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Assessment of Risk and Protection in Native American Youth: Steps Toward Conducting Culturally Relevant, Sustainable Prevention in Indian Country

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Abstract

Background—This study constitutes a building block in the cultural adaptation of Communities That Care (CTC), a community-based prevention system that has been found to be effective in reducing youth problem behaviors.

Methods—Using the data from the CTC normative survey dataset that consists of more than quarter million youth nationwide, this study examines the reliability and validity of scores derived from the Communities That Care Youth Survey (CTC-YS), one of the primary assessment tools for gathering community data on risk and protective factors related to problem behaviors including substance use. The reliability and criterion validity analyses are conducted overall for the nationwide sample of youth as well as for the student subsample of Native American youth.

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Results—The results of this study indicate that the existing CTC-YS assessments of risk and protective factors in the domains of community, family, school, and peer groups as well as within individuals yield scores that are reliable and valid within the Native American sample of youth.

Conclusions—This study informs the third step in the CTC prevention planning process, which involves the assessment of risk and protective factors to be targeted in preventive interventions. The question of how the assessment of risk and protective factors among Native American youth might be further improved and a description of efforts related to the cultural adaptation of the CTC program currently underway are also addressed in the discussion.

Keywords

cultural adaptation; Native American; prevention system; Communities That Care; risk and protective factors; substance use

Community-oriented approaches to prevention have great potential to address the needs of communities in Indian Country, as they are in line with Native values and traditions that emphasize collective decision making about community concerns (Edwards & Edwards, 1988; Hawkins, Cummins, & Marlatt, 2004; LaFromboise, Trimble, & Mohatt, 1990; Petoskey, Van Stelle, & De Jong, 1998). One such approach that has been tested and found to be effective is Communities That Care (CTC). CTC is a science-based prevention operating system that incorporates two cornerstones of prevention science: (a) measuring exposure to risk and protective factors that influence harmful behaviors among youth in the community; and (b) matching widespread risks in the community with tested, effective preventive interventions that target these factors to reduce problem behaviors (Catalano et al., 2012; Coie et al., 1993; Mrazek & Haggerty, 1994; O'Connell, Boat, & Warner, 2009; Woolf, 2008). CTC seeks to empower a community coalition of stakeholders to collect and use community-specific data on risk and protective factors to guide the selection of tested and effective prevention programs that address the community's elevated risks (Hawkins, Catalano et al, 1992). Using these cornerstones for planning and managing prevention activities at the community level has led to reductions in youth problem behaviors including violence, delinquency, and substance abuse (Feinberg, Jones, Greenberg, Osgood, & Bontempo, 2010; Hawkins, Kosterman, Catalano, Hill, & Abbott, 2008; Hawkins, Oesterle, Brown, Abbott, & Catalano, 2014; Hawkins et al., 2009; 2012).

The usefulness of CTC is contingent upon reliable and valid assessment of risk and protective factors within a given community or group (e.g., Arthur et al., 2007; Arthur, Hawkins, Pollard, Catalano, & Baglioni, 2002; Glaser, Van Horn, Arthur, Hawkins, & Catalano, 2005; Sameroff & Gutman, 2004). If communities are to use these cornerstones of prevention science to organize their prevention efforts, they need local assessment of risk and protection that accurately identifies risk factors that are elevated and protective factors that are depressed in the community. Risk and protective factors have been identified in the community, family, school, peer group, and the individual. Instruments used to assess these factors must be psychometrically valid for the youth population of the community. Measurement robustness has not often been examined for youth from historically oppressed and disadvantaged groups, and Native American youth in particular. An important question is whether measures of risk and protective factors are comparably reliable and valid for

American Indian youth as they are for youth in the general population, or whether there may be differences in reliability and the strength of association between risk and protective factors and behavioral health outcomes among Native American youth. To date, no large-scale study has evaluated the reliability and validity of tools used to assess risk and protective factors among Native American youth.

One widely used tool to assess a broad range of risk and protective factors in general population is the Communities That Care Youth Survey (CTC-YS; Arthur et al., 2002; Glaser et al., 2005). At present it is unknown whether the CTC Youth Survey provides reliable and valid assessments of risk and protection for Native American youth. However, several past studies have examined the measurement models of select risk and protective factors for problem behaviors in adolescence by assessing equivalence of relationships between indicators of risk and protective factor constructs across different demographic groups. For example, Rosay, Gottfredson, Armstrong and Harmon (2000) assessed reliability equivalence of 7 measures of risk and protective factors (RPFs) for lifetime and last-year drug use and delinquency, as well as the validity of these select RPFs in predicting delinquency across gender and ethnic groups among 6-12th grade students. They found a partial support for equivalent reliability. Moreover, after they controlled for measurement differences, all 7 RPFs predicted delinquency and drug use for all gender and ethnic groups. Similarly, Komro, Livingston, Kominsky and colleagues (2015) assessed reliability and validity of the scores from their 15-minute alcohol risk survey among high school students from the jurisdictional service area of the Cherokee Nation in northeastern Oklahoma. The internal consistency, test-retest reliability, criterion validity, and predictive validity were examined for the 16 scales assessing 10 alcohol-specific and 6 general- risk and protective factors for alcohol use problems across groups of students who self-identified as either Native American, Native American and White, or White only. The results of this study indicated acceptable psychometric properties of scores of these RPFs for adolescent alcohol use. Finally, using the data from a sample of students from 7 states, Glaser and colleagues (2005) examined the equivalence of the measurement models of the actual CTC-YS risk and protective factors and tested the invariance of the relationships between items indicating the various RPFs across the demographic groups. The results of their study suggest measurement equivalence of scores across gender and the five examined ethnic groups. The Glaser and colleagues' study, however, did not assess the predictive or criterion validity to establish that the RPFs were actually related to the expected outcomes. The present study uses nationally representative data from the Communities That Care Youth Survey to examine whether the extensive CTC-YS measures of 32 risk and protective factors in community, peer, individual, family and school domains yield scores that are reliable and valid within the Native American youth national subsample.

General risk and protective factors

Youth from Native American nations are a heterogeneous population including those from more than 560 American Indian and Alaskan Native (AI/AN) tribes and villages recognized by the U.S. government, but also those from tribes that do not have federal recognition (Bureau of Indian Affairs, 2010). As others have done before (e.g., Beauvais & Trimble, 2003; Trimble, 1991), we use the terms "American Indian and Alaskan Native" or "Native

American” as “ethnic glosses,” referring to the aboriginal populations of North America, for brevity, while acknowledging the significant diversity among the native tribes and communities. Indeed, there is a great diversity in their cultures, histories, and demographic characteristics, yet they share a history of trauma, oppression, and erosion of culture that resulted from their contact with European Americans (e.g., Baldwin, 1998; Duran & Duran, 1995; Evans-Campbell, 2008; Garrett & Herring, 2001; Herring, 1997; Unger, Soto, & Thomas, 2008; Whitesell, Beals, Crow, Mitchell, & Novins, 2012). Consequently, Native American youth face disproportionate obstacles to healthy development, including poverty (e.g., Beauvais, 1998; Ogunwole, 2006); institutional racism, discrimination (e.g., Whitbeck, Hoyt, McMorris, Xiaojin, & Stubben, 2001; Whitbeck, McMorris, Hoyt, Stubben, & Lafromboise, 2002); high prevalence of chronic health conditions, and disparities in health services access and delivery (e.g., Unger et al., 2008).

According to reports from national data as well as community samples, American Indian and Alaska Native youth report earlier initiation and higher rates of substance use, including alcohol, tobacco, and other drugs, than youth from other ethnic backgrounds (e.g., Bachman et al., 1991; Beauvais, 1996; Center for Behavioral Health Statistics and Quality, 2011; Gfeller & Hundleby, 1995; Gutierrez, Russo, & Urbanski, 1994; Office of Applied Studies, 2004; Schinke, Tepavac, & Cole, 2000; Substance Abuse and Mental Health Services Administration [SAMHSA], 2008). However, while Native American youth report higher rates of substance use, the secular patterns of increases and decreases in use over the past 30 years mostly parallel those for other youth, suggesting that many Native American youth use substances for similar reasons and respond to environmental influences in similar ways as youth from other ethnic backgrounds (Beauvais, Jumper-Thurman, & Burnside, 2008; Beauvais & Trimble, 2003). Importantly, as Beauvais and colleagues (2008) note, the finding of similar secular trends in substance use suggests that instead of designing completely new prevention programs for Native American youth, it might be reasonable to identify programs proven to be effective in the general population and culturally adapt them for Native American youth.

While there has been encouraging progress recently toward substance use prevention programs for Native American youth tailored to take into account their cultural heritage (e.g., Carter, Straits, & Hall, 2007; Kulis, Okamoto, Rayle, & Sen, 2006; Marlatt et al., 2003; Schinke et al., 2000), the efficacy of most of the prevention efforts with Native American youth has not been consistently evaluated and the science of prevention has not been rigorously applied (Beauvais & Trimble, 2003; Hawkins et al., 2004; Kulis et al., 2006; Unger et al., 2008). Similarly, AI/AN prevention science is still in its beginning stages and many questions about the efficacy of intervention, cultural adaptation of successful interventions, and implementation are yet to be answered (Etz, Arroyo, Crump, Rosa, & Scott, 2012).

The present study constitutes a building block in the cultural adaptation of CTC, a prevention system that has been shown effective in reducing problem behaviors, including initiation of adolescent substance use, violence, and delinquency (e.g., Hawkins et al., 2014), and that has promise of usefulness in Native American communities. This study focuses on the third step in prevention planning in the CTC system, which involves the assessment of

risk and protective factors to identify targets for preventive interventions (e.g., Arthur et al., 2002). Specifically, this study examines the reliability and validity of scores derived from the primary assessment tool for gathering community data on risk and protective factors from the domains of community, family, school, and peer groups, as well as within the individual, in a national sample of adolescents. In addition, the discussion includes a brief treatise on how the assessment of risk and protective factors among Native American youth might be improved and a description of efforts related to the cultural adaptation of the CTC program currently underway.

Methods

Sample

The present analyses utilize data from the CTC normative survey dataset consisting of more than 300,000 youth nationwide that were administered the CTC-YS (e.g., Arthur et al., 2002) to assess the levels of exposure to risk and protective factors and the prevalence of problem behaviors including substance use. Participants were between 10 and 19 years of age (Grades 6 – 12). Cross-sectional data were collected during 2000 through 2003 from communities and states administering the CTC-YS, which included large-site surveys covering an entire state or county in 7 states, as well as smaller-scale sites throughout the country. The small-site data, which did not have the sampling and survey administration oversight of experienced state agencies was checked for quality and compared to data from large-site surveys before it was included in the final dataset (Survey Research Group, 2007). The CTC-YS database contains cross-sectional data where missingness is due to an item non-response, or an invalid response pattern. Cases that were missing vital demographic information were excluded by the database creators because the sample weights could not be constructed for these cases. The final sample size for which the weights were calculated was $N=284,268$, which represents 1.23% of the students enrolled in grades 6–12 nationwide (Survey Research Division, 2007). The dataset is gender balanced (51.8% female; $M_{age}=14.28$, $SD_{age}=1.96$). Based on the comparison to the Common Core Data from the National Center for Education Statistics (NCES) and the 2000 Census, the overall unweighted sample does not fully represent the target population in terms of urbanicity and ethnicity, in particular for African American and Hispanic youth (Survey Research Group, 2007). Specifically, African American students represent about 9.1% of the sample ($N=25,800$) but, based on the 2000 Census, about 15% of the population aged 12–18 identified as African American. Similarly, Latino youth represent about 7.6% of the sample ($N=21,596$) but about 15% of US students self-identified as Latino/Hispanic (Survey Research Division, 2007). However, the database includes one of the largest samples of self-identified Native American youth available in the U.S. ($N=5,095$ or 1.8% of the full sample; 44.1% female, $M_{age}=13.96$, $SD_{age}=1.90$). Because the primary purpose of the dataset is comparative, sampling weights were developed for the CTC-YS dataset from the National Center for Education Statistics and the 2000 U.S. Census to establish national representativeness in gender, grades, ethnicity, SES, and urbanicity (SAMHSA, 2007b). When sampling weights are used, this database of RPFs for adolescent problem behaviors allows comparisons of the average levels of these factors for any given school with the national average (Istvan, 2007). These sampling weights were used in the full-sample analyses of the present study. The database is

maintained by the Substance Abuse and Mental Health Services Administration, and is freely downloadable on the SAMHSA website (<https://www.pmrts.samhsa.gov/pmrts/CommunitiesCares.aspx>).

Measures

The CTC-YS is a self-administered survey for students in Grades 6 through 12 designed to be administered in a classroom setting during one class period.

Substance use outcomes—Measures of adolescent substance use were created based on Monitoring the Future (e.g., Johnston, O'Malley, Bachman, & Schulenberg, 2012) questions about frequency of substance use in the past 30 days and the coding of regular alcohol use, daily cigarette use and current marijuana use outcomes included in the present study was based on the work of Beyers and colleagues (2004). Specifically, *regular alcohol use* was coded as 1 if the youth reported having drunk alcohol three or more times in the past 30 days, otherwise coded as 0. *Daily cigarette use* was defined as having smoked one or more cigarettes a day in the past 30 days (= 1, otherwise = 0). Finally, *current marijuana use* was defined as having used marijuana one or more times in the past 30 days (= 1, otherwise = 0). The prevalence of regular alcohol use in the full sample was 13.3%, daily cigarette use was 7.9%, and current marijuana use was 12.5%. For Native American youth, the prevalence was 14.6% for regular alcohol use, 10.4% for daily cigarette use, and 17% for current marijuana use.

Risk and protective factors—Risk and protection were assessed in four general domains: family, school, community, and peer/individual. Based on the CTC-YS codebook (SAMHSA, 2007b) and the development work of Arthur and colleagues (2002), 32 factors related to increased or decreased substance use (22 risk and 10 protective factors) were created and used in this study. Items from each scale were coded to be valenced in the same direction, averaged and standardized as recommended by the codebook. Table 1 lists all risk and protective factor constructs within each domain, number of items, and a brief description for each of the scales.

Analyses and Results

The first set of analyses examined the reliabilities of scores derived from the 32 measures of family, school, community, and peer/individual risk and protective factors (RPF) assessed by CTC-YS for the national sample as a whole and separately for the Native American youth. The Cronbach's alpha coefficients were computed for each risk and protective factor scale for the weighted full sample as well as the Native American subsample. Table 2 lists the reliabilities and reveals that all scores from the RPF measures in CTC-YS have acceptable internal consistency both in the full sample and within the sample of Native American youth.

The second set of analyses examined the cross-sectional correlational validity of the RPF scores. This assessment of validity (a type of criterion-related validity) involves examining whether a measure is correlated with what it is theoretically hypothesized to be related to. Specifically, the scores on the 32 risk and protective factors were related to the three substance use outcomes in a series of logistic regressions, separately for the weighted full

sample of youth and the subsample of Native American youth. Because there were differences between the Native American youth and the rest of the sample in terms of gender and age distribution and these demographic characteristics may also be related to both: the level of exposure to risk and protective factors as well as the prevalence of substance use, the criterion validity models include gender and age as covariates. The results are depicted in Figures 1, 2, and 3 for marijuana use, regular drinking, and daily smoking, respectively and summarized in Table 3. The results in the figures are presented as logit coefficients to allow for a relative equivalency in the graphical scaling of the relationship between the risk and protective factors and the substance use outcomes. The results in the tables are presented as odds ratios to ease interpretation. The full sample results indicate that the risk and protective factors were consistently and significantly related to the substance use outcomes in the expected direction. The same was the case for the analyses within the sample of Native American youth for 30 of the 32 RPFs across all three drugs. The only two exceptions to this pattern of significance were that (1) the community domain measure of low opportunities in neighborhood for prosocial involvement was not related to regular alcohol use, and (2) low neighborhood attachment in the community domain was not related to any of the substance use outcomes for AI/AN youth (see Table 3).

Discussion

This study is the first to examine the basic psychometric properties of the Communities That Care Youth Survey for gathering community data on the levels of risk and protective factors and the prevalence of health-risk behaviors specifically among Native American youth in a normative dataset used to compare average levels of RPFs with the national average. In general, the results of this study indicate that the CTC-YS measures of risk and protective factors in the community, family, school, and peer/individual domains yield scores that are reliable and valid within the Native American sample of youth. Consistent with the literature, the results of this study support the conclusion that these factors constitute salient targets for prevention and intervention programs aimed at preventing or decreasing adolescent substance use. Furthermore, because many of the risk and protective factors for adolescent substance use also predict other health and behavior problems, and exposure to multiple risk factors increase the likelihood of harmful outcomes (e.g., Furstenberg, 1999; J. D. Hawkins, Catalano, & Arthur, 2002; Pollard, Hawkins, & Arthur, 1999; Sameroff, Bartko, Baldwin, Baldwin, & Seifer, 1998), prevention and intervention programs that focus on these factors have potential to improve the health of the nation's youth, including Native American youth.

The results of this study correspond to the findings from three main studies that have examined the reliability and validity of risk and protective factors for substance use in AI/AN youth (Glaser et al., 2005; Komro et al., 2015; Rosay et al, 2000). This study extends the existing knowledge by testing the hypothesized relationships between a comprehensive range of RPFs in 4 broad domains in which the lives of youth are embedded and by juxtaposing the nation-wide estimates with those from one of the largest samples of AI/AN youth in the nation. The combined evidence from these studies shows promise for the use of the general framework of prevention science in addressing the needs of AI/AN youth.

However, this study is not without limitations. AI/AN youth are a heterogeneous population of diverse cultural origins. The present dataset does not include additional information about the ancestral, tribal, and cultural background of the AI/AN youth beyond the simple self-identified Native American category. Moreover, only youth that identified exclusively as Native American were included in the sub-sample AI/AN analyses because detailed data on those who selected multiple categories was not available. This misses a potentially large group of youth that have a bi- or multicultural identity, and this is one of the limitations of the present analyses. Finally, while the primary purpose of the normative database is comparative in order to allow the comparison of the average levels of RPFs with the national average, the estimates for the AI/AN subsample are not necessarily representative of the AI/AN population in the United States. The findings of this study should be interpreted with these caveats in mind.

Yet, learning that the general framework of risk and protection from substance misuse assessed by CTC-YS survey works similarly among Native American youth as among the national sample as a whole, particularly in terms of reliability and criterion validity, is an important first step in examining the cultural relevance of the CTC prevention system for AI/AN. There may be other factors influencing health and health-related behaviors beyond the risk and protective factors measured by the CTC-YS that are specific to the circumstances in which Native American youth grow up. These may include institutional racism, disparities in health services access and delivery (e.g., Manson, 2001; Unger et al., 2008; Zuckerman, Haley, Roubideaux, & Lillie-Blanton, 2004), exposure to trauma (Evans-Campbell, 2008; Whitesell et al., 2012), as well as stressors related to discrimination, historical trauma, colonization and loss of culture specific to their socio-historical context (Beauvais, 1998; Frank, Moore, & Ames, 2000; Walters, Simoni, & Evans-Campbell, 2002; Whitbeck, Chen, Hoyt, & Adams, 2004), and dissonance between cultural ideals and behavioral realities (Herring, 1997). Moreover, there may be important culture-specific protective factors, such as involvement in traditional and spiritual practices (Beauvais & Oetting, 1999; Garrouette, Goldberg, Beals, Herrell, & Manson, 2003; Sanchez-Way & Johnson, 2000), cultural identity (Walters et al., 2002; Whitbeck, Walls, & Welch, 2012), and presence of strong extended families and social networks that can provide culturally competent care (Garwick & Auger, 2000; Stiffman et al., 2007; Walsh, 1996; Whitbeck, 1999; Whitesell et al., 2012) that contribute to the resiliency in Native American youth and should be considered in a culturally competent prevention system. In fact, focus on the resiliency in the context of disadvantage and adversity that many Native American youth exhibit may be central to developing successful prevention and intervention programs (Etz et al., 2012). None of these culture-specific risk and protective factors are explicitly assessed in the CTC-YS. Yet, such culture-specific developmental risk and protective factors can function independently of as well as in interaction with the risk and protective factors measured by the CTC-YS to influence healthy development (Whitbeck, 2006). It is noteworthy that in the present study community attachment and community prosocial opportunities were not as strongly related to youth substance use among the Native American youth as in the general population sample. Strengthening of these measures in the community domain in particular may also be helpful.

In collaboration with the Indigenous Wellness Research Institute (IWRI) at the University of Washington, work is currently underway to augment the Communities That Care prevention system to assess culturally specific factors. This work has three key areas of focus. First, it advances the CTC survey by including culturally-specific risk and protective factors. Collaborators worked intensively with tribal members in two reservation communities to identify Native-specific risk and protective factors. Five additional factors were prioritized for examination; micro-aggressions, AI-specific lateral bullying, historical trauma/historical loss, Native ethnic identity, and engagement in traditional practices and their relationship with substance use, delinquent behavior, and depression will be examined among school-aged tribal youth in the two communities. In addition, the team is currently examining effective prevention programs and cultural adaptations of tested programs for Native American youth. Furthermore, because community involvement is one of the key components of CTC, modifications to the traditional CTC process of community engagement and training are being explored to ensure acceptance and implementation fidelity in tribal communities. This new work will bolster and adapt the CTC processes for engaging, maintaining, and sustaining Native American community involvement in the CTC prevention system.

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Figure 1.

Validity results: Association between the risk and protective factors and regular alcohol use in adolescence

Figure 2.

Validity results: Association between the risk and protective factors and daily smoking in adolescence

Figure 3.
Validity results: Association between the risk and protective factors and current marijuana use in adolescence

Table 1**Risk and Protective Factor Constructs by Domain**

Risk or Protective Factor	Definition
Community Domain	
Opportunities for prosocial involvement ^a	6 items on activities available in the youth's neighborhood, including sports teams, scouting, boys/girls clubs, or 4-H
Rewards for prosocial involvement ^a	3 items assessing neighbors' positive response to the youth's community involvement
Low neighborhood attachment ^b	3 items on the youth's desire to continue to live in or leave their neighborhood
Community disorganization ^b	5 items asking about neighborhood problems such as crime, drug selling, and graffiti, and perceived safety
Transitions and mobility ^b	4 items on whether the youth moved or changed schools
Laws & norms favorable to drug use and firearms ^b	6 items on neighborhood attitudes towards youth ATOD use, and firearms and the likelihood of a police response to it
Perceived availability of drug use and firearms ^b	5 items on the youth's perceptions of ease of access to ATOD and firearms
Family Domain	
Family attachment ^a	4 items on the youth's feelings of closeness to mother or father
Opportunities for prosocial involvement ^a	3 items on chances to help in family decision making, do fun activities, and ask for help from parents
Rewards for prosocial involvement ^a	4 items on youth's perceptions of whether parents express pride in youth, and youth enjoys spending time with parents
Poor family supervision ^b	5 items on the youth's perceptions of parent supervision of homework, curfew, and whereabouts, and family rules
Poor family discipline ^b	3 items on the youth's perceptions of consequences for their alcohol use, skipping school, or carrying a handgun
Family conflict ^b	3 items on severity and frequency of arguments in the family
Family history of antisocial behavior ^b	10 items on the youth's knowledge of family members' problem alcohol and drug use, criminal activity, and police contact
Parental attitudes favorable to ATOD use ^b	3 items on the youth's perceptions of parental attitude toward youth's ATOD use
Parental attitudes favorable to antisocial behavior ^b	3 items on the youth's perception of negative parental attitude toward the youth's involvement in stealing, fighting, or graffiti
Peer and Individual Domain	
Social skills ^a	4 items on the youth handling difficult social situations
Belief in the moral order ^a	4 items on youth's beliefs such as if it is okay to cheat at school, steal if you won't get caught, or fight if you didn't start it
Low perceived risks for drug use ^b	4 items on youth's perception of the risk of smoking, marijuana experimentation or frequent use, or daily alcohol use
Early initiation of drug use and antisocial behavior ^b	8 items on the age the teen started using ATOD, was suspended, arrested, carried a handgun, or attacked to hurt
Sensation seeking ^b	3 items on youth doing things if they feel good "no matter what," or "crazy things even if they are a little dangerous"
Gang involvement ^b	4 items on whether the teen belonged to a gang, what age they joined, and how many friends they had in a gang
Rebelliousness ^b	3 items including youth doing "the opposite of what people tell me, just to get them mad," and ignoring rules
Friends' delinquent behavior	6 items on the youth's number of friends who engaged in delinquent behavior such as carried a handgun or sold drugs
Friends' use of drugs ^b	4 items on the youth's number of friends who use ATOD

Risk or Protective Factor	Definition
Peer rewards for antisocial behavior ^b	4 items on the youth's perceptions of being seen as "cool" if they used ATOD or carried a handgun
Favorable attitudes to antisocial behavior ^b	5 items on the youth's attitudes about handguns at school, stealing, fighting, and skipping school
Favorable attitudes to ATOD use ^b	4 items on the youth's attitudes about youth ATOD use in general
School Domain	
Opportunities for prosocial involvement ^a	5 items on youth's opportunities to be part of decision making in the classroom activities or to talk to the teacher one on one
Rewards for prosocial involvement ^a	4 items including school's communication of positive involvement to parents, and teacher's praise of youth
Poor academic performance ^b	2 items on the youth's grades in the past year and how their grades compare to other students
Low school commitment ^b	6 items on the youth's interest and attendance in school

Note. ATOD = Alcohol tobacco and other drug use. Adapted from Arthur et al. (2002) and U.S. Department of Health and Human Services, Substance Abuse and Mental Health Services Administration (2007a).

^aProtective factor;

^bRisk factor.

Table 2

Reliability of Scores on Risk and Protective Factor Scales

Domain	Full	Native American
Community		
Opportunities for prosocial involvement ^a	0.77	0.77
Rewards for prosocial involvement ^a	0.83	0.81
Low neighborhood attachment ^b	0.83	0.79
Community disorganization ^b	0.82	0.79
Transitions and mobility ^b	0.65	0.67
Laws & norms favorable to drug use and firearms ^b	0.79	0.80
Perceived availability of drug use and firearms ^b	0.86	0.87
Family		
Family attachment ^a	0.76	0.75
Opportunities for prosocial involvement ^a	0.78	0.79
Rewards for prosocial involvement ^a	0.77	0.76
Poor family supervision ^b	0.76	0.78
Poor family discipline ^b	0.78	0.79
Family conflict ^b	0.75	0.73
Family history of antisocial behavior ^b	0.82	0.84
Parental attitudes favorable to ATOD use ^b	0.77	0.83
Parental attitudes favorable to antisocial behavior ^b	0.72	0.74
Peer/Individual		
Social skills ^a	0.60	0.64
Belief in the moral order ^a	0.68	0.71
Low perceived risks for drug use ^b	0.65	0.60
Early initiation of drug use and antisocial behavior ^b	0.79	0.80
Sensation seeking ^b		
Gang involvement ^b	0.60	0.65
Rebelliousness ^b	0.66	0.66
Friends' delinquent behavior ^b	0.81	0.85
Friends' use of drugs ^b	0.74	0.77
Peer rewards for antisocial behavior ^b	0.76	0.79
Favorable attitudes to antisocial behavior ^b	0.88	0.88
Favorable attitudes to ATOD use ^b	0.71	0.73
School	0.79	0.82
Opportunities for prosocial involvement ^a	0.83	0.84
Rewards for prosocial involvement ^a	0.83	0.85

Domain	Full	Native American
Poor academic performance ^b	0.79	0.82
Low school commitment ^b	0.85	0.86

Note. ATOD = Alcohol tobacco and other drug use.

^aProtective factor;

^bRisk factor

Table 3
Criterion Validity of the CTC-YS Risk and Protective Factors: Associations with Substance Use

Domain	Regular Drinking				Daily Smoking				Current Marijuana			
	National		AI/AN		National		AI/AN		National		AI/AN	
	OR	CI	OR	CI	OR	CI	OR	CI	OR	CI	OR	CI
Community												
+ Opportunities	0.90 ^a	(0.89 – 0.91)	0.97 ^{ns}	(0.89 – 1.06)	0.78 ^a	(0.77 – 0.79)	0.82 ^a	(0.74 – 0.91)	0.83 ^a	(0.82 – 0.84)	0.85 ^a	(0.78 – 0.92)
+ Rewards	0.79 ^a	(0.78 – 0.80)	0.79 ^a	(0.72 – 0.87)	0.74 ^a	(0.73 – 0.76)	0.76	(0.68 – 0.85)	0.73 ^a	(0.72 – 0.74)	0.77 ^a	(0.70 – 0.84)
Low attachment	1.08 ^a	(1.07 – 1.09)	0.97 ^{ns}	(0.89 – 1.06)	1.17 ^a	(1.15 – 1.19)	1.03 ^{ns}	(0.93 – 1.14)	1.12 ^a	(1.11 – 1.14)	1.00 ^{ns}	(0.92 – 1.0)
Disorganization	1.33 ^a	(1.31 – 1.34)	1.46 ^a	(1.35 – 1.59)	1.41 ^a	(1.39 – 1.43)	1.35 ^a	(1.22 – 1.48)	1.41 ^a	(1.40 – 1.43)	1.56 ^a	(1.44 – 1.69)
Transitions & mobility	1.14 ^a	(1.12 – 1.15)	1.20 ^a	(1.10 – 1.30)	1.28 ^a	(1.26 – 1.30)	1.36 ^a	(1.24 – 1.49)	1.23 ^a	(1.21 – 1.24)	1.21 ^a	(1.12 – 1.32)
Laws & norms	2.04 ^a	(2.02 – 2.07)	2.00 ^a	(1.81 – 2.21)	2.06 ^a	(2.02 – 2.09)	1.93 ^a	(1.73 – 2.16)	2.20 ^a	(2.17 – 2.23)	2.07 ^a	(1.88 – 2.28)
Availability of drug/arms	2.60 ^a	(2.56 – 2.63)	2.49 ^a	(2.25 – 2.76)	2.48 ^a	(2.44 – 2.53)	2.20 ^a	(1.97 – 2.47)	2.89 ^a	(2.85 – 2.94)	2.62 ^a	(2.37 – 2.89)
Family												
Family attachment	0.75 ^a	(0.74 – 0.76)	0.82 ^a	(0.74 – 0.90)	0.70 ^a	(0.69 – 0.71)	0.70 ^a	(0.63 – 0.78)	0.71 ^a	(0.82 – 0.84)	0.78 ^a	(0.65 – 0.78)
+ Family opportunities & rewards	0.72 ^a	(0.71 – 0.73)	0.80 ^a	(0.73 – 0.87)	0.69 ^a	(0.68 – 0.70)	0.73 ^a	(0.66 – 0.81)	0.70 ^a	(0.72 – 0.74)	0.79 ^a	(0.66 – 0.79)
Family rewards + involvement	0.72 ^a	(0.71 – 0.73)	0.76 ^a	(0.69 – 0.83)	0.67 ^a	(0.66 – 0.68)	0.69 ^a	(0.62 – 0.77)	0.69 ^a	(1.11 – 1.14)	0.77 ^a	(0.64 – 0.77)
– Family support	1.62 ^a	(1.60 – 1.64)	1.52 ^a	(1.39 – 1.66)	1.54 ^a	(1.52 – 1.56)	1.54 ^a	(1.39 – 1.70)	1.60 ^a	(1.40 – 1.43)	1.83 ^a	(1.54 – 1.83)
– Family discipline	1.89 ^a	(1.87 – 1.92)	1.84 ^a	(1.66 – 2.03)	1.70 ^a	(1.67 – 1.73)	1.65 ^a	(1.47 – 1.84)	1.96 ^a	(1.21 – 1.24)	2.07 ^a	(1.71 – 2.07)
Family conflict	1.41 ^a	(1.39 – 1.43)	1.37 ^a	(1.25 – 1.50)	1.41 ^a	(1.39 – 1.44)	1.38 ^a	(1.24 – 1.53)	1.43 ^a	(2.17 – 2.23)	1.48 ^a	(1.25 – 1.48)
Family history of antisocial behavior	2.28 ^a	(2.25 – 2.31)	2.33 ^a	(2.10 – 2.57)	2.48 ^a	(2.44 – 2.52)	2.19 ^a	(1.96 – 2.46)	2.84 ^a	(2.85 – 2.94)	3.39 ^a	(2.74 – 3.39)
Parent attitudes to ATOD use	1.86 ^a	(1.84 – 1.88)	1.86 ^a	(1.72 – 2.01)	1.92 ^a	(1.89 – 1.94)	1.87 ^a	(0.63 – 0.78)	1.90 ^a	(0.82 – 0.84)	2.13 ^a	(1.82 – 2.13)
Parent attitudes to antisocial behavior	1.62 ^a	(1.61 – 1.64)	1.61 ^a	(1.49 – 1.74)	1.52 ^a	(1.50 – 1.54)	1.55 ^a	(0.66 – 0.81)	1.64 ^a	(0.72 – 0.74)	1.88 ^a	(1.62 – 1.88)
Peer/individual												
Social skills	0.32 ^a	(0.32 – 0.33)	0.30 ^a	(0.27 – 0.33)	0.36 ^a	(0.35 – 0.37)	0.39 ^a	(0.35 – 0.43)	0.33 ^a	(0.33 – 0.34)	0.34 ^a	(0.31 – 0.38)
Belief in the moral order	0.40 ^a	(0.40 – 0.41)	0.39 ^a	(0.35 – 0.43)	0.46 ^a	(0.46 – 0.47)	0.46 ^a	(0.41 – 0.51)	0.40 ^a	(0.39 – 0.40)	0.39 ^a	(0.35 – 0.43)
– Perceived risk for drug use	1.90 ^a	(1.88 – 1.92)	1.81 ^a	(1.54 – 1.83)	2.18 ^a	(2.15 – 2.21)	1.68 ^a	(1.64 – 2.00)	2.37 ^a	(2.34 – 2.39)	2.05 ^a	(1.89 – 2.23)

Domain	Regular Drinking						Daily Smoking						Current Marijuana					
	National			AI/AN			National			AI/AN			National			AI/AN		
	OR	CI	OR	CI	OR	CI	OR	CI	OR	CI	OR	CI	OR	CI	OR	CI		
Initiation of drugs & antisocial behavior	3.12 ^a	(3.08 – 3.17)	2.79 ^a	(2.88 – 3.52)	3.12 ^a	(3.07 – 3.17)	3.19 ^a	(2.51 – 3.09)	3.23 ^a	(3.18 – 3.27)	3.11 ^a	(2.83 – 3.43)						
Sensation seeking	2.70 ^a	(2.67 – 2.74)	2.19 ^a	(2.55 – 3.09)	2.35 ^a	(2.31 – 2.38)	2.81 ^a	(1.98 – 2.42)	2.53 ^a	(2.49 – 2.56)	2.35 ^a	(2.15 – 2.56)						
Gang involvement	1.41 ^a	(1.39 – 1.42)	1.39 ^a	(1.54 – 1.77)	1.43 ^a	(1.42 – 1.45)	1.65 ^a	(1.29 – 1.51)	1.47 ^a	(1.45 – 1.48)	1.59 ^a	(1.49 – 1.71)						
Rebelliousness	1.92 ^a	(2.00 – 2.04)	1.97 ^a	(2.01 – 2.42)	1.92 ^a	(1.89 – 1.95)	2.20 ^a	(1.78 – 2.18)	1.93 ^a	(1.91 – 1.96)	2.11 ^a	(1.93 – 2.30)						
Friends' delinquent behavior	1.79 ^a	(1.72 – 1.75)	1.67 ^a	(1.77 – 2.05)	1.79 ^a	(1.77 – 1.81)	1.90 ^a	(1.55 – 1.80)	2.00 ^a	(1.98 – 2.02)	2.05 ^a	(1.90 – 2.22)						
Friends' use of drugs	3.97 ^a	(3.23 – 3.31)	3.13 ^a	(2.93 – 3.58)	3.97 ^a	(3.90 – 4.04)	3.24 ^a	(2.81 – 3.50)	4.70 ^a	(4.62 – 4.77)	4.12 ^a	(3.71 – 4.58)						
Peer rewards for antisocial behavior	1.63 ^a	(1.70 – 1.73)	1.74 ^a	(1.66 – 1.93)	1.63 ^a	(1.61 – 1.65)	1.79 ^a	(1.60 – 1.88)	1.75 ^a	(1.73 – 1.77)	1.86 ^a	(1.72 – 2.00)						
+ Attitudes to antisocial behavior	2.09 ^a	(2.19 – 2.25)	2.11 ^a	(2.26 – 2.69)	2.09 ^a	(2.06 – 2.12)	2.47 ^a	(1.93 – 2.32)	2.32 ^a	(2.29 – 2.35)	2.52 ^a	(2.31 – 2.75)						
+ Attitudes to ATOD use	3.30 ^a	(3.12 – 3.20)	3.09 ^a	(3.07 – 3.72)	3.30 ^a	(3.25 – 3.35)	3.38 ^a	(2.79 – 3.42)	3.94 ^a	(3.88 – 3.99)	3.47 ^a	(3.15 – 3.81)						
School																		
School opportunities + involvement	0.73 ^a	(0.72 – 0.74)	0.74 ^a	(0.68 – 0.81)	0.71 ^a	(0.70 – 0.72)	0.79 ^a	(0.72 – 0.87)	0.71 ^a	(0.71 – 0.72)	0.77 ^a	(0.71 – 0.84)						
School rewards + involvement	0.69 ^a	(0.68 – 0.70)	0.62 ^a	(0.57 – 0.68)	0.69 ^a	(0.68 – 0.70)	0.70 ^a	(0.63 – 0.77)	0.68 ^a	(0.67 – 0.69)	0.67 ^a	(0.62 – 0.73)						
– Academic performance	1.48 ^a	(1.46 – 1.50)	1.39 ^a	(1.27 – 1.51)	2.07 ^a	(2.04 – 2.11)	1.89 ^a	(1.71 – 2.10)	1.73 ^a	(1.71 – 1.76)	1.67 ^a	(1.54 – 1.82)						
Low school commitment	1.96 ^a	(1.94 – 1.99)	1.93 ^a	(1.76 – 2.11)	2.15 ^a	(2.11 – 2.18)	1.86 ^a	(1.68 – 2.06)	2.08 ^a	(2.05 – 2.11)	1.87 ^a	(1.71 – 2.04)						

Note. ATOD= Alcohol, tobacco and other drugs; AI/AN = American Indian/Alaska Native. The models include age and gender as covariates. The coefficients listed are odds ratios,

^a = p < .001;

^b = p < .01;

^c = p < .05;

^{ns} = p .05.

PF = Protective factor;

RF = Risk factor.