

Risk and protective factors predictive of adolescent problem behaviors such as substance abuse and delinquency are promising targets for preventive intervention. Community planners should assess and target risk and protective factors when designing prevention programs. This study describes the development, reliability, and validity of a self-report survey instrument for adolescents ages 11 to 18 that measures an array of risk and protective factors across multiple ecological domains as well as adolescent problem behaviors. The instrument can be used to assess the epidemiology of risk and protection in youth populations and to prioritize specific risk and protective factors in specific populations as targets for preventive intervention.

**MEASURING RISK AND PROTECTIVE
FACTORS FOR SUBSTANCE USE,
DELINQUENCY, AND OTHER
ADOLESCENT PROBLEM BEHAVIORS**
The Communities That Care Youth Survey

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Substance use, delinquency, and other problem behaviors continue to be serious problems plaguing American youth. The emerging prevention science paradigm suggests that predictors of problem behavior identified in

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prospective longitudinal research, that is, risk and protective factors, are promising targets for preventive intervention (Coie et al. 1993; Durlak 1998; Hawkins, Arthur, and Catalano 1995; Hawkins, Catalano, and Miller 1992; Kellam, Koretz, and Moscicki 1999; Mrazek and Haggerty 1994). Risk factors are “those characteristics, variables, or hazards that, if present for a given individual, make it more likely that this individual, rather than someone selected at random from the general population, will develop a disorder” (Mrazek and Haggerty 1994, 12; also see Clayton 1992; Hawkins, Catalano, and Miller 1992; Rutter and Garmezy 1983). Protective factors are factors that reduce the likelihood of problem behavior either directly or by mediating or moderating the effect of exposure to risk factors (Fraser 1997; Luthar and Zigler 1991; Masten and Coatsworth 1998; Rutter 1987; Werner and Smith 1992).

Longitudinal studies have identified risk and protective factors predictive of adolescent drug use, delinquency, violence, and school dropout (see Dryfoos 1991; Hawkins, Catalano, and Miller 1992; Hawkins et al. 1998; Lipsey and Derzon 1998; Loeber and Stouthamer-Loeber 1987; Mrazek and Haggerty 1994). The robustness of the relationship between exposure to an increasing number of risk factors and the increasing likelihood of a variety of problem behaviors is striking (Bry, McKeon, and Pandina 1982; Newcomb 1995; Pollard, Hawkins, and Arthur 1999; Rutter 1979). Some have suggested that the number of risk factors present is a more powerful predictor of problem behavior than the specific risk factors present (Sameroff et al. 1998). These findings suggest that simultaneous measurement of a broad array of risk and protective factors is necessary to predict adequately the initiation and maintenance during adolescence of problem behaviors, including substance use, delinquency, violence, and school dropout.

Based on research evidence supporting a focus on preventing adolescent problem behavior through reducing risk and enhancing protective processes (e.g., Durlak 1998; Hawkins, Catalano, and Associates 1992; Mrazek and Haggerty 1994; Sloboda and David 1997), federal, state, and community prevention planners have begun to include risk and protective factor indicators as a central component of prevention needs assessment (Kansas Department of Social and Rehabilitation Services 1996; Office of Juvenile Justice and Delinquency Prevention 1995; Office of National Drug Control Policy 2000; Washington State Department of Social and Health Services 2001). Within this prevention funding and planning context, tools to support epidemiological assessment of a broad set of risk and protective factors among community youth populations are needed. Some existing youth survey instruments, such as the Monitoring the Future survey (Johnston, O’Malley, and Bachman 1995) and the American Drug and Alcohol Survey (Oetting and Beauvais

1990), measure adolescent substance use and a limited number of risk or protective factors. However, prior to the survey instrument developed in this study, no single self-report survey instrument measured a broad array of the risk and protective factors identified in prospective longitudinal research.

A self-report measurement instrument appropriate for adolescents and capable of cost-efficient measurement of a range of research-derived risk and protective factors and problem behaviors offers important benefits. Such an instrument could provide data on the epidemiology of risk and protection among community youth populations and help to focus preventive interventions on those geographic areas or subpopulations experiencing the highest levels of risk and lowest levels of protection for later health and behavior problems. Moreover, epidemiological measurement of risk and protective factors using such an instrument would provide data to identify which risk and protective factors are elevated or depressed in a particular geographical area or population and which factors might therefore be prioritized for preventive intervention (Arthur and Blitz 2000; Hawkins 1999). Finally, such an instrument could allow analysis of the co-occurrence and correlates of multiple risk and protective factors in different youth populations.

This article describes the development of a survey instrument designed to meet these goals. The instrument was developed within the context of a multistate study funded by the Center for Substance Abuse Prevention (CSAP) to develop new measurement tools for state prevention needs assessment. The six state alcohol and drug abuse prevention agencies that collaborated on this project had all adopted a risk- and protection-focused prevention approach as their framework to guide prevention planning at the state and local level. They were seeking an assessment instrument that could provide data on empirically identified risk and protective factors. These state agencies had previously sponsored school-based surveys of drug use and related problem behavior and wanted to broaden their surveys to measure risk and protective factors in addition to drug use outcomes in order to support risk and protection focused prevention planning.

The Communities That Care Youth Survey instrument was designed to (a) assess a broad set of risk and protective factors identified by prospective longitudinal research across the domains of community, school, family, peer, and individual as well as health and behavior outcomes, including substance use, violence, and delinquency; (b) be administered within a school setting during one class period (approximately 50 minutes); and (c) be appropriate for adolescents ranging in age from 11 to 18 to allow assessment of levels of risk and protective factor exposure at difference ages during adolescence. The risk and protective factors selected for inclusion were factors that had been found to predict drug use and delinquent behavior at the individual level

in two or more longitudinal studies in which the factors were measured prior to the outcomes of interest (Hawkins, Catalano, and Miller 1992; Hawkins, Arthur, and Catalano 1995).

METHOD

The survey development process included five stages: (a) formation of a pool of items hypothesized to measure the constructs of interest; (b) cognitive pretesting of potential survey items; (c) pilot testing of the survey instrument and classroom administration procedures; (d) selection of items and scales for the final instrument using data from a statewide probability sample of public school children in Grades 6, 8, and 11 in Oregon; and (e) assessment of the reliability and validity of the resulting risk and protective factor scales.

Formation of the item pool began with a compilation of 350 self-report survey items garnered from existing survey instruments obtained from researchers studying risk and protective factors in the development of adolescent antisocial behavior. Items in these instruments were identified that were hypothesized to measure 21 risk factor and 11 protective factor constructs identified by the Communities That Care prevention planning framework (Developmental Research and Programs 1996; Hawkins, Catalano, and Associates 1992). The risk and protective factors included in this framework were identified in a series of reviews of the literature on adolescent drug use, delinquency, and violence (e.g., Hawkins, Lishner, and Catalano 1985; Hawkins, Catalano, and Miller 1992; Hawkins, Arthur, and Catalano 1995; Hawkins et al. 1998). In a few cases, the existing items were modified or new items were created to fill gaps where items from existing youth self-report instruments could not be found to measure the construct. Table 1 provides a description of the risk and protective factor constructs identified, the number of survey items measuring each risk and protective factor in the initial item pool, and the number of items in each scale in the final instrument. Four risk and protective factors identified in the literature reviews were not included in the item pool due either to a lack of brief, self-report scales measuring these constructs (e.g., resilient temperament, sociability, impulsiveness) or to concern about the validity of youth self-report methods to measure the construct (e.g., extreme economic deprivation).

Items were included to measure adolescent substance use and related problem behaviors, including delinquency and youth violence. Items

(Text continues on page 583)

TABLE 1: Risk and Protective Factor Constructs and Survey Scales

<i>Domain</i>	<i>Description</i>	<i>Initial Number of Items</i>	<i>Final Number of Items</i>
Community domain risk factors			
Low Neighborhood Attachment	Neighborhoods where youths report low levels of bonding to the neighborhood have higher rates of juvenile crime and drug use.	7	3
Community Disorganization	Neighborhoods with high population density, physical deterioration, and high rates of adult crime also have higher rates of juvenile crime and drug use.	10	5
Transitions and Mobility	Neighborhoods with high rates of residential mobility have been shown to have higher rates of juvenile crime and drug use. Also, children who experience frequent residential moves and stressful life transitions have been shown to have higher risk for school failure, delinquency, and drug use.	8	4
Laws and Norms Favorable to Drug Use	Normative attitudes about drug use and local laws and policies, such as the legal drinking age and taxes on alcohol and tobacco products, have been related to consumption.	23	6
Perceived Availability of Drugs	Perceptions of the availability of cigarettes, alcohol, marijuana, and other illegal drugs have been shown to predict use of these substances.	10	5
Extreme Economic Deprivation	Children growing up in families and neighborhoods characterized by extreme poverty are at greater risk of delinquency, violence, drug use, school failure, and teenage pregnancy.	0	0
School domain risk factors			
Academic Failure	Beginning in the late elementary grades (Grades 4-6), academic failure increases the risk of both drug use and delinquency.	4	2

(continued)

Table 1 (continued)

<i>Domain</i>	<i>Description</i>	<i>Initial Number of Items</i>	<i>Final Number of Items</i>
School domain risk factors			
Little Commitment to School	Drug use is less prevalent among students who expect to attend college than among those who do not. Factors such as liking school, time spent on homework, and perceiving schoolwork as relevant are also negatively related to drug use.	16	4
Family domain risk factors			
Poor Family Management	Family management practices characterized by unclear expectations for behavior, poor monitoring of behavior, few and inconsistent rewards for positive behavior, and severe or inconsistent punishment for unwanted behavior increase the risk for drug use, violence, and delinquency.	24	9
High Family Conflict	Children raised in families high in conflict, whether or not the child is directly involved in the conflict, are at greater risk for both delinquency and drug use.	10	3
Family History of Antisocial Behavior	Children born or raised in a family with a history of alcoholism are at higher risk of having alcohol or other drug problems themselves.	23	10
Parental Attitudes Favorable to Drug Use	In families in which parents use illegal drugs, are heavy users of alcohol, or are tolerant of children's use, children are more likely to use drugs themselves.	10	3
Parental Attitudes Favorable to Antisocial Behavior	In families in which parents engage in criminal behavior or are tolerant of their children's involvement in criminal or violent behavior, children are more likely to engage in delinquent and violent behavior.	10	3

Table 1 (continued)

<i>Domain</i>	<i>Description</i>	<i>Initial Number of Items</i>	<i>Final Number of Items</i>
Peer/individual domain risk factors			
Rebelliousness	Young people who feel they are not part of society, are not bound by rules, do not believe in trying to be successful or responsible, or who take an active rebellious stance toward society are more likely to use drugs.	3	3
Early Initiation of Antisocial Behavior	The earlier the onset of any drug use, the greater the involvement in other drug use and the greater the frequency of use. Onset of drug use prior to the age of 15 is a consistent predictor of later drug abuse.	24	8
Attitudes Favorable to Drug Use	Initiation of use of any substance is preceded by values favorable to its use. Youths who express positive attitudes toward drug use, including lower perceived risks from using substances, are more likely to use drugs.	22	4
Attitudes Favorable to Antisocial Behavior	Youths who express positive attitudes toward delinquency and violence are at higher risk for later involvement in such behaviors.	24	4
Peer Drug Use	Young people who associate with peers who engage in alcohol or substance abuse are much more likely to engage in the same behavior.	10	4
Peer Antisocial Behavior	Young people who associate with peers who engage in delinquent or violent behavior are much more likely to engage in the same behavior.	18	6
Peer Rewards for Antisocial Behavior	Youths who believe that their friends and peers would approve and admire them for engaging in drug use, delinquency, and violence are more likely to become involved in such behaviors.	7	4
Sensation Seeking	Young people who like to engage in risky and thrilling behaviors are more likely to use drugs.	7	3

(continued)

Table 1 (continued)

<i>Domain</i>	<i>Description</i>	<i>Initial Number of Items</i>	<i>Final Number of Items</i>
Peer/individual domain risk factors			
Impulsiveness	Youths who show a tendency to act impulsively are at higher risk for drug abuse, violence, and delinquency.	0	0
Peer Rejection	Youths who feel rejected and are disliked by their peers are more likely to engage in drug use, delinquency, and violence.	7	0
Community domain protective factors			
Opportunities for Prosocial Community Involvement	Youths who perceive more opportunities for involvement in prosocial activities in the community are more likely to participate in such activities and less likely to use drugs.	7	0
Rewards for Prosocial Community Involvement	Youths who perceive greater rewards and recognition for involvement in prosocial activities in the community are more likely to participate in such activities and less likely to use drugs.	3	3
School domain protective factors			
Opportunities for Prosocial School Involvement	Youths who perceive more opportunities for involvement in prosocial activities in school are more likely to participate in such activities and less likely to use drugs.	10	2
Rewards for Prosocial School Involvement	Youths who perceive greater rewards for involvement in prosocial activities in school are more likely to participate in such activities and less likely to use drugs.	6	3
Family Domain Protective Factors			
Opportunities for Prosocial Family Involvement	Youths who perceive more opportunities for involvement in prosocial activities in their family are more likely to participate in such activities and less likely to use drugs.	11	3
Rewards for Prosocial Family Involvement	Youths who perceive greater rewards and recognition for involvement in prosocial activities in their family are more likely to participate in such activities and less likely to use drugs.	4	4

Table 1 (continued)

<i>Domain</i>	<i>Description</i>	<i>Initial Number of Items</i>	<i>Final Number of Items</i>
Family Domain Protective Factors			
Family Attachment	Youths who report stronger emotional bonds to their parents (or legal guardians) are less likely to use drugs, unless their parents use drugs.	11	4
Peer/individual domain protective factors			
Religiosity	Youths who report more frequent involvement in organized religious activities are less likely to use drugs.	2	1
Belief in the Moral Order	Youths who hold stronger moral beliefs are less likely to use drugs.	8	4
Social Skills	Youths who display more skillful social behavior (e.g., social problem solving, greater respect and awareness of others, better communication) are less likely to use drugs or become involved in delinquent or violent behavior.	4	4
Prosocial Peer Attachment	Youths who report stronger emotional bonds to peers that engage in prosocial behaviors and abstain from drug use and delinquent behavior are less likely to use drugs or engage in delinquent or violent behavior themselves.	7	0
Resilient Temperament	Children who have an easygoing temperament and who recover quickly from emotionally upsetting incidents are less likely to engage in drug use or delinquent behavior during adolescence.	0	0
Sociability	Children who are socially outgoing and have a pleasant personality are less likely to use drugs or become involved in delinquent or violent behavior.	0	0

measuring substance use were adopted from the Monitoring the Future survey instrument (Johnston, O'Malley, and Bachman 1999) to allow users of the new instrument to make comparisons between local, state, and national

trends in drug use. Items assessing delinquency and violence were adopted from the National Youth Survey (NYS) (Huizinga and Elliott 1986), with additional behaviors of concern to state planners (e.g., possessing handguns at school) added to the NYS format. Ten items measuring demographic characteristics (age, grade in school, gender, race/ethnicity, family composition and size, and language spoken in the home) also were included.

The primary objective of this project was to create a survey instrument measuring a broad array of risk and protective factors that students could complete within a single class period. Thus, it was essential to minimize the number of items used to measure the desired constructs while maintaining adequate psychometric properties of the resulting scales. Once the item pool was compiled, rational/empirical data reduction procedures (Jackson 1970) were followed to select a subset of items that provided reliable and efficient measurement of the identified constructs. The first step in this process was to conduct cognitive pretesting (Jobe and Mingay 1990) of the items to elicit information about how respondents interpreted the meaning of survey questions. Twenty-five adolescents were recruited for the cognitive pretest. They were divided as evenly as possible by sex and ethnicity (European American, African American, Asian, and Hispanic) and were recruited from an alternative high school in a large urban school district ($n = 15$) and from a community recreation center in a suburban community ($n = 10$).

These adolescents were asked to think aloud as they formulated their responses to a subset of about 20% of the pool of risk and protective factor items, so that each item was tested with five adolescents from differing backgrounds. Probing questions were developed for each item to determine what specific words within the question and response set meant to the respondents. These responses were examined to identify ambiguous questions or response sets and questions that were interpreted differently than intended. The results of the cognitive pretesting suggested that 98 items were unclear to these adolescents or elicited responses other than intended. These items were eliminated from the item pool, resulting in a revised pool of 252 items measuring risk and protective factors.

Following cognitive pretesting, items were compiled into a pilot questionnaire to test item response formats and the survey administration protocol. A total of 1,097 students in Grades 6 to 12 from six Oregon school districts participated in the pilot test. Individual item frequency distributions and item intercorrelations were examined. On the basis of these results, some items were eliminated as redundant ($> .85$ interitem correlations) or as having little variance (more than 90% of respondents providing the same answer). Some items were modified rather than eliminated in an attempt to retain measures of constructs when the number of items dropped to less than three per

construct. After these changes were made, the item pool contained 251 risk and protective factor items, 72 items measuring problem behaviors, and 10 demographic items.

Based on the pilot test, a revised survey instrument was developed and administered to a statewide probability sample of 6th-, 8th-, and 11th-grade Oregon public school students. The items were compiled into test booklets that were organized in six sections: Demographics, Community, Substance Use and Other Problem Behaviors, Peer-Individual, Family, and School. Two items were added to the end of the survey asking about truthfulness in completing the survey and the importance the respondents attached to the survey questions.

A multistage cluster sample of 6th-, 8th-, and 11th-grade students was designed and used to provide statewide and regional estimates of substance use and delinquency prevalence for Oregon (Finnigan 1995). In the first stage of sampling, a total of 131 schools containing 51 sixth-grade, 43 eighth-grade, and 37 eleventh-grade classes was selected to participate. Schools were randomly sampled within five substate administrative regions to provide accurate regional estimates. The probability of any school's selection was proportional to school enrollment. In the second stage of the sampling process, all students in the appropriate grade levels of the sampled schools were selected. Only one grade level was surveyed at each school.

Sampled schools were not obligated to participate. Forty-six (35%) of the originally selected schools choose not to participate. Replacement schools were selected by matching a replacement school from the same administrative region on school enrollment and student demographic characteristics (gender, race, percentage participating in the free lunch program). Analysis showed that the replacement schools did not differ from the participating selected schools in the original sample on demographic variables (Finnigan 1995). Enrollment in the targeted grades in the 131 participating schools in the spring of 1994 was 13,480. Passive parental consent procedures were used at all schools, and all students were informed they had the option not to participate. Nine students or parents chose not to participate. Regular classroom teachers administered the survey to intact classrooms. Standardized administration instructions were read to students, and students were allotted one class period (45 to 50 minutes) to complete the survey.

Information from all items in the item pool was needed to complete selection of the final item set, but because 333 items were included in the pilot instrument, most students could not complete the entire survey in the allotted time. Based on results from the initial pilot test, it was expected that nearly all 6th-grade students would complete between one half to two thirds of the items within the allotted time, whereas nearly all 8th- and 11th-grade

students would complete between two thirds and three fourths of the items. Therefore, to prevent this expected missingness for the same set of items, one of four "start points" was randomly assigned to all students within each surveyed school. Students were instructed to start work on the survey at one of the four different start points within the survey booklet after completing initial demographic items. After reaching the end of the instrument, students who started at a point other than the first section (Community) were instructed to turn back in their booklet and complete the skipped sections.

Given the large sample surveyed, this strategy for randomizing the expected missingness guaranteed that all items were completed by more than 1,500 randomly selected students per grade and allowed calculation of stable estimates of the correlations between each pair of items. Moreover, because the items comprising each scale were asked within the same section of the instrument (e.g., family, school, etc.), most of the missingness that occurred resulted in entire scales being missed rather than single items within a scale being missed. Thus, the correlations among all items in each scale used to evaluate scale reliability and to select the items contributing the most variance to each scale were computed on essentially intact randomly selected subsets of the entire sample.

Surveys were collected from 11,564, or 85.8% of the eligible students. Of the 11,564 surveys, 402 were eliminated primarily because none or only a few of the items were completed. This resulted in a final total of 11,162 useable surveys representing 82.8% of the student population in the sampled grades and schools.

RESULTS

Table 2 reports the gender, family status, average family size, birthplace of students' parents, and language used most often at home by survey respondents. The distributions of these items were similar across the three grade levels.

As expected, not all students finished all 333 items in the survey in the allotted time. Averaging across the start point conditions, 66.3%, 79.8%, and 87.1% of the items were completed by the 6th-, 8th-, and 11th-grade students, respectively. This finding confirmed the need to reduce further the number of items selected for the final survey instrument.

There were no differences between start point conditions in the amount of missing data for the 8th- and 11th-grade students. In the 6th-grade sample, a relatively small proportion of variance in the amount of missing data was

TABLE 2: Gender and Family Demographic Characteristics of Survey Respondents

	<i>6th Grade</i>	<i>8th Grade</i>	<i>11th Grade</i>	<i>Combined</i>
Female ^a	48.6	50.5	47.7	49.1
Male ^b	51.4	49.5	52.3	50.9
Family status				
Two-parent	60.6	60.5	56.9	59.5
Single parent	36.4	35.5	37.9	36.5
Other adult	2.1	2.8	4.3	3.0
Foster home	0.9	1.3	0.9	1.0
Family size (in means) ^c	4.35 (1.94)	4.16 (2.06)	4.08 (1.91)	4.19 (1.99)
Parents born in the United States ^d	89.5	89.3	91.8	90.1
English is primary language spoken at home ^e	94.2	93.3	95.6	94.3

NOTE: All values expressed as percentages, except for family size. Standard deviations in parentheses.

a. Missing observations = 219 (2.0%).

b. Missing observations = 84 (0.8%).

c. Missing observations = 171 (1.6%).

d. Missing observations = 260 (2.4%).

e. Missing observations = 139 (1.3%).

accounted for by the start point ($h^2 = .014$). The start point condition was not significantly related to any demographic characteristic, suggesting that the random assignment to start point resulted in distributing the patterns of missingness across demographically comparable samples.

Three analytic strategies were adopted to identify and eliminate students from the data set who provided responses of questionable validity. The first strategy assessed evidence of false reporting directly via responses to two questions. In one question, the students were simply asked how honestly they had responded to all survey questions. In the second question, they were asked about their past month use of "Derbisol," a fictitious drug (Moskowitz et al. 1979). The second strategy identified students reporting unrealistically frequent use of illicit drugs other than marijuana (i.e., cocaine, heroin, LSD, inhalants), which was defined as 120 or more uses of these illicit drugs in the past 30 days. The third strategy identified students reporting logically inconsistent patterns of substance use for four or more substances (such as use in the past 30 days but not use in the past year).

About 5% of the students ($n = 555$) were identified as providing questionable responses by one or more of these strategies. Males, 8th-grade students, students who reported use of a language other than English language at home,

and students currently living in foster care situations were more likely to be identified by these strategies. However, the maximum η^2 value for any of these characteristics was .013, indicating that a very small proportion of the variation in response validity was associated with demographic characteristics. Because the primary objective of the analyses reported in this article was to examine the viability of short scales measuring the specified risk and protective factor constructs, the 555 students identified as providing questionable responses were eliminated from subsequent analyses, and data from 10,607 students, or 79% of the total student sample, were used in the item selection analysis.

The resulting 32 risk and protective factor scales were analyzed. First, the distributional properties of each item were examined. Although evidence of skewness and kurtosis was present in some of the items, most risk and protection items met the assumption of normality. Analyses of the nonnormally distributed items were performed using both the original data and log transformed data and produced equivalent results. For ease of interpretation, the results reported here are from the analyses using nontransformed items.

Next, a two-phase analytic strategy was used to assess the dimensionality of each risk and protective factor item set and to select the strongest items to create brief scales representing each construct. In the first phase, three random 10% samples of the entire data set were drawn. Principal component analyses were then conducted on each set of items hypothesized to measure each risk and protective factor construct. Although single factors were hypothesized from each set of items, the eigenvalue greater than 1 rule was used to determine the number of factors present (McDonald 1985; Tabachnick and Fidell 1996). Oblimin rotations were obtained when more than one factor emerged. In addition, analyses of scale reliabilities using Cronbach's alpha were conducted to assess the internal consistency of each scale and to identify items that could be eliminated without compromising the internal consistency of the scale. These analyses were repeated for each of the three random samples.

During these analyses, the following diagnostic indicators were used to help determine the factorability of the items: the determinant, the Keiser-Meyer-Olkin statistic, Bartlett's test of sphericity, and the anti-image correlation matrix (Tabachnick and Fidell 1996). When these statistics indicated problems with the correlation matrix that prevented factoring, items were removed from the analysis in an attempt to correct these problems. Despite these efforts, the item sets representing the following three risk and protective factors were eliminated from further consideration in the scale development process because of weak factor structures and unacceptable reliabilities: Community Opportunities for Positive Involvement, Peer Rejection, and

Prosocial Peer Attachment. In each of these three cases, the items hypothesized to measure these constructs failed to demonstrate acceptable psychometric properties.

In the second phase of the analysis, the strongest 121 items identified in Phase 1 as representing the 29 remaining risk and protective factor constructs were reanalyzed. In this phase, factor analyses of each item set were run separately for all grade levels by gender combinations. These analyses indicated that in general, the sets of items selected to represent each construct had good factor structures. Most sets of items produced only one factor. Five risk and protective factor scales (Laws and Norms Favorable to Drug Use, Transitions and Mobility, Poor Family Management, Family Attachment, and Early Initiation of Antisocial Behavior) produced two factors in some of the groups. However, examination of the eigenvalues indicated that the second factor accounted for very little variance for two of the scales (Transitions and Mobility, and Early Initiation of Antisocial Behavior), and for the remaining three scales the weak second factor was identifiable only for specific grade by gender subgroups. Moreover, combining all of the items in each set into single scales resulted in high Cronbach's alphas for each of these five constructs. Given the theoretical specification of these five constructs and the weak empirical evidence for dividing the items into separate scales, each of these scales was retained as a single scale.

Cronbach's alpha and the eigenvalues for each scale computed within each grade by gender subgroup are shown in Table 3. All scales, with the exception of Opportunities for Involvement in School, averaged reliabilities greater than .60. The Family Conflict scale had the greatest variability in internal consistency across gender and grade levels, with lower reliability among younger students and males than among older female students. For all other scales, however, reliability values did not vary substantially across grade level or gender in spite of the relatively small number of items included in each scale.

Based on the above results, scales representing each of the 29 risk and protective factor constructs were calculated as the average value of the scale items. To calculate a scale score for a respondent, responses to a minimum of two thirds of the survey items in the scale were required. Otherwise, a missing value for the scale was assigned.

The final step in scale development was to examine relationships between each of the risk and protective factor scales and demographic variables and problem behavior outcomes as an initial check on the validity of the final scales. Because the risk and protective factor scale scores were not always normally distributed, the demographic variables were ordinal scales, and the

TABLE 3: Scale Reliability Coefficients and Eigenvalues by Grade and Gender

<i>Scale Name</i>	<i>6th-Grade Males</i>		<i>6th-Grade Females</i>		<i>8th-Grade Males</i>		<i>8th-Grade Females</i>		<i>11th-Grade Males</i>		<i>11th-Grade Females</i>	
	<i>Alpha</i>	<i>Eigen</i>	<i>Alpha</i>	<i>Eigen</i>	<i>Alpha</i>	<i>Eigen</i>	<i>Alpha</i>	<i>Eigen</i>	<i>Alpha</i>	<i>Eigen</i>	<i>Alpha</i>	<i>Eigen</i>
Community domain risk factors												
Low Neighborhood Attachment (3)	.82	2.21	.86	2.33	.83	2.24	.87	2.37	.83	2.23	.86	2.33
Community Disorganization (5)	.78	2.43	.77	2.38	.82	2.61	.82	2.61	.85	2.76	.83	2.65
Transitions and Mobility (4)	.70	2.15	.72	2.18	.76	2.32	.76	2.34	.75	2.28	.72	2.19
Laws and Norms Favorable to Drug Use (6)	.80	3.00	.80	2.98	.80	3.06	.81	3.10	.76	2.71	.75	2.66
Perceived Availability of Drugs (5)	.84	3.06	.82	2.99	.86	3.25	.86	3.26	.84	3.09	.83	3.03
School Domain Risk Factors												
Academic Failure (2)	.69	1.53	.75	1.60	.75	1.62	.77	1.63	.79	1.65	.79	1.66
Little Commitment to School (4)	.71	2.19	.70	2.14	.76	2.35	.79	2.45	.77	2.37	.75	2.32
Family domain risk factors												
Poor Family Management (9)	.87	4.36	.81	3.68	.85	4.13	.82	3.71	.80	3.52	.80	3.47
High Family Conflict (3)	.54	1.57	.60	1.67	.62	1.72	.70	1.86	.57	1.64	.68	1.83
Family History of Antisocial Behavior (10)	.82	4.01	.82	4.05	.84	4.25	.84	4.28	.82	3.88	.80	3.67
Parental Attitudes Favorable to Drug Use (3)	.77	2.07	.69	1.85	.83	2.24	.79	2.10	.76	2.02	.73	1.95
Parental Attitudes Favorable to Antisocial Behavior (3)	.81	2.21	.79	2.27	.82	2.53	.79	2.24	.77	2.12	.72	1.87
Peer/individual domain risk factors												
Rebelliousness (3)	.77	2.10	.77	2.03	.77	2.01	.77	2.11	.77	2.00	.77	1.99
Early Initiation of Antisocial Behavior (8)	.76	2.89	.72	2.52	.76	2.89	.76	2.90	.76	2.90	.71	2.64

Attitudes Favorable to Drug Use (4)	.88	3.00	.87	2.91	.89	2.99	.88	2.97	.86	2.81	.86	2.80
Attitudes Favorable to Antisocial Behavior (4)	.83	2.66	.82	2.60	.84	2.72	.82	2.61	.79	2.46	.72	2.20
Peer Drug Use (4)	.83	2.67	.84	2.73	.84	2.74	.85	2.77	.83	2.68	.85	2.77
Peer Antisocial Behavior (6)	.84	3.40	.85	3.45	.87	3.64	.89	3.74	.83	3.04	.81	3.05
Peer Rewards for Antisocial Behavior (4)	.93	3.32	.93	3.30	.89	3.03	.90	3.04	.82	2.63	.83	2.64
Sensation Seeking (3)	.74	1.99	.73	1.96	.81	2.17	.80	2.14	.74	1.99	.75	2.02
Community domain protective factors												
Rewards for Prosocial Community Involvement (3)	.86	2.35	.87	2.39	.88	2.42	.89	2.48	.90	2.49	.90	2.49
School domain protective factors												
Opportunities for Prosocial School Involvement (2)	.59	1.41	.57	1.40	.55	1.38	.57	1.40	.54	1.37	.50	1.33
Rewards for Prosocial School Involvement (3)	.62	1.71	.61	1.70	.62	1.71	.61	1.68	.58	1.64	.58	1.60
Family domain protective factors												
Opportunities for Prosocial Family Involvement (3)	.74	1.98	.72	1.93	.73	1.96	.78	2.07	.74	1.99	.77	2.05
Rewards for Prosocial Family Involvement (4)	.77	2.36	.73	2.26	.76	2.34	.77	2.42	.74	2.29	.76	2.39
Family Attachment (4)	.79	2.45	.75	2.30	.75	2.30	.76	2.32	.77	2.39	.76	2.33
Peer/individual domain protective factors												
Religiosity (1)		N/A		N/A		N/A		N/A		N/A		N/A
Belief in the Moral Order (4)	.71	2.17	.75	2.28	.70	2.11	.74	2.24	.64	1.95	.68	2.06
Social Skills (4)	.68	1.99	.60	1.77	.70	2.06	.70	2.05	.63	1.91	.56	1.71

outcome variables were computed as dichotomous variables, Spearman correlation coefficients were calculated (Hays 1988).

The correlations of the risk and protective factor scales with the demographic variables were generally low. Moderate correlations were found between grade level and some scales (e.g., Laws and Norms Favorable to Drug Use, Perceived Availability of Drugs and Handguns, Peer Substance Use, Poor Family Management, and Attitudes Favorable Toward Substance Use). As expected, students in higher grades reported higher levels of these factors. Also, living in a two-parent family was associated with lower levels of the risk factors Transitions and Mobility and Family History of Antisocial Behavior and higher levels of the protective factor, Family Attachment, than living in a single-parent household, living with other adults, or living in foster care. Gender and language spoken in the home showed no or very small correlations with the risk and protective factor scales.

Correlations between the risk and protective factor scales and substance use and delinquency are presented in Table 4. Two patterns are evident in these data. First, the direction of the correlations is as expected for all of the risk and protective factors; all of the correlations for the risk factors show a positive relationship with problem behaviors, whereas all of the correlations for the protective factors show a negative relationship with problem behaviors.

Second, the risk and protective factor scales in the Peer-Individual domain showed correlations of higher magnitude with problem behaviors than scales in the other domains. These findings are as expected given the greater etiological and developmental proximity of these factors to the outcomes. Peer influences on behavior increase during adolescence, and peers are often involved in an individual's initiation of drug use (Barnes and Welte 1986; Brook et al. 1990). Similarly, individual attitudes and intentions regarding behavior are hypothesized to be the most proximal risk factors for the behavior itself (Brunswick and Boyle 1979; Prochaska, DiClemente, and Norcross 1992; Rachal et al. 1982). Thus, as temporally proximal predictors of behavior, these peer and individual risk factors should be most highly correlated with behavior measured concurrently.

In other domains, moderate correlations between risk, protection, and outcomes were also found. In the community domain, Laws and Norms Favorable to Drug Use and Perceived Availability of Drugs showed the strongest associations with substance use and delinquency. In the family domain, Poor Family Supervision, Poor Family Discipline, Family History of Antisocial Behavior, and Family Attitudes Favorable to Antisocial Behavior were moderately correlated with the problem behaviors. The two strongest scales from

the School domain, Low Academic Achievement and Low School Commitment, were also moderately correlated with problem behaviors.

In the final step of the analysis, the relationships between the risk and protective factor scales and drug use outcomes were reexamined while taking the nested structure of the data (students clustered within schools) into account. Multilevel logistic regression models were computed to examine the strength of the individual-level relationships between each risk and protective factor construct and drug use outcomes after controlling for the between-school variance in the measures. The pattern of findings from this analysis (not tabled) confirmed the significant relationships between the risk and protective factor scales and drug use outcomes: positive for the risk factors and negative for the protective factors.

Thus, the final survey instrument included 121 items scaled to measure 29 risk and protective factor constructs. Most items were adapted from longer scales previously used to measure these constructs and were evaluated and selected due to their face validity as measures of these constructs. The strongest items from these scales were selected to create short scales representing the 29 constructs. All but five of the scales emerged as single factors in exploratory and confirmatory factor analysis repeated across multiple subsamples and grade-gender groups, and the five items sets that revealed a potential second factor in some groups also showed acceptable properties as single scales. All but four of the scales had internal consistency coefficients greater than .70, and only one scale (Opportunities for School Involvement) consistently fell below .60 across groups. The scales all showed statistically significant relationships in the expected direction (positive for risk factors, negative for protective factors) with outcome measures of substance use and delinquent behavior. These results provide evidence of the construct validity of the survey measures of risk and protective factors and support further application and analysis of the instrument as an efficient measurement tool for a broad array of risk and protective factors for adolescent problem behavior.

DISCUSSION

Data from a representative statewide sample of more than 10,000 students in Grades 6, 8, and 11 suggest that this self-administered instrument measures reliably a broad range of risk and protective factors in multiple ecological domains. The factor structures of the scales are coherent. Reliability

TABLE 4: Spearman Correlations of the Risk and Protective Factor Scales With Self-Reported Drug Use, Total Sample (N= 10,607)

<i>Scale Name</i>	<i>Cigarettes, Lifetime</i>	<i>Cigarettes, Last 30 Days</i>	<i>Alcohol, Lifetime</i>	<i>Alcohol, Last 30 Days</i>	<i>Marijuana, Lifetime</i>	<i>Marijuana, Last 30 Days</i>
Community domain risk factors						
Low Neighborhood Attachment	.21	.17	.16	.16	.19	.14
Community Disorganization	.17	.15	.13	.15	.17	.15
Transitions and Mobility	.16	.15	.08	.08	.17	.13
Laws and Norms Favorable to Drug Use	.39	.32	.37	.38	.41	.32
Perceived Availability of Drugs	.45	.37	.45	.44	.45	.34
School domain risk factors						
Academic Failure	.29	.27	.15	.20	.28	.22
Little Commitment to School	.30	.29	.20	.27	.31	.26
Family domain risk factors						
Poor Family Management	.37	.34	.34	.38	.39	.32
High Family Conflict	.20	.18	.15	.16	.16	.14
Family History of Antisocial Behavior	.47	.40	.38	.44	.51	.40
Parental Attitudes Favorable to Drug Use	.36	.38	.31	.40	.43	.42
Parental Attitudes Favorable to Antisocial Behavior	.24	.25	.20	.26	.26	.26
Peer/individual domain risk factors						
Rebelliousness	.37	.32	.35	.36	.33	.27
Early Initiation of Antisocial Behavior	.63	.45	.47	.48	.46	.35
Attitudes Favorable to Drug Use	.52	.53	.42	.51	.58	.49

Attitudes Favorable to Antisocial Behavior	.35	.33	.30	.36	.35	.30
Peer Drug Use	.57	.57	.42	.53	.64	.54
Peer Antisocial Behavior	.35	.39	.24	.34	.44	.35
Peer Rewards for Antisocial Behavior	.22	.23	.18	.22	.22	.19
Sensation Seeking	.34	.32	.33	.37	.35	.30
Community Domain Protective Factors						
Rewards for Prosocial Community Involvement	-.23	-.19	-.22	-.19	-.21	-.18
School domain protective factors						
Opportunities for Prosocial School Involvement	-.18	-.18	-.19	-.20	-.20	-.17
Rewards for Prosocial School Involvement	-.22	-.19	-.19	-.21	-.22	-.17
Family domain protective factors						
Opportunities for Prosocial Family Involvement	-.25	-.23	-.19	-.22	-.24	-.17
Rewards for Prosocial Family Involvement	-.26	-.23	-.21	-.22	-.24	-.18
Family Attachment	-.23	-.20	-.18	-.18	-.20	-.15
Peer/individual domain protective factors						
Religiosity	-.16	-.13	-.15	-.15	-.17	-.12
Belief in the Moral Order	-.41	-.34	-.39	-.40	-.36	-.30
Social Skills	-.44	-.42	-.37	-.48	-.45	-.37

values for most scales are good, averaging about .78 across all of the scales. The risk and protective factors are correlated with the problem behaviors as expected, providing evidence of the construct validity of the scales as measures of the specified risk and protective factors. Risk factors expected to increase with age during adolescent development include Perceived Availability of Drugs, Laws and Norms Favorable to Drug Use, Favorable Attitudes Toward Substance Use, and Peer Substance Use. These factors were positively correlated with grade level, providing additional evidence for the validity of these scales.

Nevertheless, important questions about the validity of the Communities That Care Youth Survey risk and protection measures remain. Although the risk and protective factor constructs included in the study were identified from longitudinal studies showing predictive relationships between these constructs and behavioral outcomes measured at a later time point, the data used in the present study to test the construct validity of the scales in the CTC Youth Survey were cross-sectional. Moreover, the outcomes with which the risk and protective factor scales were correlated were obtained from the same self-report instrument, and no external measures of validity were obtained in this study. Longitudinal studies are needed to establish conclusively the predictive validity of the risk and protective factor scales retained in the final instrument.

The present findings indicate that the risk and protective factor scales perform adequately, with few differences in reliability found across gender and age groups. However, possible differences in measurement reliability and validity across racial and ethnic groups remain to be explored. The population of Oregon students from which the data were obtained is not sufficiently diverse to examine this issue further in this data set. Opportunities will exist in the future to explore these questions in greater depth. A number of other states have completed statewide school-based surveys using the final form of this instrument. Data have been collected from representative samples of students in Grades 6, 8, 10, and 12 in seven states, totaling about 160,000 students. Comparative analyses of these data will allow assessment of the stability of these measures across age, gender, and racial and ethnic groups.

Other issues also remain to be explored. The magnitude of correlations between the risk and protective factors and specific antisocial behaviors varies. Some of this variation may be due to quality of measurement, and some may be due to differences in the proximity of different factors in the etiology of specific behaviors. Moreover, partitioning the variance into school-level and individual-level components revealed that some of the scales had

substantial variation across schools. These scales appear to tap meaningful components of risk and protection at both the school and individual levels. Further use of this instrument in different populations will assist in the replication of the present findings and in the exploration of the epidemiology of these risk and protective factors at multiple levels of analysis. Use of this survey instrument in prospective longitudinal studies will assist in the exploration of the role of these factors in the etiology of different behaviors.

It should be noted that the current Communities That Care Youth Survey does not measure all risk and protective factors identified by research as predictive of adolescent substance abuse and delinquency. Attempts to develop reliable and valid scales measuring community opportunities for prosocial involvement, prosocial peer involvement, and peer rejection were not successful. Brief, reliable scales for use with adolescents measuring economic deprivation, resilient temperament, impulsiveness, and sociability were not identified from prior studies and were not attempted in this study. Three of the scales included in the final instrument appear to have somewhat low internal consistency. These are Family Conflict, Opportunities for School Involvement, and Rewards for School Involvement. Future work could focus on improving the psychometric properties of these scales and on developing brief scales representing the risk and protective factors omitted from the current version of the instrument. The present study provides a solid foundation on which to build.

The Communities That Care Youth Survey instrument was designed to be used as a tool for assessing prevention needs in adolescent populations. These initial results suggest that the survey does, in fact, measure the identified risk and protective factors that have been shown in other studies to predict adolescent antisocial behavior, including delinquency, substance abuse, and violence. The instrument has important applications in prevention needs assessment and strategic prevention planning. When administered to representative samples of students, the instrument can indicate the level and prevalence of students' exposure to risk and protective factors in a school or in a community served by the school. It can identify subpopulations reporting high levels of risk and/or low levels of protection. It can also identify specific risks that are elevated and specific protective factors that are depressed in a target group. Preventive programs that effectively address the identified elevated risk and suppressed protective factors can be selected for implementation with the target group, thus focusing prevention efforts on changing potential etiological factors where they may have the greatest impact. This should increase the effectiveness and efficiency of prevention efforts by facilitating strategic prevention planning addressing specific predictors of problem behavior in schools and communities.

REFERENCES

- Arthur, M. W., and C. C. Blitz. 2000. Bridging the gap between science and practice in drug abuse prevention through needs assessment and strategic community planning. *Journal of Community Psychology* 28 (3): 241-55.
- Barnes, G. M., and J. W. Welte. 1986. Patterns and predictors of alcohol use among 7-12th grade students in New York State. *Journal of Studies on Alcohol* 47 (1): 53-62.
- Brook, J. S., D. W. Brook, A. S. Gordon, M. Whiteman, and P. Cohen. 1990. The psychosocial etiology of adolescent drug use: A family interactional approach. *Genetic, Social, and General Psychology Monographs* 116 (2): 111-267.
- Brunswick, A. F., and J. M. Boyle. 1979. Patterns of drug involvement: Developmental and secular influences on age at initiation. *Youth and Society* 11 (2): 139-62.
- Bry, B. H., P. McKeon, and R. J. Pandina. 1982. Extent of drug use as a function of number of risk factors. *Journal of Abnormal Psychology* 91 (4): 273-79.
- Clayton, R. R. 1992. Transitions in drug use: Risk and protective factors. In *Vulnerability to drug abuse*, edited by M. Glantz and R. Pickens, 15-51. Washington, DC: American Psychological Association.
- Coie, J. D., N. F. Watt, S. G. West, J. D. Hawkins, J. R. Asarnow, H. J. Markman, S. L. Ramey, M. B. Shure, and B. Long. 1993. The science of prevention. A conceptual framework and some directions for a national research program. *American Psychologist* 48 (10): 1013-22.
- Developmental Research and Programs. 1996. *Communities That Care planning kit*. Seattle, WA: Author.
- Dryfoos, J. G. 1991. Adolescents at risk: A summation of work in the field: Programs and policies. *Journal of Adolescent Health* 12 (8): 630-37.
- Durlak, J. A. 1998. Common risk and protective factors in successful prevention programs. *American Journal of Orthopsychiatry* 68 (4): 512-20.
- Finnigan, M. 1995. *The 1994 Oregon Public School Drug Use Survey: Final report*. Salem, OR: Office of Alcohol and Drug Abuse Programs.
- Fraser, M. W., ed. 1997. *Risk and resilience in childhood: An ecological perspective*. Washington, DC: NASW Press.
- Hawkins, J. D. 1999. Preventing crime and violence through communities that care. *European Journal on Criminal Policy and Research* 7:443-58.
- Hawkins, J. D., M. W. Arthur, and R. F. Catalano. 1995. Preventing substance abuse. In *Crime and justice: Vol. 19. Building a safer society: Strategic approaches to crime prevention*, edited by M. Tonry and D. Farrington, 343-427. Chicago: University of Chicago Press.
- Hawkins, J. D., R. F. Catalano, and Associates. 1992. *Communities that Care: Action for drug abuse prevention*. San Francisco: Jossey-Bass.
- Hawkins, J. D., R. F. Catalano, and J. Y. Miller. 1992. Risk and protective factors for alcohol and other drug problems in adolescence and early adulthood: Implications for substance abuse prevention. *Psychological Bulletin* 112 (1): 64-105.
- Hawkins, J. D., T. Herrenkohl, D. P. Farrington, D. Brewer, R. F. Catalano, and T. W. Harachi. 1998. A review of predictors of youth violence. In *Serious and violent juvenile offenders: Risk factors and successful interventions*, edited by R. Loeber and D. P. Farrington, 106-46. Thousand Oaks, CA: Sage.
- Hawkins, J. D., D. M. Lishner, and R. F. Catalano. 1985. Childhood predictors and the prevention of adolescent substance abuse. In *NIDA Research Monograph Vol. 56: Etiology of drug abuse: Implications for prevention*, edited by C. L. Jones and R. L. Battjes, 75-126. Washington, DC: Government Printing Office.

- Hays, W. L. 1988. *Statistics, 4th Ed.* Fort Worth, TX: Holt, Rinehart & Winston.
- Huizinga, D., and D. S. Elliott. 1986. Reassessing the reliability and validity of self-report delinquency measures. *Journal of Quantitative Criminology* 2 (4): 293-327.
- Jackson, D. N. 1970. A sequential system for personality scale development. In *Current topics in clinical and community psychology (Vol. 2)*, edited by C. Spielberger. New York: Academic Press.
- Jobe, J. B., and D. J. Mingay. 1990. Cognitive laboratory approach to designing questionnaires for surveys of the elderly. *Public Health Reports* 105:518-24.
- Johnston, L. D., P. M. O'Malley, and J. G. Bachman. 1995. *National survey results on drug use from the Monitoring the Future Study, 1975-1994: Volume I. Secondary students*. Rockville, MD: National Institute on Drug Abuse.
- . 1999. *National survey results on drug use from the Monitoring the Future study, 1975-1998 Volume I: Secondary school students*. Rockville, MD: National Institute on Drug Abuse.
- Kansas Department of Social and Rehabilitation Services. 1996. *Kansas Communities That Care regional planning resource guide*. Topeka, KS: Author.
- Kellam, S. G., D. Koretz, and E. K. Moscicki. 1999. Core elements of developmental epidemiologically based prevention research. *American Journal of Community Psychology* 27 (4): 463-82.
- Lipsey, M. W., and J. H. Derzon. 1998. Predictors of violent or serious delinquency in adolescence and early adulthood: A synthesis of longitudinal research. In *Serious and violent juvenile offenders: Risk factors and successful interventions*, edited by R. Loeber and D. P. Farrington, 86-105. Thousand Oaks, CA: Sage.
- Loeber, R., and M. Stouthamer-Loeber. 1987. Prediction. In *Handbook of juvenile delinquency*, edited by H. C. Quay, 325-82. New York: John Wiley.
- Luthar, S. S., and E. Zigler. 1991. Vulnerability and competence: A review of research on resilience in childhood. *American Journal of Orthopsychiatry* 61 (1): 6-22.
- Masten, A. S., and J. D. Coatsworth. 1998. The development of competence in favorable and unfavorable environments: Lessons from research on successful children. *American Psychologist* 53 (2): 205-20.
- McDonald, R. P. 1985. *Factor analysis and related methods*. Hillsdale, NJ: Lawrence Erlbaum.
- Moskowitz, J. M., E. Schaps, J. W. Condon, J. H. Malvin, and G. R. Martin. 1979. *The Napa Project—01 Year Annual Drug Survey*. Napa, CA: Pacific Institute for Research and Evaluation.
- Mrazek, P. J., and R. J. Haggerty, eds., and Committee on Prevention of Mental Disorders, Institute of Medicine. 1994. *Reducing risks for mental disorders: Frontiers for prevention intervention research*. Washington, DC: National Academy Press.
- Newcomb, M. D. 1995. Identifying high-risk youth: Prevalence and patterns of adolescent drug abuse. In *Adolescent drug abuse: Clinical assessment and therapeutic intervention*, edited by E. Rahdert, D. Czechowicz, and I. Amsel, 7-38. Rockville, MD: National Institute on Drug Abuse.
- Oetting, E. R., and F. Beauvais. 1990. Adolescent drug use: Findings of national and local surveys. *Journal of Consulting and Clinical Psychology* 58 (4): 385-94.
- Office of Juvenile Justice and Delinquency Prevention. 1995. *Guide for implementing the comprehensive strategy for serious, violent, and chronic juvenile offenders*. Washington DC: Office of Juvenile Justice and Delinquency Prevention, U.S. Department of Justice.
- Office of National Drug Control Policy. 2000. *National Drug Control Strategy: 2000 annual report*. Washington, DC: Government Printing Office.
- Pollard, J. A., J. D. Hawkins, and M. W. Arthur. 1999. Risk and protection: Are both necessary to understand diverse behavioral outcomes in adolescence? *Social Work Research* 23 (8): 145-58.

- Prochaska, J. O., C. C. DiClemente, and J. C. Norcross. 1992. In search of how people change: Applications to addictive behaviors. *American Psychologist* 47 (9): 1102-14.
- Rachal, J. V., L. L. Guess, R. L. Hubbard, S. A. Maisto, E. R. Cavanaugh, R. Waddell, and C. H. Benrud. 1982. Facts for planning: No. 4. Alcohol misuse by adolescents. *Alcohol Health and Research World*, 6(3): 61-68.
- Rutter, M. 1979. Protective factors in children's responses to stress and disadvantage. In *Primary prevention of psychopathology: Vol. 3. Social competence in children*, edited by M. W. Kent and J. E. Rolf, 49-74. Hanover, NH: University Press of New England.
- . 1987. Temperament, personality, and personality disorder. *British Journal of Psychiatry* 150:443-58.
- Rutter, M., and N. Garmezzy. 1983. Developmental psychopathology. In *Handbook of child psychology: Vol. IV. Socialization, personality, and social development*, edited by P. H. Mussen, 775-911. New York: John Wiley.
- Sameroff, A. J., W. T. Bartko, A. Baldwin, C. Baldwin, and R. Seifer. 1998. Family and social influences on the development of child competence. In *Families, risk, and competence*, edited by M. Lewis and C. Feiring, 161-85. Mahwah, NJ: Lawrence Erlbaum.
- Sloboda, Z., and S. L. David. 1997. *Preventing drug use among children and adolescents: A research-based guide*. Rockville, MD: National Institute on Drug Abuse.
- Tabachnick, B. G., and L. S. Fidell. 1996. *Using multivariate statistics*. New York: HarperCollins.
- Washington State Department of Social and Health Services. 2001. *Washington State incentive grant: State Substance Abuse Prevention System*. Olympia, WA: Author.
- Werner, E. E., and R. S. Smith. 1992. *Overcoming the odds: High risk children from birth to adulthood*. Ithaca, NY: Cornell University Press.

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