responsibility; Trust; Occupational Primacy and Industriousness; Wealth; Family; Altruism; Education. Each of the identified values and cultural characteristics were operationalized by several questionnaire items comprising the final instrument. Some questions were modified from existing psychometric instruments and surveys published in the social science literature (Backman, Kahn, Davidson, & Johnson, 1967; Gurin, P., Gurin, G., Lao, & Beattie, 1969; Kahl, 1965). A draft of the instrument was pretested with several members of the Indian community for clarity, language usage, and possible cultural bias.

The final instrument consisted of 130 questions, 95 of which utilized a 5-point Likert scale to code the degree of the respondent's agreement with or adherence to the value, belief, or cultural factor in question. Each item yielded a score of 1 to 5 for individual statistical analyses, and items were also grouped together under their intended operational categories to yield additive subscores for further statistical analysis. A copy of the Cultural Values Survey is available by request from the authors. After completion of data collection, confirmatory factor analysis (Varimax rotation) was conducted to examine the internal validity of individual items and their grouping into operational categories.

Health Risk Appraisal Instrument

"Healthier People," a version of the Health Risk Appraisal (HRA) instrument, is a questionnaire developed by the Centers for Disease Control and the HRA Research Group of the Emory University Carter Center (Amler, Moriarty, & Hutchins, 1988). The HRA instrument is designed to measure various known health-risk behaviors — e.g., seat belt use, exercise, diet, tobacco use, alcohol use. Certain measurements of objective health status are also assessed by the HRA — e.g., blood pressure (measured with a mercury sphygmomanometer in the right arm of the participant in a seated position), body mass (kg/m^2), serum cholesterol as measured by a Reflotron analyzer. From these data the HRA provides a calculated "Health Index" value reflecting the relative health risk of the individual.

A computed appraised age for each respondent is generated from age- and sex-specific mortality data using aggregated epidemiologic algorithms that relate behavioral risk factors to death rates. The Health Index is derived from the difference between the individual's actual age and the appraised age calculated from the HRA, negative Health Index values therefore indicating poor health and greater health risk, and positive values indicating good health and less health risk. The validity, reliability, and statistical basis for the development of this and similar instruments is discussed elsewhere (Amler et al., 1988; Beery, 1986; Gazmararian, Foxman, Yen, Morgenstern, & Edington, 1991).

Study Design

The study was conducted over a seven month period, between September 1987 and March 1988, on the Cheyenne River Sioux Reservation in central South Dakota. Permission to conduct the study was granted by the Cheyenne River Sioux Tribal Council. Individuals aged 18 and older were randomly selected from tribal enrollment lists. Participation of these selected individuals was solicited by letter, telephone call, or home visits by an interviewer. If home visits were attempted, additional family members aged 18 and older who were members of the Cheyenne River Tribe also were recruited into the study. Each participant received a ten dollar gratuity to defray costs related to their participation.

Through this process, a total of 889 tribal members were identified as potential participants in the study. Of these subjects, 83 had moved off of the reservation, and 17 were deceased or unable to participate due to mental or physical impairment. Four hundred twenty-nine of the 778 eligible participants who resided on the reservation and were able to participate completed the survey, yielding a participation rate of 55.1%. Two hundred eighty-six eligible participants failed three appointments to

complete the survey, or were otherwise unable to be contacted, while 74 refused to participate altogether.

Three tribal members assisted in data collection, and after receiving training in interviewing techniques, administered the instruments to all participants. An on-site study coordinator also was available for assistance in administering the questionnaires.

Statistical Analysis

Correlational analysis (Pearson Product Moment) was used to examine the relationship between scores on the questionnaire items of the Cultural Values Survey, which were treated as independent variables, and the dependent variable of Health Index, a numerical score calculated from the HRA instrument. Regression analysis was used to examine the ability of the independent variables to explain Health Index scores. Stepwise regression procedures were used to select the most important independent variables. Each of these analyses were conducted separately for men and women, because the men and women were found to be significantly different on both the independent and dependent measures. *P* values less than or equal to 0.05 were considered significant. T-tests were used to compare differences in mean values, and chi square tests were used to compare cell values of dichotomous variables.

Results

No serious problems were encountered in the administration of the instruments to participants. The reliability coefficient (Cronbach Alpha) for the Cultural Values Survey was .90. Confirmatory factor analysis (Varimax rotation) of the responses in the CVS showed that individual items of the CVS did not "load" in accordance with their intended operational groupings. Therefore, in subsequent statistical analyses the individual questionnaire items — rather than subtotal scores of the operational question groups originally created to measure a particular unique value (e.g., "Wealth," "Altruism," "Industriousness," etc.) — were used as the independent variables.

Males and females were found to differ significantly in terms of several physiologic and behavioral parameters measured by the Health Risk Appraisal instrument (Table 1).

Because of these differences, Health Index values calculated by the HRA differed significantly between men and women. Men had an average index value of +0.80, while women had an average index value of +1.81, significantly higher than both the theoretical mean of zero (0) and the mean value for men ($p < .05$), indicating that the women in our study population were healthier than the men. This finding is corroborated

Table 1
A comparison of prevalence and mean values for physiologic and behavioral parameters of male and female study subjects

Parameter	Males (n = 207)	Females (n = 222)	*p* value
Age	36 (13.6)	38 (12.9)	NS
Weight (lbs.)	194.3 (41.2)	168.6 (32.3)	NS
Body Mass Index	28.0 (5.4)	28.4 (5.3)	NS
HDL Chol (mg/dl)	45.1(0.7)	55.0 (0.7)	NS
Health Index	0.8 (3.5)	1.8 (3.0)	<.01*
Diabetes (%)	5.7	13.5	<.01†
Systolic BP (mm Hg)	131.1 (14.6)	123.2 (16.6)	<.01*
Diastolic BP (mm Hg)	83.7 (11.2)	77.9 (10.0)	<.01*
Hypertension (%)	39.1	21.8	<.01†
Total Cholesterol (mg/dl)	201.8 (11.2)	193.6 (10.0)	<.05*
Drive or ride when driver had too much to drink (%)	42.9	21.0	<.01*
Drink beer (%)	52.9	28.4	<.01*
Drink wine (%)	7.1	1.8	<.01*
Drink liquor (%)	28.6	7.0	<.01*
Violence (% reporting 2 or more incidents in the past year)	23.4	12.3	<.01*
Physical Activity (%) reporting 3 or more times per week)	66.5	43.6	<.01*

Note. Standard Deviation listed in parenthesis: * — Student's T test; †— Chi square test; NS — Not significant.

by mortality data collected in the Aberdeen Area of the Indian Health Service (Figure 1).

Table 1 illustrates that the principal reasons for the lower health index scores in men included a higher prevalence of hypertension, hypercholesterolemia, violence, and alcohol use. Perhaps offsetting these factors were a higher prevalence of diabetes mellitus and a lesser amount of weekly physical activity in females. There was no significant difference in the mean ages of the males and females.

For the combined population of males and females, no groupings of variables or individual variables were found to be significantly correlated with Health Index. When the population was broken down by sex, however, several cultural values and factors were found to be significantly correlated with Health Index, and these factors differed for males and females (Table 2).

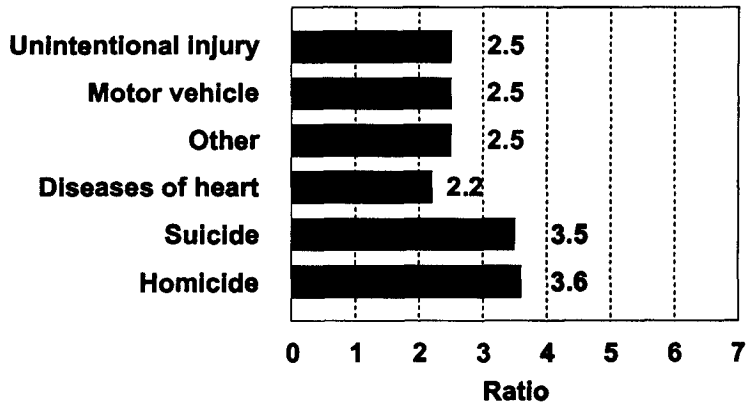

Figure 1
Ratio of males to females for selected causes of death
Aberdeen area 1986–1988

Table 2
Simple linear regression analysis:
individual Cultural Values Survey items vs. Health Index

Independent Variables (CVS Items)	n	*r*	*p*
I. FEMALES			
Cultural isolationism	222	.24	.00
Degree of Indian blood	219	.23	.00
Lakota language spoken	222	.20	.00
Combination of Lakota and English spoken	222	.20	.00
Happiness in life	222	.19	.01
Personal control over health	220	.18	.00
Degree of Lakota spoken	222	.16	.02
Lakota lifestyle	221	.16	.02
Altruism	222	.16	.02
Self-esteem	222	.15	.02
Satisfaction with life	221	.15	.02
Traditional parents	221	.15	.02
Personal control	222	.15	.02

Table 2 (Continued)
Simple linear regression analysis:
individual Cultural Values Survey items vs. Health Index

Independent Variables (CVS Items)	n	*r*	*p*
II. MALES			
Hard work/industriousness	206	.18	.00
Personal control	205	.16	.02
Individual action	207	.16	.02
Personal control	207	.15	.03
Friendliness to non-Indians	205	.15	.04
Hard work/industriousness	206	.15	.04

By simple linear regression analysis, five of the six questionnaire items most strongly correlated with Health Index values for males related to beliefs in industriousness and personal control. Two items dealt with valuation of hard work and industriousness (r = .18 and .15); two other items measured positive valuation of personal control (r = .16 and .15). The remaining item assessed belief in individual action (r = .16). The final highly correlated item assessed a positive valuation of friendliness towards non-Indians (r = .15).

Healthier females scored higher on questions measuring traditional Lakota lifestyle and culture, and beliefs in altruism and personal control. The CVS items designed to measure traditional Indian culture which proved most strongly correlated with Health Index include: belief in the good of cultural isolationism (r = .24), greater degree of Indian blood (r = .23), Lakota language fluency (3 separate items — r = .20, .20, .16), and adherence to Lakota lifestyle (r = .16). Items measuring altruism (r = .16) and personal control (2 items, r = .18, .15) also were found to be significantly correlated with Health Index. The remainder of significant items included questions assessing mental health, indicating greater self-esteem (r = .15) and satisfaction with life (2 items — r = .18, .15).

Stepwise multiple linear regression analysis was performed to identify the grouping of factors accounting for the greatest amount of variance in Health Index values (Table 3). Again, differences were found between females and males. Overall, the R^2s of 0.17 for males and 0.17 for females were statistically significant, although low in predictive ability. Similar results as in the simple regression analysis were obtained, but for females, in addition to factors mentioned above, devaluation of wealth and occupation were predictive of healthy behaviors. Similarly for males, additional items found to be predictive of healthy behaviors included attitudes of acceptance of the system, and of friendliness towards non-Indians. The

Table 3
Stepwise multiple linear regression analysis:
Cultural Values Survey items vs. Health Index

Independent variable (CVS items)	r	r^2 change	r^2	p of change
I. FEMALES				
Satisfaction with life	.15	.05	.05	.00
Cultural isolationism	.24	.03	.08	.02
Devaluation of wealth	.13	.02	.10	.04
Devaluation of occupation	.09	.02	.12	.04
Lakota language	.20	.03	.15	.01
Personal control	.15	.02	.18	.04
II. MALES				
Hard work/Industriousness	.18	.05	.05	.00
Acceptance of current system	.16	.05	.09	.01
Friendliness to non-Indians	.15	.04	.13	.01
Self-reliance	.12	.02	.19	.03
Personal control over system	.04	.02	.17	.05

groups of these identified items accounted for over 17% of the variance of Health Index values for both male and female populations ($p < .05$).

Discussion

Through this study, an instrument to measure cultural values and related characteristics in an American Indian reservation population was developed and administered conjunctive with the Health Risk Appraisal (HRA) so that determinants of healthy behavior could be assessed. This is the first study in which the HRA-derived Health Index was examined in terms of cultural factors. There are many intriguing findings, although several factors limit the validity of our data. The relatively low participation rate in this study was an expected problem; a majority of the tribal members does not have telephones, and many participants live as far as 50 miles away from the tribal headquarters and could not easily follow up with interviews. Thus, there was a low overt refusal rate considering these factors, although the representativeness of our population can nonetheless be questioned.

Pilot testing of the Cultural Values Survey identified several problems with the instrument. Factor analysis demonstrated significant

shortcomings in the internal validity of the instrument's operational "value" constructs. This suggests an inescapable element of arbitrariness in the labels we use to define cultural values and beliefs; this may reflect the fact that these labels are products of Euro-American society, and consequently, may have different meanings in Lakota culture (W. Powers, personal communication, April 2, 1993). The lack of internal construct validity also reflects a difficulty in assessing values through written questionnaires in general; even the most carefully designed questions are subject to divergent interpretations, by participants as well as interviewers, in a cross-cultural study such as ours.

In future revisions of the instrument, those items determined by factor analysis to be statistically "nonloading" will certainly require revision or deletion. Test-retest reliability as well as the validity of the CVS and the HRA also require formal testing in this particular study population. This represents the greatest limitation in the interpretation of our data. Future work is essential to revise the CVS and to conduct rigorous trials of validity and reliability for both the CVS and Health Index as measured by the HRA.

Despite the concerns above, however, several important findings that support the value of our instruments emerged from this work. Our study added to existing data that Lakota men are significantly less healthy than Lakota women in this reservation community. They suffer more from hypertension and hyperlipidemia — which may result from less healthy dietary behaviors — as well as more frequent alcohol abuse and violence. Moreover, this study demonstrated that differences in cultural values correspond with the differences in health status and health-risk behavior between men and women. This supports the hypothesis that values are intimately — perhaps causally — linked with health-related behavior and health status.

The particular value and belief trends emerging from our data prove consistent with what is known about Lakota and Anglo cultural values from an anthropologic perspective, further lending a strong measure of face validity to our data. Regarding data for females (Table 4), the constellation of altruism, devaluation of wealth and occupation, cultural isolationism, and personal control, describes value ideals that many observers consider integral to Lakota culture, and to the traditional Lakota female gender role in particular (Powers, 1986). The coincidental identification of these values along with certain markers of greater degree of Indian culture and heritage (degree of Indian blood; Lakota language fluency and lifestyle; traditional practices) supports the significance of the findings.

The same considerations apply to the value profile of the healthy male (Table 4). However, in contrast to women, the healthier Lakota men were found to fit a value profile more closely resembling the Anglo male role, which is typically felt to embody values of industriousness and self-determination (Williams, 1970, 1979). Healthier men, who scored higher

Table 4
Summary of cultural factors significantly correlated with Health Index values by simple and multiple linear regression analyses

Values and Beliefs	Cultural Factors
I. FEMALES	
Altruism	Degree of Indian blood
Devaluation of wealth	Lakota language
Devaluation of occupation	Lakota lifestyle
Cultural isolationism	Traditional parents
Personal control over health	
Personal control over system	
II. MALES	
Hard work/Industriousness	(none)
Personal control	
Friendliness towards non-Indians	
Individual effort	

on these presumably Anglo value questionnaire items, did not score higher on markers of Indian heritage and culture. A similar convergence towards Anglo values as measured by the Rokeach Values Survey was observed by Flores (1986) in a study of alcoholic Indians on the Gila River Reservation (Arizona). This small study comparing predominantly male Pima and Papago Indian alcoholics with nonalcoholics and non-Indian "Anglos" demonstrated greater similarities to Anglo values for nonalcoholic as opposed to alcoholic Indians.

This points to an interesting contrast between women and men. The healthiest women appear to be those who are the most traditional, or least acculturated to Anglo society, whereas the healthiest men appear to be those who are the least traditional and the most acculturated to Anglo society. Exactly why the degree of acculturation appears to be related in opposite ways to health for women and men — if this is a valid conclusion — is not clear. The notion of "stress" as a condition of unmet needs encompassing many dimensions — physical, psychological, social, and cultural — is an integrating concept that may be useful in the interpretation of our study findings (Janes, 1986). If we assume that the condition of "stress" is inversely related to health, then our findings can be interpreted to demonstrate that acculturation produces less stress for Lakota men than for Lakota women, or that there is more pressure towards Anglo acculturation for Lakota men than for Lakota women. This interpretation is

supported by the observations of Powers (1986), who postulated several reasons why, in the process of acculturation in Anglo society, Lakota gender roles have allowed Lakota women to retain perhaps more elements of traditional Lakota culture than Lakota men.

A more extensive analysis of our data in these theoretical contexts is beyond the scope of this study. Significant to the validity of our findings, however, is the fact that other studies have demonstrated relationships between acculturation and various aspects of health and health-risk behavior, and that the concept of stress has been similarly used to provide plausible interpretations of these relationships. The relationship between acculturation and hypertension has been explored in different ethnic populations by Janes (1986) and Dressler et al.(1987). May (1982) found a lower incidence of alcohol abuse in Indian tribes that were tightly integrated and that experienced relatively low levels of acculturational stress. Stress was a unifying concept for Dressler's (1985) study of the relationship between psychosomatic symptoms and modernization.

Of course, many other possible explanations of the data exist; the "healthy" values identified in this study may in fact have little to do with acculturation or Lakota traditionality. Accepting or rejecting such alternative hypotheses is highly problematic, as there is no single best measure of Lakota traditionality. Indeed it is debatable whether any culture — Lakota or any other — can be defined in a sufficiently comprehensive and culturally unbiased way through empirical studies like ours. Since this study was not designed to examine the relationship between values and acculturation *per se,* different higher-order interpretations of the data are equally plausible.

Moreover, our study by no means examined the entire spectrum of cultural values in Lakota society, nor were many other important social factors (e.g., education, economic status) assessed. Many other unmeasured "intervening and mediating variables" (Rabkin & Struening, 1976) undoubtedly exist. There also is nothing to suggest an *a priori* healthiness of any value or other cultural factor. For these reasons, while certain cultural factors and values may be correlated with healthy behaviors in our study population, one cannot conclude that these factors comprise the only cultural avenue towards health. Other combinations of factors may be equally adaptive in different circumstances or populations. Thus one cannot readily generalize our specific findings to other ethnic populations, in which unique historical circumstances may render different cultural factors important to the achievement of health.

These considerations call for caution against overinterpreting the data; however, they do not diminish the significance of our study's principal finding — that certain values and cultural factors are indeed related to health-risk behavior. More work is needed to better understand the nature of this relationship, but our preliminary findings have important implications for preventive medicine and public health policy. The findings suggest that

perhaps those values and cultural characteristics identified as healthy by our study should be promoted in this population, provided that the social and ethical contexts of these characteristics are better understood and respected. Our findings also provide data to potentially identify individuals at high risk for unhealthy behaviors and morbidity. As a risk-stratifying tool, the Cultural Values Survey could allow such individuals to be targeted for health intervention programs.

Conroy (1979) asserted that the "current health crisis can be formulated to represent, at its very core, a crisis in values." The aim of our study was to explore the relationship between health-risk behavior and cultural values. Instruments like the CVS can generate quantitative data that lend themselves to epidemiologic analysis. It is clear, however, that validating and making sense of these data requires thoughtful qualitative analysis, and a careful consideration of the theoretical difficulties in understanding human culture. Further research is needed to pursue this subject.

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