

Does Cultural Programming Improve Educational Outcomes for American Indian Youth?

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This study examined the influence of cultural programming on American Indian school outcomes. Ecological systems theory suggests that school learning is a result of multiple, complex transactions. Thus, the effects of cultural programming over and above other proven contributors to school success were analyzed. Structural equation modeling, which allows for the study of multiple variables and their interactions upon school outcomes, was used to evaluate extant data collected from 240 urban American Indian youth. The results of this exploratory study indicated that cultural programming moderately, and largely indirectly, influences student outcomes. The strongest predictor of school success appeared to be the extent to which schools provide supportive personnel and safe and drug-free environments.

American Indian youth have been historically underserved by our nation's formal educational system. According to the U.S. Department of Education (1992), American Indians/Alaska Natives are drastically underrepresented in higher education and have the highest dropout rates and second highest rates of referral to special education of any racial or ethnic group. Yet, American Indian/Alaska Native students appear to begin school with the prerequisites for success. In general, they function at an average to superior range until fourth grade; by tenth grade these youth are, on average, three years academically behind their non-Native peers (Hornett, 1990; Rampaul, Singh, & Didyk, 1984; Safran, Safran, & Pirozak, 1994; Westby & Roman, 1995). Furthermore, an alarming number of American Indian/Alaska Native adolescents have either dropped out of school altogether or are only attending sporadically (Coladarci, 1983).

Unfortunately, research investigating reasons for lack of school success among American Indian/Alaska Native youth is often based on small ethnographic studies, informal observations, and conjecture. Most studies tend to look for a single explanation for underachievement, are based on very small

sample sizes that limit generalizability, and do not allow for powerful inferential statistical analyses (McShane, 1983; Pavel & Padilla, 1993).

One notable exception is a multivariate analysis of school learning completed by Keith and Benson (1992). They applied a well supported model of school learning to a national dataset that included five different ethnic groups of students. The model proposed that student achievement is due in part to the combined effects of student ability, quality of instruction, motivation, and academic instruction time. Though considerable support for this model was found among other ethnic groups, American Indian/Alaska Native students' pattern of achievement was discrepant from the relationships predicted by this model (Keith & Benson, 1992). Unlike the other ethnic groups, quality of instruction, student motivation, and time engaged in homework did not have a significant effect on American Indian/Alaska Native students' school grades when examined simultaneously with ability and exposure to academic coursework.

Keith and Benson's (1992) model may have failed to predict Indian students' patterns of school learning because two potentially critical determinants of school success for American Indian/Alaska Native students, cultural continuity and school climate, were not included. A review of literature suggests that a major challenge to American Indian/Alaska Native students' academic success is cultural discontinuity. In general, researchers agree that students achieve better educational outcomes if they have been reared in a culture that has expectations and patterns of behaviors consistent with those of the school (Comer, 1984). Conversely, young people who must develop two—sometimes competing—sets of values, norms, and behaviors in order to negotiate the demands of their school and those of their home and community environments may be at a disadvantage. For example, researchers have identified instructional (e.g., competitively structured lessons, public recitation), discipline-related (e.g., direct confrontation, public punishment), interpersonal (e.g., direct eye contact, an emphasis on small-talk) and institutional characteristics (e.g., rigidly structured schedules, stereotypes that lower expectations) of schools that are contrary to Indian culture. These discontinuities are likely to have a cumulative effect that leads to poor educational outcomes for Indian students (e.g., dropout, truancy, lack of motivation, failure to form trusting relationships with non-Indian peers and teachers, feelings of rejection, anxiety, and low self-concept; Chrisjohn, Towson, & Peters, 1988; Lomawaima, 1995; Mehan, Lintz, Okamoto, & Wills, 1995).

A frequently cited deleterious effect of cultural discontinuity is the challenge it poses to students' opportunities to form attachments with school personnel. Establishing trusting relationships with teachers and other school staff is an asset to school children. Masten (1994) observed that "schools . . . not only provide knowledge and teach problem-solving skills, they provide a setting where children can become connected with caring, competent adults" (p. 15). Recent results from the National Longitudinal Study of Adolescent Health indicate that perceived teacher caring and fairness are critical components of "school connectedness" (Resnick et al., 1997). Such connectedness is significantly

associated with better emotional health among students as well as lower levels of involvement in health-risking behaviors such as substance use and self-directed and interpersonal violence (Resnick et al., 1997). Furthermore, Pavel and Padilla (1993) found students' sense of social integration to promote postsecondary American Indian/Alaska Native students' school persistence. American Indian/Alaska Native students, like all other students, learn better in a supportive social context than from impersonal teachers (Murdoch, 1988).

Goodenow (1993) proposed that students who hold a different way of relating to people than that of school staff are at greater risk of feeling socially isolated at school and subsequently becoming less invested in academic work. Conversely, she provided evidence to support that a sense of connection to adults in school settings fosters in students a greater confidence in their own ability as well as greater perceived availability of support from school personnel. The incongruent interaction styles of school staff and American Indian/Alaska Native children may strain these critical relationships between student and teacher. For example, Native students may avoid sustained eye contact or a firm handshake because they perceive these actions as aggressive or disrespectful (Safran et al., 1994). Many of the Navajo reservation school teachers surveyed by Plank (1994) indicated that their students' silence impeded formation of interpersonal relationships. Members of the dominant culture appear to be uncomfortable with silence while members of American Indian/Alaska Native culture generally value silence (Kasten, 1992). A discontinuity between what Native students and Anglo teachers believe to be the meaning of verbal or nonverbal cues may lead some teachers to misinterpret American Indian/Alaska Native children's behavior. Non-Native teachers may misperceive American Indian/Alaska Native students to be uninterested in developing a relationship with them, or to be overly shy, rude, or immature (Hornett, 1990; Kasten, 1992; Murdoch, 1988; Plank 1994). Any of these conclusions may impede the formation of interpersonal relationships between school staff and Native students.

Dehyle (1992) observed Native students' mistrust of schooling as a reaction to negative stereotypes perpetuated by teachers. Conversely, she witnessed Native students' enthusiasm for learning under the instruction of approachable and caring teachers. She reported that "the issue of teacher caring" was very important to many of the Native youth (p. 31). Over one third of American Indian dropouts interviewed by Coladarci (1983) and almost half of those interviewed by Dehyle (1992) reported that their teachers failed to care about them. American Indian/Alaska Native youth who drop out commonly cite the school's cultural irrelevancy, lack of instructional support, and uncaring teachers as contributing to their decision to leave school (Coladarci, 1983; Dehyle, 1992). In sum, the relationship between American Indian/Alaska Native students and their teachers appears to be strained by cultural discontinuity, yet it is critical to school persistence.

In addition to reducing teacher supportiveness, cultural discontinuity negatively impacts home-school relationships. The same sociolinguistic

interference, discordant interaction styles, and stereotypes that disrupt student-teacher social relationships also present formidable barriers to home-school collaboration. Furthermore, American Indian/Alaska Native parents and grandparents are inhibited by their own past school failures and the abysmal history of boarding schools. Historically, boarding schools forced children from their homes and communities, exposed them to severe discrimination, and provided substandard facilities and teaching (Berlin, 1987; Joe & Malach, 1994). Sanchez and Stuckey (1999) observed that “American Indians have been subjected to an impressive array of educational policies and programs designed specifically to eradicate all traces of their resident cultures” (p. 84). Thus, many American Indian/Alaska Native parents find collaboration with school personnel difficult, particularly if aspects of their own culture are obviously absent from the school.

Cultural discontinuity is also theorized to decrease student academic engagement due to a curriculum that lacks both relevance and rigor. Bradley (1984) argued that American Indian/Alaska Native students are disproportionately exposed to remedial curricula that emphasize basic skills. He termed this condition *remediation syndrome* whereby a child is required to repeat the same tasks over and over in an attempt to remediate a deficiency attributed to the child. Exposure to this type of curriculum is thought to result in prolonged suffering from repeated failure, poor self-image, and an increasing dislike for the subject (Bradley, 1984). Furthermore, many authors have argued that mainstream curriculum trivializes American Indian/Alaska Native cultural heritage (Chrisjohn et al., 1998; Lomawaima, 1995; Mehan et al., 1995). Conversely, cultural-based curricula contain relevant content and values that promote American Indian/Alaska Native students’ self-esteem as well as an “intellectual continuity between demands at school and those placed upon the child at home or in the community” (Murdoch, 1988, p. 237).

Cultural programs typically recruit Native teachers and infuse Native learning styles into the instruction and Native content and values into the curriculum. Sanchez and Stuckey (1999) contended that American Indian/Alaska Native culture is essential to successfully educating American Indian/Alaska Native students. Furthermore, they suggested that the popularity of culturally based programs is increasing as American Indian/Alaska Native tribes and groups regain the power to make curricular decisions from the American government. Yet few researchers have analyzed the effectiveness of cultural programming, particularly in the context of other identified influences on school learning.

In this research, we developed and tested a model of school learning that takes into account cultural programming, as well as more commonly investigated educational variables such as home-school collaboration, quality of instruction, and student motivation. The model draws on an ecological perspective that attributes school failure to cultural discontinuities in young peoples’ social and environmental contexts. A guiding principle of the ecological paradigm is that intra-individual and systemic influences transact to shape development and

learning. Axioms of a transactional-ecological framework include (a) a strong predictor of behavior is a child's ecology (Bronfenbrenner, 1979); (b) learning occurs through a dynamic process by which children are affected by and affect their ecology; and (c) learning difficulties arise from a mismatch between the demands of the environment and the developing capabilities of the child (Conoley & Haynes, 1992). Cultural ecological investigations diverge from those that solely attribute educational outcomes to static conditions such as low social economic status, single parenting, or American Indian/Alaska Native membership. Bronfenbrenner (1979) termed these static conditions *social addresses* and noted that while these conditions of risk have been shown to correlate with compromised development among populations, they tell us very little about underlying processes. Native students' educational outcomes may be represented as the result of complex transactions that occur throughout multiple environmental systems.

A cultural ecological approach to developing an American Indian/Alaska Native model of school learning requires examining the complex interactions affecting the developing child: his/her position in the life course and the nested environmental structures that influence his/her development. However, few of those who have researched American Indian/Alaska Native student achievement have actually investigated these multiple contexts and multiple levels of influence on learning. The current study examines the relative contribution of cultural programming in conjunction with the more universal educational variables identified by Keith and Benson (1992).

Model of School Learning for American Indian Youth

The present research examines the direct and indirect effects of seven variables on the educational outcomes of American Indian youth as depicted in Figure 1. Limitations in the available data restricted the range of variables we could include in this study; these limitations are discussed in greater detail in the discussion section of this paper. The causal pathways among the latent variables were selected based on the primary research question, "Does cultural programming improve educational outcomes for American Indian youth?" Accordingly, the direct effects of cultural programming were estimated by including a direct path from cultural programming to educational outcomes, and the indirect effects of cultural programming on educational outcomes were estimated by including paths from the latent variable "cultural program" to each manipulable educational variable (e.g., parental involvement, motivation, quality of instruction, and school climate) in the model. Furthermore, it was hypothesized that student motivation would mediate the influences of the various contributors to educational outcomes (e.g., quality of instruction and school climate) and was accordingly placed in the center of the model, and paths from each exogenous variable (except income) to motivation were included in the model. Additional plausible pathways, such as the direct effects of income on motivation or parental involvement, were omitted because they did not reflect manipulable influences on educational

outcomes. The inclusion of these pathways may have increased the estimated fit between the model and the data, at the expense of parsimony. The rationale for including each of the seven latent variables in the model is described below.

Motivation

Motivation is consistently identified as a predictor of achievement (Haertel, Walberg, & Weinstein, 1983). McInerney and Swisher (1995) found that achievement motivation was related to positive educational outcomes among American Indian students. They concluded that motivational variables such as striving for excellence and a sense of competence have construct validity when applied to patterns of school achievement among Native students. However, there are data to suggest that Native students may be less likely to develop this asset for school success (Benson, 1996). Native youth may perform poorly in school because their motivation suffers from low teacher expectations, parental noninvolvement with school, and a lack of connectedness to school personnel and norms (Chrisjohn et al., 1988; Dehyle, 1992; Hornett, 1990). These threats to American Indian students' motivation to perform well academically are thought to stem from cultural discontinuity. Therefore, achievement motivation was included in our model of school learning.

Ability and Prior Achievement

Children's current academic success is based, in part, on their emerging cognitive and academic skills and their evolving sense of academic self-competence. Consequently, the construct of ability and prior achievement was included in the model to account for its impact on educational outcomes.

Quality of Instruction

Most models of school learning contain a quality of instruction variable (Haertel et al., 1983). Furthermore, American Indian/Alaska Native students appear to be disproportionately exposed to unchallenging curricula and instruction. While Native students are overidentified for special education services (U.S. Department of Education, 1992) and overexposed to remedial curricula (Bradley, 1984), they are underidentified for gifted and talented programs (Roy Wilkins Center, 1997). Dehyle (1992) found that many American Indian/Alaska Native youth left school because their coursework was insufficiently challenging. This suggests that the curriculum and instruction provided to Native students are not adequately matched to their abilities and interests.

Unchallenging instruction commonly is caused by low expectations for students' success. A number of authors have suggested that incongruous communication and behavioral expectations lead teachers to perceive American Indian/Alaska Native students as passive, unmotivated, or less able (Chrisjohn et al., 1988; Hornett, 1990; Rampaul et al., 1984). Low expectations purportedly result from ethnic stereotypes and misinterpretations of American Indian/Alaska Native students' behaviors and are likely to dissuade teachers from encouraging

their Native students to excel to the best of their abilities (Kasten, 1992; Murdoch, 1988; Plank, 1994). The decline in Native students' academic achievement may be caused by students' growing awareness of the dismal expectations their teachers hold for them (Hornett, 1990). In contrast, effective teachers who provide quality instruction commonly set high expectations, match instruction to students' skill levels, and represent an encouraging figure by providing instructional support and promoting positiveness in the classroom environment (Algozzine & Ysseldyke, 1992-1993). Phelan, Yu, and Davidson (1994) reported that teacher encouragement and individualized attention were critical to helping minority students who were encountering difficulties navigating the cultural barriers between home and school.

Parental Involvement

American Indian/Alaska Native dropouts commonly cite lack of parental support as contributing to their decision to leave school (Coladarci, 1983; Dehyle, 1992). Sometimes termed *parental non-interference*, a lack of parental involvement among American Indian/Alaska Native families has been attributed to wariness on the part of parents to reenter a system that was personally discriminatory, unsupportive, and historically detrimental to their culture. In addition, schools represent an alien culture (e.g., sociolinguistic interference and Anglicized curricula) to many American Indian/Alaska Native parents as well as their children.

Parents have the potential to assist their children in overcoming the barriers to school success created by cultural discontinuity. As Comer (1984) stated,

Their presence and participation with the staff ensure a culturally consistent social and academic program. In this way the children do not feel the social distance or gap between the home, primary social network and school. (p. 333)

However, evidence suggests that parents of students who are struggling or resisting the transition to a school socio-cultural context are commonly unsure of what they can do to help their child meet the demands of school (Phelan et al., 1994). American Indian/Alaska Native-based educational programs may reduce the challenges that schools present to home-school partnerships by viewing parents in a more accepting and positive light, presenting more similar norms for education, offering a less threatening and alienating climate, and overall demonstrating greater flexibility in meeting the needs of parents.

School Climate

Previous research has demonstrated that American Indian/Alaska Native students' opportunities to learn in a safe environment with caring and approachable teachers may be compromised by discordant language, interpersonal relationships, and discipline styles. They can impede the development of a social bond between Native students and the adults in their school (Plank, 1994). Interviews conducted with American Indian/Alaska Native school dropouts suggest that lack of

identification with school personnel and the norms of the school is a part of the dropout process (Dehyle, 1992). Little Soldier (1997) wrote, "A warm, accepting, and informal atmosphere for learning, created by a sensitive and genuinely concerned teacher, can provide a strong psychological base for students" (p. 652). Currently, many cultural programs have included efforts to promote and sustain American Indian/Alaska Native students' interpersonal bonds with school staff.

Feeling safe is a basic need among humans and generally a prerequisite for learning. One of the Native education goals set by the Indian Nation At-Risk Task Force (1994) is to ensure that every school responsible for educating Native students provides a safe and drug-free learning environment. Results from a national survey of rural reservation-based American Indian/Alaska Native youth found over a quarter of younger youth (grades 7-9) and over half of older youth (grades 10-12) reported witnessing drug or alcohol use by other students (Blum, Harmon, Harris, Bergeisen, & Resnick, 1992). Similarly, a substantial number of these respondents reported observing their fellow students destroy property or engage in fighting at school. Therefore, the extent to which urban American Indian/Alaska Native youth assess their schools to be safe and drug-free was considered an important indicator of school climate.

Family Income

Students who are economically disadvantaged are commonly thought to be at-risk for school failure (Masten, 1994). Urban poverty is linked with health problems, underfunded schools, violent neighborhoods, teen pregnancy, and other conditions that place youth at risk for school failure. Processes through which poverty affects students' educational outcomes have recently become a focus of more in-depth study. For instance, daily household needs for additional economic resources combined with a strong pro-family ideology is linked to dropping out of school for purposes of seeking full-time employment (Bartelt, 1994).

Though poverty is not an easily manipulated condition, disregarding students' socio-economic status is likely to lead to the identification of spurious relationships among the variables under study (Keith, 1993). For example, since socio-economic status is associated with parental involvement and school achievement, if it is not controlled, the estimated relationship between parental involvement and school achievement will be inflated.

Cultural Programming

Cultural discontinuity theory is based on the axiom that behavioral, communication, instructional, and curricular expectations of the school contradict or undermine those of Native youths' families and communities. Recently, schools with high Native student enrollment have begun to address the issue of cultural discontinuity by infusing Native culture into the curriculum and instructional processes. These efforts include recruiting Native educators; teaching Native languages and stories; avoiding content and instructional strategies that directly conflict with the values of the American Indian/Alaska Native

community; building on the background knowledge of the students; and celebrating American Indian/Alaska Native historical figures, contributions, and events (Allen et al., 1999; McCarthy, Wallace, Lynch, & Benally, 1991; Mehan et al., 1995). Through these changes, schools attempt to increase students' sense of self-esteem and interest in school. In addition, it is assumed that if the culture of the school is made more familiar, then interacting with new academic material becomes less alienating for Native students (Mehan et al., 1995). Efforts to establish Native-based education in public schools, such as the KEEP program and Rough Rock school on the Navajo Indian Reservation, have demonstrated positive effects on students' academic and behavioral outcomes (McCarthy et al., 1991; Mehan et al., 1995).

In summary, the extant literature provides strong evidence that American Indian/Alaska Native students experience discordance between teacher/school imposed and community/family sanctioned interaction styles, learning strategies, and methods of discipline. However, conclusions about the effectiveness of cultural programs in overcoming cultural discontinuities are limited by a lack of data that directly link cultural programs to educational outcomes within the context of other empirically supported influences on education.

Method

In this analysis structural equation modeling was used to simultaneously examine direct and indirect effects of student characteristics (achievement motivation, ability and prior achievement), family characteristics (family income, home support for learning, home-school collaboration), and school characteristics (quality of instruction, school climate, and cultural programming) on a sample of urban American Indian students' educational outcomes (model depicted in Figure 1). The goal was to determine whether attempts to increase the cultural continuity of schooling through cultural-based programming led to greater educational outcomes through increased parental involvement in school, higher quality of instruction, greater student motivation, and improved school climate.

Study Participants

Study participants included 240 American Indian students who were surveyed as part of the Indian Youth Resiliency Impact Study (IRIS). The data were drawn from wave one of a three-year study designed to assess the impact of a community-based American Indian youth development program in a large midwestern city. Students were either enrolled in this culturally based after-school program, which includes sports and recreational activities, academic tutoring, social skill development, and exercises in substance use resistance skills, or they were selected from public school enrollment records as part of a comparison group. Almost all of the participants attended public school. All participants were American Indian, primarily Ojibwa, Lakota, or Dakota. They ranged in age from 9 to 18 years at the time of survey administration; 52% were female ($m = 11.66$ years of age, $SD = 2.13$).

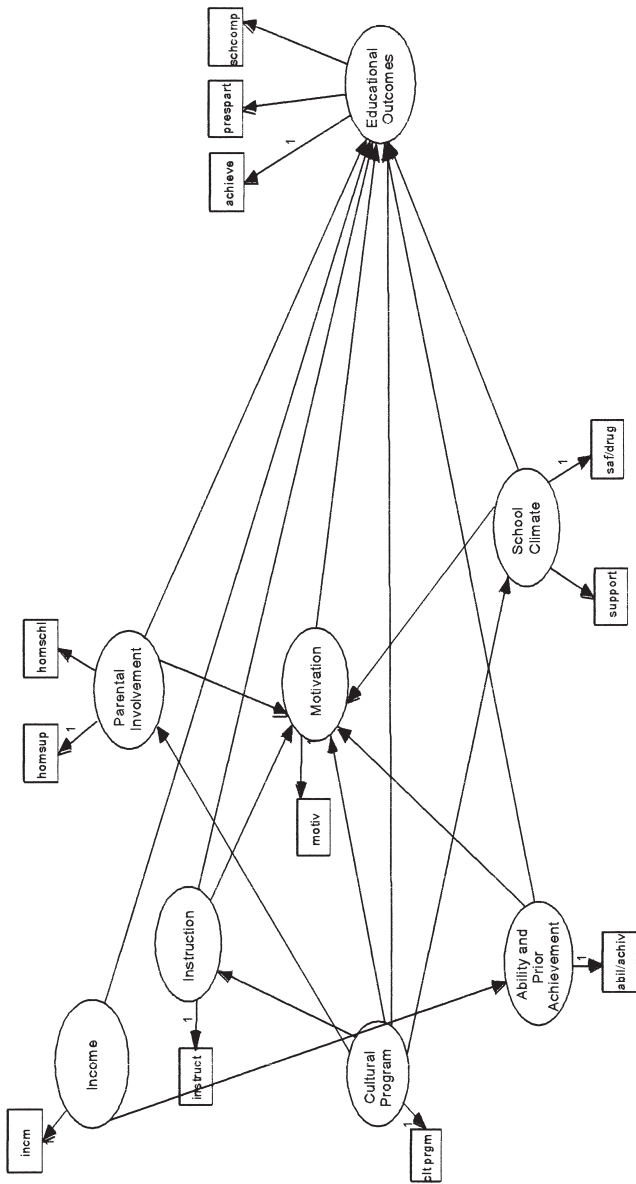


Figure 1. Theoretical model

Procedures

Survey administration occurred during the 1995-96 academic school year through the following summer. Following active parental consent and student assent, participants completed three surveys: the Alcohol, Tobacco and Other Drugs; the Indian Culture and Values Survey; and the Urban Indian Youth Health Survey (only the latter two were used in the present study). The surveys were developed through an extensive consensus-building process that drew from the existing literature on child development, risk and resiliency, cultural identification, and alcohol and substance use. Items were derived in part from the National American Indian Adolescent Health Survey, a well validated survey developed by a team at the University of Minnesota in conjunction with the Indian Health Service (Blum et al., 1992). Further, input from various stakeholders of the local schools and American Indian community was sought. Each survey was pilot tested on a group of approximately 40 urban Indian youth, revised, and piloted again. With each survey administration, demographic information, including age, gender, grade, and school of attendance, was collected. Respondent anonymity was ensured through a procedure that required separating study participants' names from their responses and using individual identification numbers to link the surveys. Participants completed surveys at the program facilities, at school during school hours, or at a community center after school hours. The University of Minnesota's Institutional Review Board approved all study protocols.

Analysis

Structural equation modeling (SEM) integrates a structural model of latent variables (e.g., parental involvement in education, and school climate) and a measurement model of observed variables (i.e., responses to survey items) to estimate the degree of fit between a theoretical model of relationships among a set of variables and the actual variance and covariance of those variables (Keith, 1996). By combining measurement and latent variables, SEM is able to take into account measurement errors (which threaten reliability and validity), which improves the estimate of the structural model (Keith, 1996). The two basic assumptions of SEM identified by Pavel and Padilla (1993) were met: these are (a) the theoretical model is based on sound existing research, and (b) the sample size is larger than the number of structural coefficients or hypothesized relationships to be estimated. Pavel and Padilla (1993) and McShane (1983) noted that SEM has only rarely been used to examine American Indian/Alaska Native educational processes.

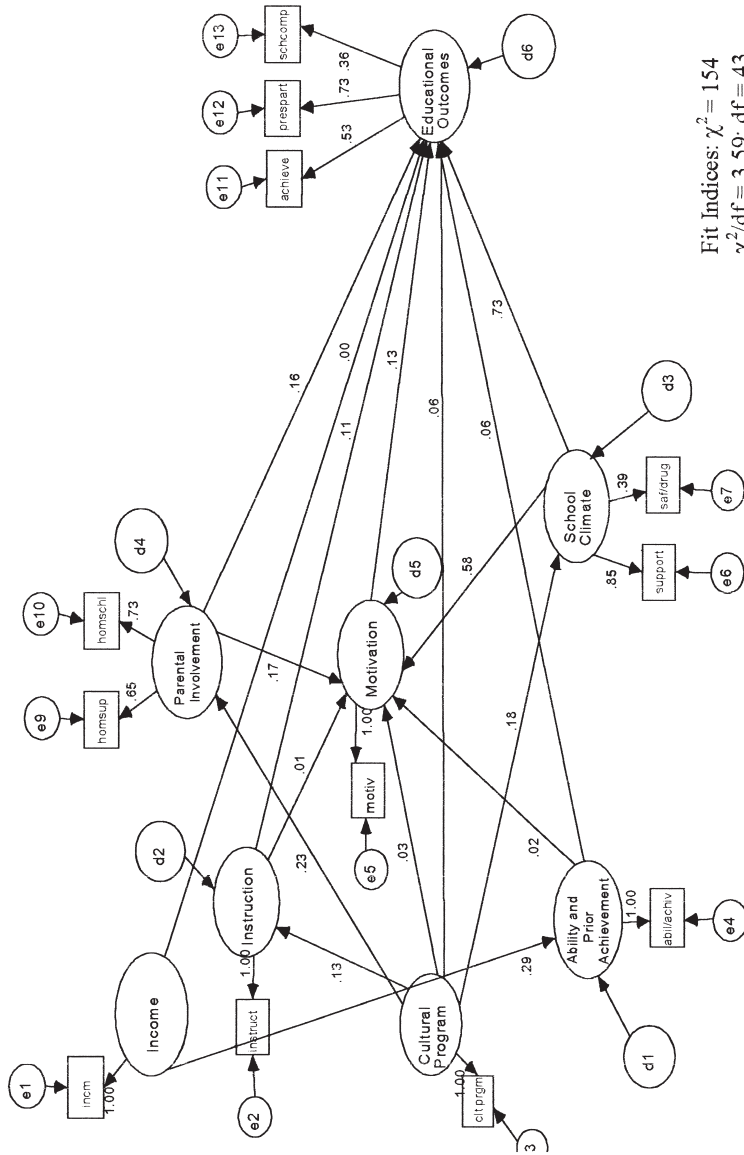
The model examined in this study incorporated variables commonly identified in the school learning literature. Family income and student ability and prior achievement were included because they are background characteristics that often are included in models of school learning. Quality of instruction, student motivation, school climate, and parental involvement in education were included because of their dominance in studies that focus on manipulable educational conditions. Participation in American Indian cultural programs at school (i.e.,

cultural programming) was added to the model based on the Indian education literature that suggests that cultural discontinuity represents a formidable challenge to Native students' educational outcomes. Thus, the proposed model depicted in Figure 1 consists of 7 latent variables used to predict the eighth latent variable *educational outcomes*. These variables are (a) parental involvement, (b) ability and prior achievement, (c) motivation, (d) quality of instruction, (e) school climate, (f) family income, and (g) cultural programming. SEM, like all causal modeling approaches, assumes that models are based on sound theory rather than trial and error. A brief description of how these variables were measured is contained in Appendix A.

Items from the student surveys were used to construct twelve scales to measure the latent variables: (a) achievement; (b) school presence and participation; (c) school completion; (d) ability and prior achievement; (e) motivation; (f) home-school collaboration; (g) home support for learning; (h) quality of instruction; (i) school personnel supportiveness; (j) safe and drug-free school; (k) cultural programming; and (l) family income. The standardized internal consistency estimates, means, and standard deviations for each scale are reported in Table 1.

Following a number of descriptive statistical analyses, the data were transformed so that each item had a minimum scale score of 0 and a maximum score of 1. This transformation compensated for the varied number of response options for each item, thereby allowing each item to contribute equally to each scale. Otherwise, items with 5 response options could potentially contribute more to a scale than an item with 3 response options. Each participant received a scale score based on his or her responses to the scale items. A criterion for the minimum number of items to be completed was set based on the number of items contributing to each scale and estimates of the scale's internal consistency. For example, a participant who skipped two survey items on a scale with six items and a high internal consistency estimate would be included and their scale score would be computed based on the four items they completed; yet if a participant skipped two items on a scale with only four items, he or she would be dropped from the study. Fifty-five participants were dropped from the final analysis due to missing data. There were no significant differences between those dropped from the final analysis and the 240 participants who remained in the study based on gender ($p = .193$), age ($p = .357$), receiving special services for learning or behavioral problems ($p = .357$), or having a working phone in the house ($p = .860$).

Following the reduction of the data into scales, structural equation modeling was used to estimate the direct and indirect effects of the exogenous variables (e.g., family income, cultural programming, and ability and prior achievement) on the endogenous variables (e.g., motivation, school climate, parental involvement, and educational outcomes). The fit and causal effects of the model of school learning for American Indian youth shown in Figure 2 were estimated using the Analysis of Moment Structure (AMOS, Version 3.51) structural



Fit Indices: $\chi^2 = 154$
 $\chi^2/df = 3.59$; $df = 43$
 GFI = .904; PGFI = .498

Figure 2. Full sample

Table 1
Scale Items, Means, Standard Deviations, and Internal Consistency Estimates

| Scales | Mean | SD | Std. Alpha |
|---|------|-----|---------------|
| EDUCATIONAL OUTCOMES | | | |
| <i>Achievement</i> | .63 | .28 | .73 |
| <ul style="list-style-type: none"> • In general, what are your grades right now? • What kind of student are you? | | | |
| <i>School presence and participation</i> | .56 | .18 | .45 |
| <ul style="list-style-type: none"> • In the past month, how many days of school did you miss? • In the past year, how often have you missed full days of school because you skipped or cut? • Is it important to you to be at school every day? • How much time do you spend each week in other school activities? • In the past year which of the following have you done to help others . . . help teachers at school? | | | |
| <i>School Completion</i> | .86 | .22 | .62 |
| <ul style="list-style-type: none"> • Do you plan to finish high school? • Do you want to go to college or trade school after high school? | | | |
| MOTIVATION | | | |
| <i>Motivation</i> | .72 | .23 | .53 |
| <ul style="list-style-type: none"> • Do you try as hard as you can to do your best at school work? • Is it important to you to be proud of your school work? • Do you like school? | | | |
| QUALITY OF INSTRUCTION | | | |
| <i>Quality of Instruction</i> | .50 | .30 | .36 |
| <ul style="list-style-type: none"> • Is your school work . . . too easy, too hard, or just right? • Do people at your school expect you to do well? • Do the adults in your school encourage you to do the best that you can? | | | |
| SCHOOL CLIMATE | | | |
| <i>School Personnel Supportiveness</i> | .56 | .22 | .57 |
| <ul style="list-style-type: none"> • Do you get along with your teachers? • In the past year, has a teacher gotten to know you really well? • How much do you feel school people care for you? • Teacher approachability composite scale item = Turn to a teacher/counsel for help in the case of: (a) physical abuse; (b) depression.; and/or (c) unplanned pregnancy. | | | |
| <i>Safe and Drug Free School</i> | .60 | .19 | .63 |
| <ul style="list-style-type: none"> • Do you worry about getting stabbed or shot at school? • How much have you seen . . . students treating each other with respect? • How much have you seen . . . students drinking or using drugs? • How much have you seen . . . students stealing or destroying things? • How much have you seen . . . students getting into fights? • How much have you seen . . . students carrying weapons to school? • How much have you seen . . . students helping each other resolve conflicts without getting into fights? • Do you feel safe at school? | | | |

Table 1 (continued)

| FAMILY INCOME | | | |
|---|-----|-----|-----|
| <i>Family Income</i> | .60 | .23 | .36 |
| <ul style="list-style-type: none"> • Do you receive free or reduce cost school lunches? • How many times have you moved in the past year? • Do you have a phone in your house that works? • Do you worry about your family not having enough food or money? | | | |
| ABILITY AND PRIOR ACHIEVEMENT | | | |
| <i>Ability and Prior Achievement</i> | .67 | .20 | .23 |
| <ul style="list-style-type: none"> • Have you ever been held back in school? • Is keeping up with your school work hard because you have trouble reading? • Have you ever been in any classes for learning or behavioral problems? • How many hours a week do you spend reading just for fun? | | | |
| PARENTAL INVOLVMENT | | | |
| <i>Home Support for Learning</i> | .73 | .21 | .61 |
| <ul style="list-style-type: none"> • How upset would your family be if you dropped out of school? • When you do well, do you get praise from your family? • In the past year did anyone in your family ask about homework? • In the past year did anyone in your family help you with your homework? • In the past year, how often have you and someone in your family talked about how things are going at school? • In the past year, how often have you and someone in your family talked about your job or education plans after high school? | | | |
| <i>Home-School Collaboration</i> | .50 | .30 | .58 |
| <ul style="list-style-type: none"> • In the past year did anyone in your family go to parent-teacher conferences? • In the past year did anyone in your family help out at your school? • In the past year did anyone in your family go to your school activities/games? | | | |
| CULTURAL PROGRAMMING | | | |
| <i>Cultural Programming</i> | .56 | .25 | .71 |
| <ul style="list-style-type: none"> • How much have you learned about Indian culture from school? • How much have you learned about Indian stories from school? • In your school, how many students are Indian? • Are you learning a tribal language at school? • In the past year, how often did you read, talk about, or take a class on Indian history or culture? • Where do you learn about spirituality . . . at school? | | | |

equation modeling computer program. When possible, two or more scales were used to measure one psychological construct in order to reduce the amount of random error within each estimate of a latent variable (Hoyle, 1995).

Results

Correlations Among Scales

The Pearson correlation coefficient was calculated for each pair of scales. Almost 70% of these bivariate correlations were statistically significant. These correlations are presented in Table 2 at the end of the document. Cultural programming was significantly correlated with 6 of the 12 scales: achievement ($r = .19$; $p < .003$), school presence and participation ($r = .17$; $p < .009$), motivation ($r = .17$; $p < .008$); home-school collaboration ($r = .20$; $p < .002$), quality of instruction ($r = .130$; $p < .044$), and school personnel supportiveness ($r = .149$; $p < .021$).

Factor Analysis

Three of the eight latent variables were estimated by multiple scales. Among the latent variables with multiple scale indicators, the factor loadings for each of the scales indicate the extent to which the scale shared a common variance with the unobserved variables (Hoyle & Panter, 1995). Thus, scales with larger factor loading shared more of their variance with the latent variable than scales with smaller factor loadings. The factor coefficients (standardized and unstandardized) and error estimates are listed in Table 3. Three scales (i.e., achievement, school presence and participation, and school completion) estimated the latent variable *educational outcomes*. Among these, school presence and participation (.732) was a stronger contributor to estimating the latent variable than the achievement (.528) and intention to complete school (.361) scales. In fact, the intention to complete school scale's loading on this factor was almost half of the other two scales. An even stronger disparity between the factor loadings was found for the *school climate* latent variable. Two scales measured the school climate variable, but the school personnel supportiveness scale (.849) was twice as strong as the safe and drug free school scale (.392) in explaining the variance of this latent variable. Parental involvement, the third latent variable estimated by more than one scale, had much more evenly distributed factor loadings. The two scales, home-school collaboration (.731) and home support for learning (.647), were similar in their contributions to estimating this latent variable.

Indirect and Direct Effects of Latent Variables

The results of the structural equation analysis direct and indirect path coefficients are identified in Figure 2. The direct and indirect effects of each exogenous variable on the endogenous variable *educational outcomes* are summarized in Table 4. Path coefficients, which are equivalent to standardized regression coefficients or β weights, indicate the strength of the relationship between two latent variables, that is, the effect of the size of one variable on another. According

Table 2
Correlations Among Scales (N = 240)

| | a. | b. | c. | d. | e. | f. | g. | h. | i. | j. | k. | l. |
|------------------------------------|------|------|------|------|------|------|------|------|------|------|------|-----|
| a. Achievement | 1.0 | | | | | | | | | | | |
| b. School presence & participation | .44* | 1.0 | | | | | | | | | | |
| c. School completion | .19* | .25* | 1.0 | | | | | | | | | |
| d. Ability and prior achievement | .19* | .12 | .10 | 1.0 | | | | | | | | |
| e. Motivation | .41* | .44* | .29* | .14* | 1.0 | | | | | | | |
| f. Home-school achievement | .25* | .22* | .22* | .21* | .22* | 1.0 | | | | | | |
| g. Home support | .19* | .26* | .30* | .17* | .38* | .47 | 1.0 | | | | | |
| h. Quality of achievement | .15* | .22* | .20* | -.01 | .17* | .07 | .19* | 1.0 | | | | |
| i. School personnel support | .33* | .62* | .27* | .19* | .53* | .27* | .40* | .26* | 1.0 | | | |
| j. Safe and drug free | .24* | .15* | .08* | .04 | .34* | .06 | .15* | .18* | .33* | 1.0 | | |
| k. Family income | -.1 | .00 | .06 | .29* | -.07 | .17* | .07 | .09 | .00 | -.07 | 1.0 | |
| l. Cultural programming | .19* | .17* | .09 | .08 | .17* | .20* | .11 | .13* | .15* | .08 | -.05 | 1.0 |

* $p \leq .05$

Table 3
Measurement Model Standardized Factor Coefficient Loadings

| Variable Indicator | Scales | Standardized Coefficient | Standard Error | Unstandardized Coefficient | Error Estimate | CR |
|-------------------------------|-----------------------------------|--------------------------|----------------|----------------------------|----------------|-------|
| Educational Outcomes | Achievement | .528 | .133 | 1.00 | .054 | |
| | School presence and participation | .732 | .122 | .896 | .014 | 6.758 |
| | School completion | .361 | | .536 | .040 | 4.389 |
| Ability and prior achievement | | 1.00 | | 1.00 | 0 | |
| Motivation | | 1.00 | | 1.00 | 0 | |
| Parental Involvement | Home-school collaboration | .731 | .483 | 1.616 | .042 | 3.348 |
| | Home support for learning | .647 | | 1.00 | .025 | |
| Quality of Instruction | | 1.00 | | 1.00 | 0 | |
| School Climate | School personnel supportiveness | .849 | .553 | 2.602 | .014 | 4.709 |
| | Safe and drug-free schools | .392 | | 1.00 | .030 | |
| Family Income | | 1.00 | | 1.00 | 0 | |
| Cultural Programming | | 1.00 | | 1.00 | 0 | |

Note. Five latent variables (i.e., family income, instruction, motivation, cultural programming and ability and prior achievement) have single indicators, therefore, their unstandardized factor loadings = 1.00.

Table 4
Standardized Path Coefficients of Variables on Educational Outcomes

| Variable | Direct Effect | Indirect Effects | Total Effects |
|-------------------------------|---------------|------------------|---------------|
| School Climate | .732 (1.44) | .075 (.148) | .807 (1.58) |
| Cultural Programming | .059 (.034) | .207 (.118) | .266 (.152) |
| Parental Involvement | .163 (.174) | .022 (.023) | .185 (.197) |
| Motivation | .128 (.084) | | .128 (.084) |
| Quality of Instruction | .113 (.066) | .001 (.001) | .114 (.067) |
| Ability and Prior Achievement | .059 (.034) | .002 (.001) | .061 (.042) |
| Family Income | .001 (.001) | .018 (.011) | .019 (.012) |

Note. Standardized coefficients are listed first; unstandardized coefficients are in parentheses.

to Keith (1993), the effect size of conditions that are manipulable influences of learning are as follows: (a) $< .05$ is too small to be meaningful, even if significant; (b) $.05$ to $.10$ represent small but meaningful influences; (c) paths in the $.10$ to $.25$ range represent moderate influences; and (d) paths greater than $.25$ constitute a large effect on school learning.

Cultural Programming

Given Keith's (1993) rubric for path coefficients, cultural programming had a moderate ($\beta = .266$) though primarily indirect effect on students' educational outcomes. The variables that mediated the relationship between cultural programming and educational outcomes included school climate, parental involvement, quality of instruction, and student or achievement motivation. The largest cultural programming path coefficient was to parental involvement ($\beta = .234$) followed by school climate ($\beta = .179$) and quality of instruction ($\beta = .131$). The path coefficient from cultural programming to student motivation was negligible at $.029$. In aggregate, indirect effects accounted for 78% of the total variance in educational outcomes explained by culturally based programs. Because of the large effects of school climate on educational outcomes, 71% of the indirect effects, and 54% of the total effects of cultural programming were mediated through this latent variable. The next largest indirect effect of cultural programming was through parental involvement, with 20% of the indirect effects and 16% of the total effects of cultural programming accounted for through this variable. Instructional quality accounted for 7% of cultural programming's indirect effects.

Effects of Other Variables

School climate, which included supportive school personnel and safe and drug-free schools, was by far the most important variable affecting educational

outcomes. It had the model's largest direct path coefficient of .732. It had a total effect of .807 on educational outcomes, far greater than the next most influential variable, that of cultural programming. Within the latent variable *school climate*, the teacher supportiveness scale loaded much more heavily than the "safe and drug-free" scale indicating that students' perceptions of teacher supportiveness was the major contributing factor to their perception of school climate. The third largest effect on educational outcomes was parental involvement ($\beta = .185$), with almost all of it having a direct effect. Two other variables moderately affected educational outcomes, student motivation ($\beta = .128$) and quality of instruction ($\beta = .113$). Ability and prior achievement had negligible effects on educational outcomes as well as on motivation. Income had no effect on educational outcomes, although the coefficient of the path from income to ability and prior achievement was .294, suggesting a moderate to strong link between these two variables.

Model Fit

Fit indices in Figure 2 were calculated to examine the adequacy of the theoretical model of the effects of culturally based programming. In general, fit indices indicate the degree to which a model provides a good explanation of the data. One fit index, Chi square, estimates the extent to which the covariance matrix implied by the model differs from the actual covariance matrix calculated from the data (Keith, 1996). Based on the Chi square statistics, the theoretical model did not fit the observed covariance matrices. That is, a significant discrepancy was found between the observed and the implied covariance matrices, and the model could be rejected based on a significant Chi square ($p < .001$). However, Chi square tends to reject the null hypothesis at a higher rate than it should, particularly for very small or very large samples (Gerbing & Anderson, 1993). In addition, the Chi square does not indicate the degree of fit (Gerbing & Anderson, 1993).

A second fit index, the Goodness of Fit Index (GFI), estimates the total variance and covariance accounted for by the model; thus, it is similar to an R^2 in multiple regression (Keith, 1996). The GFI is influenced by sample size and the complexity of the model (i.e., if an excessive number of parameters are estimated, GFI is likely to be inflated). Conversely, Parsimonious Goodness of Fit Index (PGFI) penalizes for model complexity by combining the fit of the model with its parsimony (Maruyama, 1997). Because many models could fit a data set if an unlimited number of parameters were included, the PGFI gives greater value to those models that account for variability with relatively few free parameters (Keith, 1996). A good fit of the proposed model to the data is indicated by GFI and PGFI estimates that approach 1. The conventional cut-off value is .90 (Hoyle & Panter, 1995). The GFI index of .904 indicates that the model explained a significant amount of the variance among the variables. The lower PGFI (.498) suggests that while the theoretical model accounted for much of the variance, it was not very parsimonious.

The most likely reason for a poor Chi square fit is specification error. Our model misspecified the process of school learning in that it failed to account for

important educational influences not included in the model. For instance, our model did not include course content (i.e., time students spend on academic versus non-academic work), which some (Hartel et al., 1983; Keith & Benson, 1992) have found to be a strong predictor of academic achievement among American Indian students. Also, we were limited in our measurement of student ability and prior achievement, another important variable Keith and Benson (1992) found to be indicative of academic success. Furthermore, additional paths, such as the effects of family income on parental involvement, would likely improve the fit between the covariance matrix and our model. However, parsimony is warranted with small sample sizes. For example, one assumption of structural equation modeling is that the sample size is larger than the number of structural coefficients to be estimated (Pavel & Padilla, 1993).

Though the model appears to suffer from specification error, the GFI suggests that the model explained a significant amount of the variance among the variables. Thus, the GFI estimate indicates that the model adequately explains the influence of the seven variables, identified in this study, on American Indian students' educational outcomes.

Discussion

Culturally based educational programs have been developed to curb the alarming rates of school failure among American Indian/Alaska Native students by increasing the cultural continuity between students' home and school. The results of this multivariate analysis of school learning found support for the premise that culturally based educational programs enhance conditions that enable American Indian/Alaska Native students to be successful in school. However, among this urban American Indian sample, the total effect of Indian-based programs was quite small in comparison to the effect of school climate, as indicated by teacher supportiveness and safe and drug-free schools. Identifying manipulable conditions, such as providing accessible and supportive school personnel that are associated with positive school outcomes, is the first step toward mobilizing protective factors that may buffer American Indian/Alaska Native students against the academic and social-emotional risks caused by cultural discontinuity.

Parental Involvement

In the current model, Indian educational programs were most strongly related with the latent variable *parental involvement*. The model presented in Figure 1 hypothesizes that culturally based programs increase parental involvement, yet, highly involved Native parents in turn are likely to influence public schools to become more focused on Native culture. Whether or not cultural programs are the result of involved Native parents, Indian-based educational programs likely further parental involvement in schooling by promoting a shared vision and language between Native parents and school staff. Conversely, Murdoch (1988) and Robinson-Zañartu (1996) contended that mainstream schools serve to alienate Native parents through culturally incongruent goals, values, and structures. In

a national survey of American Indian/Alaska Native parents' attitudes toward formal education, Robinson-Zañartu and Majel-Dixon (1993) found that a lack of understanding and attention to American Indian/Alaska Native culture was a major source of dissatisfaction for these parents (as cited in Robinson-Zañartu, 1996). In contrast, Indian-based education programs have the potential to validate Native culture and reduce the discontinuity that tends to rebuff Native parents.

Quality of Instruction

Cultural interference in communication patterns and other social factors can lower the expectations teachers hold for their Native students (Plank, 1994). In contrast, many cultural-based education programs are designed to identify and build upon cultural strengths rather than stress student deficits. Consequently, American Indian/Alaska Native students who attend cultural programs may be more likely to benefit from teachers who hold high expectations for student success. Our findings support this hypothesis: Indian-based educational programs had a moderate effect on the perceived quality of instruction as measured by students' perceptions of higher teacher expectations, more encouragement from teachers, and greater instructional match.

The direct effect of instructional quality on students' educational outcomes was much smaller than expected. One possible explanation is a lack of sensitivity and reliability among the limited survey items assessing the quality of instruction. An alternative hypothesis is that Native students within this sample unilaterally believed that they received effective instruction, which suggests that student report did not provide very discriminating estimates of instructional effectiveness. Due to the minimal direct effect of quality of instruction on the educational outcomes in our model, school climate appeared to be an even more decisive factor in these Native students' attainment of positive educational outcomes.

School Climate

Perhaps the most striking finding is the large effect of school climate on educational outcomes. Two scales, teacher supportiveness and safe and drug-free schools, were used to measure the social and psychological environment of the school. The standardized factor loadings of the two scales indicated that students' perception of the supportiveness of their teachers was the major contributing factor to their perception of the school climate. Thus, the extent to which students are personally connected to their teachers and feel that their teachers are approachable and caring represents a powerful indicator of students' perceptions of the climate of their school. This, in turn, is a strong predictor of school success. Moreover, a strong relationship was found between the schools' social and psychological environment and student achievement motivation. Furthermore, a very strong bivariate correlation found between the scales *school personnel supportiveness* and student *presence and participation* indicates that the urban Native students in our sample who enjoyed supportive and approachable teachers were most likely to attend and participate in school.

Our findings are consistent with Goodenow's (1993) research on the psychological, social, and academic advantages of feeling personally accepted, respected, and supported by school personnel. Goodenow provides evidence that a student's sense of belonging or psychological membership is associated with academic achievement and achievement motivation. A sense of belonging, which is fostered through social interactions with caring and supportive teachers, is thought to promote students' commitment to school norms, sense of academic self-efficacy, achievement motivation, and academic success (Finn, 1989; Goodenow, 1993; Wehlage & Rutter, 1986). In addition, Phelan et al. (1994) found that caring, approachable teachers were commonly cited as instrumental to school success by students experiencing difficulties in negotiating cultural discontinuity at school. Clearly, urban American Indian/Alaska Native students benefit from supportive and approachable teachers, school counselors, school psychologists, and administrators.

Our findings also highlight the potentially devastating effects of violence and drug use in urban schools on educational outcomes. This violence was observed firsthand during survey administration. One administration during school hours was temporarily halted when the students were forced to take cover during a shooting on the school playground. A second administration was postponed because the students had to be evacuated due to a bomb threat at school.

The results of this study indicate that schools must provide safe and drug-free learning environments and supportive, caring teachers to intervene in the educational outcomes of American Indian/Alaska Native students. Though this finding is not unique to urban Native students, the quality of their school climate may be compromised by larger systemic influences, including poor economic conditions and cultural discontinuity at school.

Additional Student Characteristics

Family income and student ability and prior achievement were not found to be associated with educational outcomes though they were strongly associated with each other. These static student characteristics were weak predictors of students' educational outcomes because they are either unrelated to current school success or they were measured poorly by the instrument items. Lack of variability in student income within the sample may explain the low correlations between this variable and the other variables.

Limitations

There are a number of limitations to this study. Foremost is the singular reliance on self-report data. While self-report is often the only method for collecting data on individuals' opinions, perceptions, and attributions, and it is relatively inexpensive and unobtrusive to the educational process, self-report is not as rigorous as collecting data from multiple sources utilizing multiple methods. Multiple sources of data, such as teacher interviews, direct observation, parent

report, student test scores, and teacher evaluations by peers or administrators would strengthen this study by allowing the researchers to corroborate the self-report data and to collect data on variables that are not as easily self-reported (e.g., quality of instruction and academic engagement). However, access to these sources was limited.

In general, Native communities have grown wary of non-Native social scientists and often perceive them as “unwelcome intruders” (LaFromboise & Planke, 1983, p. 45). Historically, American Indian/Alaska Natives have been viewed as the “passive objects of scientific inquiry” (Snipp, 1995, p. 256). Until recently, much of the research on American Indian/Alaska Native people has been used to serve the needs of the researcher; it was rarely presented in a meaningful manner to the community and even less frequently led to positive changes for Native communities (Chrisjohn et al., 1988; LaFromboise & Planke, 1983). In order to be sensitive to these conditions, this study used extant data collected for a joint evaluation research project between an American Indian community youth program and a Midwestern University. Therefore, there were few objective measures to corroborate and supplement the student report data, and the number and scope of the survey items relating to student’s educational experiences were limited. Additional survey items and objective measures such as standardized achievement assessments and direct observation of student engagement would increase the validity and explanatory power of this study, but were not within the purview of the evaluation project.

Some specific measurement limitations associated with three specific variables (i.e., family income, ability and prior achievement, and quality of instruction) are described in Appendix B. Each of these three latent variables was plagued by being measured by a single scale with poor internal consistency. Because these variables may not have been well measured, the effects reported by this study represent minimum estimates of the true influence of these constructs. Furthermore, important educational variables such as student engagement were not included in the model. Thirdly, the chi square estimate suggests a less than perfect fit between the conceptualized model and the actual data. Accordingly, this study should be considered exploratory and further research should be conducted to confirm, reject, or modify these findings and conclusions.

A final caveat concerns the sample of Native youth who participated in the study. Participants in this study were those who were enrolled in school at the time of data collection. In this metropolitan area school district, approximately 9 out of 10 Native students fail to complete high school. Thus, this is a representative sample of only American Indian youth enrolled in and attending school; the results do not generalize to those students who have prematurely exited school.

Conclusions

The results of the current literature review and exploratory study suggest the strength of Native-based education programming appears to reside in parental

involvement, quality of instruction, and school climate. Without these components, cultural based educational programs may not increase Native students' educational outcomes. This finding is consistent with the argument that superficially adding Native arts and crafts to a curriculum does little to improve Native students' achievement (Bradley, 1984; Hull, Phillips, & Polyzoi, 1995). Rather, effective cultural programs validate Native culture at a social and psychological level. Optimally, this validation includes redefining Native students as competent learners, negotiating cultural barriers to reach out to Native parents as important partners in education, and creating a school climate that is nurturing and accepting of Native students' cultural identity. Further research is needed to clarify the effects of Native-based education programs on promoting home-school partnerships, teacher supportiveness, quality instruction, student academic motivation, and other contributors to school success. The ecological model of school learning presented here received some support based on extant data from 240 urban American Indian students; however, the limitations of the study suggest that cross-validation of this and alternative models of school learning warrant further investigation.

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Appendix A Description of Eight Latent Variables

Educational Outcomes

This endogenous latent variable was comprised of three scales: (a) achievement, (b) school presence and participation in school activities, and (c) intention to complete school completion. The achievement scale included two items: students' grades and achievement level. Some argue that grades are better indicators of achievement than standardized assessments because they are more reflective of the context in which a student is educated and better predictors of school dropout than achievement test scores (Keith & Benson, 1992). Furthermore, self-reported grades are typically accurate (Keith & Benson, 1992), stable, and moderately correlated to standardized achievement test results (Marsh, 1990). In the current study, self-reported grades correlated moderately ($r = .60$) with school report card grades for a subsample ($n = 40$) of study participants. This correlation is probably an underestimate of the true relationship between self-reported and actual grades because the report cards and the self-reported grades did not represent the same academic period. The report card grades were collected in the fall semester and the self-reported grades were collected during the spring and summer.

The second educational outcomes scale consisted of attitudinal and behavioral questions about school attendance and participation in extracurricular school activities. Participation in extracurricular activities has been identified as a powerful indicator of a sense of school belonging—a critical outcome for many successful students (Finn, 1989). Goodenow (1993) proposed that students who do not identify with the adults or norms of the school do not invest in school activities. Extracurricular activities measured in this study included helping teachers at school and weekly participation in nonathletic extracurricular activities. This scale also queried students about their attendance. School attendance has been found to be a powerful predictor of academic success and school persistence (Wehlage & Rutter, 1986). Self-reported school attendance for a one-month time frame correlated moderately with attendance data collected from fall semester school report cards for a subsample ($n = 30$) of our study participants. Once again, this is probably an underestimate of the actual correlation between self-report attendance and actual attendance because they represent different time periods (i.e., one month in the spring versus fall semester attendance).

The third scale measuring the educational outcomes latent variable consisted of two items on students' intention to complete school. Wehlage and Rutter (1986) provided evidence of the predictive validity of survey items tapping students' intention to complete high school and college. They demonstrated that students' expected school attainment at 10th grade was a more powerful predictor of students' school persistence than family income or school performance. American Indian students who may perceive school as a threat to their Native culture or as an inadequate opportunity structure for obtaining employment are

less likely to expect to complete secondary or postsecondary education (Dehyle, 1992).

Ability and Prior Achievement

The scale that assessed this latent exogenous variable included reading abilities, special education status, and retention of one or more grade levels. Without longitudinal data, it is difficult to determine whether indicators such as special education status, previous grade retention, or reading difficulties represent students' current academic skills and abilities or their past academic success and challenges.

Motivation

This latent variable was measured by a single scale that measured the extent to which students reported taking pride in their work, exerting effort toward attaining school objectives, and enjoying school.

Parental Involvement

In this study, the latent variable *parental involvement* was measured by two scales, home-school collaboration and home support for learning, in order to reflect on two major contexts in which parents can lend academic support to their children. The accuracy of student reported parental support for formal learning may actually be better than collecting these data directly from parents because parents may be likely to overestimate the extent to which they are involved in their child's formal education.

Quality of Instruction

This variable is based on students' assessment of teacher encouragement, instructional match, and teachers' expectations as measures of quality of instruction. Survey items on these three instructional characteristics were combined into a single scale that measured the latent variable *quality of instruction*.

School Climate

Two scales measured this construct: school personnel supportiveness and safe and drug-free schools. The extent to which the participants in the current study assessed their schools to be safe and drug-free and to provide approachable and caring teachers was considered an important indicator of school climate.

Family Income

A single scale consisting of four items measured the latent variable *family income*. These items assessed whether students received free or reduced cost school lunch, family mobility, presence of a phone in the home, and students' worries about having enough food or money.

Cultural Programming

In this study, a single scale measured the latent variable cultural programming. This scale assessed the extent to which students learned about Indian stories, culture, history, language, and spirituality in school, and the extent to which they attended school with other Indian children.

Appendix B

Limitations of Three Scales

Some specific measurement limitations associated with three specific latent variables used in the present model are described here.

Family Income

In the present study, the survey items designed to measure family income did not produce a scale with adequate internal consistency. This may have been due to low variability among responses (e.g., 72% of respondents reported receiving free or reduced cost lunch). Huizinga and Elliott (1986) noted that the reliability coefficient is based not only on a measure's degree of precision but also on the total variance of that measure. Thus, "the same level of precision will provide a higher coefficient of reliability if the variance is large than if the variance is small" (p. 296). The limited number of items and response options also restricted the variability in the data collected by this scale. Alpha depends on the average inter-item correlation as well as the number of items in the scale, that is, as the average correlations between items and the number of items increase the value of alpha (Carmines & Zeller, 1976). The three scales with poor internal reliability estimates from the current study were limited to only 3 to 4 items and many of the item response options were also restricted to two or three choices rather than the ideal 5-7 point Likert scale. Response options were further limited to increase readability for those participants as young as 9 years of age.

Ability and Past Achievement

A second problematic scale, and resulting variable, was ability and prior achievement. The internal consistency estimate for this scale was very low. The low internal reliability of this scale may have occurred because some scale items were mutually exclusive. For example, poor performing students are likely to be retained at grade level or referred to special education, depending on their school's policy, but they are unlikely to be both referred and retained. Because this scale measured educational experiences that may be mutually exclusive, or only loosely associated at best, the scale had serious measurement limitations. This lack of measurement precision is problematic. As Huizinga and Elliott (1986) observed, "If the items contained in a scale development are dependent on more than one dimension, trait, or attribute, then the internal consistency estimate of reliability may be poor and underestimate the actual reliability" (pp. 295-296). As such, this aggregate measure of ability-achievement is best conceptualized as an index than a scale.

Quality of Instruction

The third variable that was problematic was quality of instruction. Once again either specification error or lack of variability in response, or both caused the scale to perform poorly. For example, survey participants may be ill-equipped to assess

objectively the quality of the instruction they receive. Fifty-seven percent of the sample gave the highest ratings to their teachers' level of encouragement, high expectations, and provision of appropriately matched instruction.