School Bonding As a Moderator of the Effect of Peer Influences on Alcohol Use Among American Indian Adolescents

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ABSTRACT. Objective: Previous research suggests that substance use among American Indian youth is associated with disproportionate rates of morbidity and substance misuse. Additional work to understand risk and protective factors for alcohol use is needed. The current study examined the role of school bonding in buffering the effect of peer alcohol use on a student's own alcohol use among American Indian adolescents. **Method:** The present study is part of a larger examination of alcohol use among American Indian youth. Survey data were collected from middle and high school students during the 2009–2010 and 2010–2011 school years from 37 school districts in the United States. The sample consisted of 2,582 students ages 11–19 years: 1,606 were younger than 16, and 976 were age 16 or older. All students self-identified as American

Indian or Alaskan Native. The sample was approximately equally divided by gender (49% male). **Results:** For all students, peer alcohol use was a risk factor for (a) lifetime alcohol use and (b) level of alcohol use among users. School bonding was associated with a lower likelihood of lifetime alcohol use for adolescents younger than age 16 and a lower level of use among users for all adolescents. School bonding emerged as a protective factor that buffers against peer alcohol use among adolescent alcohol users younger than 16. **Conclusions:** Results of the study demonstrate the influence of exposure to alcohol-using peers and the protective role of school bonding on alcohol use among American Indian adolescents. Implications for prevention are discussed. (*J. Stud. Alcohol Drugs*, 73, 597–603, 2012)

THE USE AND MISUSE OF ALCOHOL is a major problem among youth of all ethnic groups, including American Indian youth (Johnston et al., 2008). Specifically, American Indian youth appear to be at a heightened risk for consequences of alcohol misuse (Kulis et al., 2002). In one study, approximately one third of American Indian youth began to use alcohol by age 11 (Mail, 1995), and the average age at substance use initiation among American Indian youth is younger than what is found in other ethnic groups (Hawkins et al., 2004). Additionally, substance use among American Indian youth is associated with higher rates of lifetime alcohol use and alcohol misuse in comparison to European Americans or other ethnic minority groups (Herring, 1994). American Indian youth also have disproportionate rates of morbidity and mortality as a result of substance misuse. For example, American Indian youth have a mortality rate that is 2.1 times higher than the general population (Hawkins et al., 2004). Given the prevalence of alcohol use among American Indian youth and the associated negative consequences, further research is needed to determine influencing factors.

Over the last few decades, a large body of work has documented the importance of a risk and protective factors approach to substance use prevention (Hawkins et al., 1992; Oetting et al., 1998). Risk factors are variables associated with increased substance use, whereas protective factors offset the ill effects of a risk factor. In this article, we consider one of the most salient risk factors for adolescent alcohol use, peer use of alcohol, as well as one of the most important protective factors for adolescent alcohol use, school bonding. Among the general population of adolescents, ample research has identified these variables as important in predicting the likelihood that an adolescent will use alcohol (Hawkins et al., 1992; Resnick et al., 1997). However, little research has assessed these risk and protective factors among American Indian youth. Therefore, it is important to determine if these risk and protective factors operate in a similar fashion in this population.

Peer use of alcohol: A risk factor for adolescent alcohol use

Extensive research has identified peer influence and peer behavior as one of the strongest influences of an adolescent's substance use (Dishion and Owen, 2002; Fergusson et al., 2002; Guo et al., 2002; Hawkins et al., 1992; Oetting and Beauvais, 1987). Adolescence is a developmental period characterized by increasing amounts of time spent with peers and decreasing influence from parents and family (Oetting

Received: October 26, 2011. Revision: March 6, 2012.

This research was supported by National Institute on Drug Abuse Grant 5R01DA03371-23 to Fred Beauvais.

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et al., 1998); therefore, opportunity for interactions and exposure to peer behaviors (both prosocial and antisocial) increases. As a result, peer behavior can exert a strong influence on an adolescent's behavior (Guo et al., 2001). Specific to the American Indian population, research shows that deviant peers and peer alcohol use can influence adolescent alcohol use (Radin et al., 2006; Yu and Stiffman, 2007). Given the strong relationship between peer influence and adolescent alcohol use in the general population, further examination of these factors in an American Indian adolescent sample is essential.

School bonding: A protective factor for adolescent alcohol use

School bonding is one protective factor that may serve to decrease an adolescent's substance use in the face of risk (e.g., association with peers who use alcohol). School bonding is broadly defined as the extent to which a student is committed to school, attached to prosocial peers and teachers, and believes in the prosocial norms of behavior established by the school (Hawkins and Weis, 1985). For children and adolescents, the school environment has been described as a particularly important socialization environment (Catalano et al., 2004). Ample research with the general population shows a moderate to strong negative relationship between school bonding (and other related school engagement factors) and alcohol use (Catalano et al., 2004; Guo et al., 2001; Henry et al., 2007, 2009; Resnick et al., 1997). To date, few studies have explored school bonding as a moderator of the effect of peer use on alcohol use among adolescents, but we posit that school bonding may buffer this effect. Research suggests that school bonding and other forms of school engagement can serve as a compensatory factor against various health outcomes among youth (Catalano et al., 2004; Li and Lerner, 2011). According to the social control theory (Hirschi, 1971), students who are bonded to school are less likely to develop delinquent behaviors such as alcohol use because they are motivated to meet school's high expectations (Li and Lerner, 2011). Consequently, further research is needed to determine if school bonding is also associated with a decrease in alcohol use among American Indian youth and if higher levels of school bonding can buffer the negative effects of peer alcohol use.

Present study

In this study, we explored the relationship between peer alcohol use, student alcohol use, and school bonding among American Indian adolescents. We hypothesized that peer use would be positively associated with alcohol use, and school bonding would be negatively associated with alcohol use. Further, we hypothesized that school bonding would moderate the relationship between peer alcohol use and a student's

own alcohol use. We predicted that the effect of peer use would be the strongest for students with low school bonding and that the effect of peer use would be the weakest for students with high school bonding. That is, we hypothesized that school bonding would serve as a buffer against the ill effect of peer use on a student's use of alcohol.

Method

Participants

Participants were American Indian and/or Alaskan Native students from schools on or near reservations that had an enrollment of at least 20% American Indian youth. Students were invited to complete a paper-and-pencil survey during school hours. During the 2009–2010 and 2010–2011 school years, 37 schools in Washington, Oregon, Montana, Arizona, North Dakota, South Dakota, Minnesota, Wisconsin, Nevada, and Alabama were surveyed. Twenty-six of the schools are located within the boundaries of American Indian reservations. Thirty-two schools are public schools, and five were Bureau of Indian Education Schools. American Indian students are the majority ethnic group in 78% of the schools, whereas White students are the majority ethnic group in 22% of the schools. Specific identity of tribes and reservations are kept confidential. Seventh- through 12th-grade students who self-identified as American Indian or Alaskan Native were included in the analyses for the present study. We made an a priori decision to analyze the data from younger and older adolescents separately because school attendance is not mandatory for older students, and therefore the effects of school bonding may differ. We split the sample into two segments—those adolescents who were younger than 16 at the time of the survey ($n = 1,606$) and those who were 16 or older at the time of the survey ($n = 976$).

Procedure

The current study is part of a larger ongoing epidemiological study of substance use among reservation-based American Indian youth. Each year, a cross-sectional sample of adolescents is selected and surveyed. Yearly recruitment is based on a sampling scheme to reflect the proportion of American Indians residing in six geographic regions (Northwest, Northern Plains, Northeast, Southeast, Southern Great Plains, and Southwest). Permission is obtained from both the schools and the parents. Information regarding the survey is sent home to parents, and parents can elect to remove their child from the project by returning the consent form to the school. Less than 1% of students did not complete the survey because of lack of parental consent. Administration of the survey is by an institutional review board-trained school staff member, and the students are given a class period to complete the survey. The surveys contained no identifying

information, and procedures were used to ensure confidentiality. On completion, all students placed their surveys in a large envelope, which was then sealed. School staff members were instructed to remain in an area of the classroom that precluded observation of student surveys.

Measures

Students were given the American Drug and Alcohol Survey (Oetting and Beauvais, 1990). This survey consists of 99 items and includes a variety of psychosocial items related to substance use by the student and by his or her peers, school engagement, crime and violence, religion, relationships with family and peers, and other individual and community risk factors in youth substance use.

Student alcohol use. Five measures of alcohol use were considered. First, based on two items that inquired about lifetime use of alcohol, we created a variable that differentiated between those adolescents who had ever consumed alcohol and those who had never consumed alcohol. Some 52.2% of adolescents younger than 16 had consumed alcohol, whereas 72.4% of adolescents age 16 or older had consumed alcohol. Four additional items inquired about level or amount of use: (1) "How often in the last 12 months have you gotten drunk" (1 = *none*, 2 = *1 or 2 times*, 3 = *3–9 times*, 4 = *10–19 times*, 5 = *20–49 times*, 6 = *50 or more times*); (2) "How often in the last month have you gotten drunk" (rated on the same scale as Item 1); (3) "How much do you like to drink" (1 = *I don't drink*, 2 = *just a glass or two*, 3 =

enough to feel it a little, 4 = *enough to feel it a lot*, 5 = *until I get really drunk*); and (4) a summed alcohol consequences index made up of five items that inquired about whether the following set of problems had ever resulted from drinking—car accident, arrested, trouble at school, passed out, could not remember what happened while drinking. These four measures were treated as ordered categorical indicators of a latent adolescent alcohol use variable in the structural equation models specified to answer the research questions (described below in the *Data analysis* section). Because of sparse numbers in some of the upper categories of the scale, Items 1 and 2 were collapsed to four categories, and Item 4 was collapsed to five categories. Descriptive statistics for the alcohol indicators among those reporting any lifetime use are reported in Table 1. Cronbach's α for Items 1–4 was .89 for the younger than 16 group and .86 for the 16 and older group.

Peer alcohol use. The peer alcohol use scale consisted of three items (α = .82 for adolescents younger than age 16 years and .80 for adolescents 16 and older): "How many of your friends get drunk once in a while," "How many of your friends get drunk almost every weekend" (both scored 1 = *none*, 2 = *one or two*, 3 = *some of them*, 4 = *most of them*), and "number of friends that get drunk" (1 = *none*, 2 = *a few*, 3 = *most of them*, 4 = *all of them*). The peer alcohol use score was obtained by standardizing each item and then computing the mean of the three items.

School bonding. The school bonding scale consisted of four items (α = .86 for adolescents younger than 16 and .84 for adolescents 16 and older) comprised of "I like school," "My teachers like me," "I like my teachers," and "School is fun" (all scored 1 = *no*, 2 = *not much*, 3 = *some*, 4 = *a lot*). The school bonding score was obtained by standardizing each item and then computing the mean of the four items.

Control variables. In all models, we controlled for five variables: three demographic variables—gender (male = 1, female = 0), age (a continuous measure ranging from 11 to 19), and family structure (1 = lives with both biological parents, 0 = all others)—and two scales (cultural identification and parental monitoring). Cultural identification was defined by the average of two standardized items: "Do you live by or follow the American Indian way of life?" and "When you are an adult, will you be a success in the American Indian way of life?" Each was measured on a 4-point scale (1 = *no*, 2 = *not much*, 3 = *some*, 4 = *a lot*). Cronbach's α was .83 for the younger adolescents and .84 for the older adolescents. Parental monitoring was defined by the average of four standardized items: "My parents let me go out as often as I want," "My parents let me go places without asking," "My parents are less strict than other parents," and "My parents let me stay out as late as I want." Each was measured on a 4-point scale (1 = *very true*, 2 = *mostly true*, 3 = *somewhat true*, 4 = *not at all true*). Cronbach's α equaled .81 for the younger adolescents and .85 for the older adolescents.

TABLE 1. Descriptive statistics for alcohol indicators among adolescents reporting some lifetime use of alcohol

Item	Age of adolescents	
	<16 years %	≥16 years %
How often in the past 12 months have you been drunk?		
None	46.3	38.0
1–2 times	27.3	27.4
3–9 times	15.4	18.8
≥10 times	10.9	15.9
How often in the past month have you been drunk?		
None	72.8	70.0
1–2 times	19.3	20.2
3–9 times	6.0	7.9
≥10 times	1.9	1.8
How much do you like to drink?		
I don't drink	24.7	19.5
Just a glass or two	19.1	14.5
Enough to feel it a little	30.4	36.4
Enough to feel it a lot	15.1	21.3
Until I get really drunk	10.7	8.3
No. of alcohol consequences		
None	47.2	40.2
1	17.1	18.3
2	21.5	23.5
3	8.2	11.7
≥4	6.1	6.3

TABLE 2. Regression estimates for adolescents younger than age 16 years

Variable	Lifetime use vs. no lifetime use (<i>n</i> = 1,606)						Level of use among lifetime users (<i>n</i> = 838)					
	Model A			Model B			Model C			Model D		
	<i>b</i>	<i>SE</i>	<i>p</i>	<i>b</i>	<i>SE</i>	<i>p</i>	<i>b</i>	<i>SE</i>	<i>p</i>	<i>b</i>	<i>SE</i>	<i>p</i>
Male	-0.51	0.16	.001	-0.50	0.16	.002	-1.07	0.46	.020	-1.05	0.46	.023
Age	0.32	0.11	.003	0.32	0.11	.004	0.54	0.18	.003	0.53	0.18	.003
Lives with both biological parents	-0.27	0.12	.018	-0.27	0.12	.018	-0.85	0.50	.089	-0.85	0.51	.097
Cultural identification	-0.01	0.06	.921	-0.01	0.06	.831	-0.11	0.20	.575	-0.13	0.20	.513
Parental monitoring	-0.27	0.07	.000	-0.27	0.07	.000	-1.01	0.23	.000	-1.02	0.22	.000
Peer use of alcohol	0.94	0.09	.000	0.94	0.09	.000	2.72	0.31	.000	2.63	0.30	.000
School bonding	-0.30	0.07	.000	-0.33	0.07	.000	-0.75	0.29	.011	-0.61	0.27	.024
Peer Use of Alcohol $\times$ School Bonding				-0.09	0.05	.108				-0.47	0.18	.008

Data analysis

There was a small amount of missing data across the variables of interest. To properly account for this, we created 10 multiply imputed data sets using SAS IVEWARE (Raghunathan et al., 2001). All models were run across these ten data sets, and the results were combined using the procedures outlined by Rubin (1987). All models were tested in Mplus, Version 6.11 (Muthén and Muthén, 1998–2007). The analysis was conducted in two stages. First, we examined the influence of peer use of alcohol, school bonding, and the control variables on lifetime use of alcohol. In these models, the dependent variable was a binary variable that differentiated between youth who reported that they had tried alcohol in their lifetime and those who reported no alcohol use in their lifetime. Two models were specified—one model without the interaction of peer use and school bonding (Model A) and one with the interaction of peer use and school bonding (Model B). Second, we examined the influence of peer use of alcohol, school bonding, and the control variables on level of use (defined by the alcohol use latent variable described above) among those adolescents who reported some lifetime use of alcohol. In these models, the dependent variable was a latent variable made up of the four ordered categorical alcohol use indicators described in the measurement section. Two models were specified, one model without the interaction of peer use and school bonding (Model C) and one with the interaction of peer use and school bonding (Model D). All models were estimated with a robust maximum likelihood estimator, and the nesting of students in school districts was handled using the Type = Complex feature of Mplus, Version 6.11, which adjusts the standard errors for non-independence attributable to clustering.

Results

Adolescents younger than age 16

The results of the models for adolescents younger than age 16 years are reported in Table 2. First consider Models

A and B, which assess the effect of our key predictors (peer use of alcohol and school bonding) on lifetime incidence of alcohol use (specified as a binary variable and modeled with a logit link). The results of Model A indicate that peer use of alcohol is associated with a higher likelihood of lifetime use, and school bonding is associated with a lower likelihood of lifetime use. Model B adds the interaction between peer use and school bonding. Although it is in the expected direction, it does not reach statistical significance. Next consider the second set of models (Models C and D). These models assess the effect of peer use and school bonding on level of alcohol use among adolescents who reported using alcohol in their lifetime (excluding youth who indicated they had never used alcohol). In these models, alcohol use is specified as a latent variable defined by the four ordered categorical indicators listed in Table 1. Although the latent variable models the underlying continuous distribution of the latent construct, a logit link is used to relate the latent variable to the four ordered categorical indicators. The results of Model C indicate that peer use is positively associated with level of alcohol use, and school bonding is negatively associated with level of alcohol use. Model D adds the interaction term for peer use and school bonding. The interaction effect is statistically significant. As school bonding increases, the deleterious effect of peer use on alcohol use is diminished. By probing the interaction, we determined that, although the effect of peer use on a student's own alcohol use is significant at 1 *SD* below the mean of school bonding ($b = 3.10$, $SE = 0.37$, $p < .001$), at the mean of school bonding ($b = 2.63$, $SE = 0.30$, $p < .001$) and at 1 *SD* above the mean of school bonding ($b = 2.15$, $SE = 0.33$, $p < .001$) the effect of peer use is substantially diminished as school bonding increases. In other words, school bonding buffers the ill effect of peer use on a student's own use of alcohol.

Adolescents age 16 and older

We ran the same set of models for the older adolescents. These results are reported in Table 3. Model A indicates that peer use is positively associated with lifetime use of

TABLE 3. Regression estimates for adolescents age 16 years and older

Variable	Lifetime use vs. no lifetime use (<i>n</i> = 976)						Level of use among lifetime users (<i>n</i> = 707)					
	Model A			Model B			Model C			Model D		
	<i>b</i>	<i>SE</i>	<i>p</i>	<i>b</i>	<i>SE</i>	<i>p</i>	<i>b</i>	<i>SE</i>	<i>p</i>	<i>b</i>	<i>SE</i>	<i>p</i>
Male	-0.16	0.21	.437	-0.16	0.21	.437	0.36	0.33	.280	0.36	0.33	.282
Age	0.13	0.15	.372	0.13	0.15	.371	0.07	0.19	.702	0.07	0.19	.702
Lives with both biological parents	-0.35	0.11	.001	-0.35	0.11	.002	-0.91	0.24	.000	-0.91	0.23	.000
Cultural identification	0.07	0.06	.213	0.07	0.06	.199	0.30	0.15	.054	0.30	0.15	.055
Parental monitoring	-0.15	0.10	.121	-0.15	0.10	.133	-0.75	0.16	.000	-0.76	0.16	.000
Peer use of alcohol	0.95	0.11	.000	0.93	0.11	.000	2.20	0.30	.000	2.20	0.30	.000
School bonding	-0.17	0.11	.126	-0.16	0.11	.142	-0.49	0.19	.010	-0.49	0.17	.004
Peer Use of Alcohol $\times$ School Bonding				0.09	0.09	.308				-0.02	0.15	.914

alcohol, but school bonding is unrelated to lifetime use of alcohol. Model B indicates that peer use and school bonding do not interact to predict lifetime use of alcohol among older adolescents. Model C indicates that peer use of alcohol is positively associated, and school bonding is negatively associated, with level of alcohol use among lifetime users. However, peer use and school bonding do not interact to predict level of alcohol use among users (see interaction term in Model D).

Discussion

Previous research suggests that peer alcohol use is associated with one's own alcohol use among adolescents (Guo et al., 2002; Hawkins et al., 1992; Oetting and Beauvais, 1987; Oetting et al., 1998), and school bonding is associated with less alcohol use (e.g., Hawkins and Weis, 1985; Henry and Slater, 2007; Li and Lerner, 2011). The present study was conducted to determine if these same relationships also exist among American Indian adolescents.

Consistent with previous research, and as predicted by our hypothesis, peer use and school bonding were both significantly associated with a student's own alcohol use. Across all models and both age groups, peer use was positively associated with alcohol use (in terms of both lifetime use and level of use among users). School bonding was negatively associated with lifetime use and level of use among users for the younger adolescents and negatively associated with level of use among users for the older adolescents. Our moderation hypothesis, which posited that school bonding would serve as a protective factor against the ill effects of peer use, held for younger adolescents but not for older adolescents. Interestingly, the protective effect emerged when considering level of use among users and not for lifetime use in general.

Limitations

Before considering implications from this study, it is important to recognize the limitations. First, the current study does not include adolescents who had already dropped out of

school. These students are likely to have been poorly bonded to school and are an important group to consider. Our results cannot speak to this population of adolescents. Second, when exploring alcohol use among American Indian adolescents, previous researchers have suggested the importance of considering regional variations in drug use patterns (e.g., Plunkett and Mitchell, 2000). In the present study, the American Indian youth sampled were living on or near reservations, and the generalizability to all American Indian youth may be limited because of potential variance in environmental conditions. However, Spicer et al. (2003) found that American Indian regional group membership accounted for a small amount of the variance in alcohol use; therefore, the results of the present study may be generalizable to other groups of American Indian youth. Last, this study is cross-sectional, and we are unable to determine causality or direction of influence among the variables of interest. However, we believe that the strengths, significance, and novelty of the findings presented here tend to outweigh these weaknesses.

Implications for prevention

The results of this study demonstrate the harmful role of exposure to alcohol-using peers and the compensatory role of school bonding among American Indian adolescents. For adolescents younger than 16, we demonstrate that school bonding can buffer a major risk factor—peer alcohol use. Even among students who associate with alcohol-using peers and who have had some experience with alcohol, school bonding may have the power to offset this harmful effect. This is an encouraging discovery. Once alcohol use has been initiated, interventions emphasizing school bonding are critically important because school bonding provides a target that may stop the escalation of substance use.

Given the prevalence of alcohol use during adolescence, particularly among American Indian youth, American Indian students will inevitably be exposed to alcohol use through peers. Therefore, it is important to teach adolescents what to do in situations where their peers may pressure them to engage in risky behaviors, such as substance use. Skills-

based interventions—such as the Journey of Circles (Marlatt et al., 2003), which is a group-based intervention program for high-risk American Indians that focuses on incorporating culture and life skills to reduce drug use—could aid in teaching drink-refusal skills.

Moreover, the knowledge that school bonding can buffer this effect of peer use among younger adolescents is vital. In this present study, school bonding buffered the effect of peer use among younger adolescents. Although school bonding did not moderate the effect of peer use for older students, school bonding was seen to be associated with lower levels of alcohol use among high school students as well—indicating that it is a salient compensatory factor for all youth.

Research suggests that students can be behaviorally and emotionally engaged in school (Li and Lerner, 2011). Specifically, school bonding behaviors include involvement in academic and extracurricular activities and positive conduct, whereas emotional bonding consists of a student's emotional reaction to the school, teacher, and his or her peers (Li and Lerner, 2011). According to Steinberg et al. (1992), individuals with strong school bonding actively participate in class, enjoy and value school, and behave well in school. Overall, school bonding can be enhanced through increased involvement in extracurricular activities and consistent school attendance. More specifically, research suggests that there are certain methods for enhancing school bonding that are designed specifically for American Indian youth. These methods include involvement in youth programs, self-efficacy in academic performance (Scales et al., 2000), positive school attitudes, good grades in school, and developing academic plans, such as going to college (LaFromboise et al., 2006). Research indicates that bonding to school can be enhanced through fostering relationships with teachers and positive peer networks (Henry and Slater, 2007; Marcus and Sanders-Reio, 2001; Steinberg et al., 1992) as well as encouraging value placement on academic achievement and expectancies for success (Marcus and Sander-Reio, 2001). Along those same lines, Henry and Slater (2007) suggest that a strong bonding to school is associated with a commitment to be involved with both academic and social activities; a belief in prosocial norms regarding school; and an attachment to peers, teachers, and staff. This research suggests potential points of intervention to increase school bonding among adolescents.

In sum, there are effective means of enhancing school bonding among students, but more research is needed to develop and test school bonding interventions for American Indian youth. Epidemiological findings of school disengagement among American Indian adolescents indicate that these types of programs are desperately needed not only to promote positive youth development and the avoidance of risk behaviors but also to increase academic attainment. Recent estimates indicate that more than half of American Indian youth drop out of school (Faircloth and Tippeconnic, 2010),

and we know that the process of school dropout is already apparent in middle school (Henry et al., 2012). Programs designed to promote school bonding, school engagement, and academic achievement among American Indian youth may have multiple benefits during adolescence and throughout the life course.

The results of this study highlight the importance of school bonding and peer influence on youth development. In this study, the role of school bonding on the relationship between peer use of alcohol and an adolescent's own use of alcohol was examined among a population particularly at risk for substance use, American Indian youth. Both school bonding and peer alcohol use were important predictors of a student's own alcohol use. These two factors may be potential points of intervention to reduce the risk of alcohol use among American Indian youth, and future research should explore interventions targeting these two factors. Such an approach may be useful among all cultural groups and may be especially important for American Indian youth.

Acknowledgments

The authors acknowledge the efforts and work of the Tri-Ethnic Center for Prevention Research, Colorado State University, and the students and staff of the participating schools, who all collaborated to make this research possible.

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