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The Relation Between Risk and Protective Factors for Problem Behaviors and Depressive Symptoms, Antisocial Behavior, and Alcohol Use in Adolescence

Kathryn C. Monahan,
University of Pittsburgh

Sabrina Oesterle,
University of Washington

Isaac Rhew, and
University of Washington

J. David Hawkins
University of Washington

Abstract

Both externalizing and internalizing psychopathology increase throughout adolescence and a similar set of risk and protective factors may underlie depressive symptoms, antisocial behavior, and alcohol use. Analyses test how risk and protective factors for externalizing behavior in community, school, family, peer and individual domains are related to depressive symptoms, antisocial behavior, and alcohol use concurrently and longitudinally in a sample of 2002 students assessed in 8th and 10th grades (52% male; 58% Caucasian). Findings indicate that risk and protective factors for antisocial behavior and alcohol use are also associated with depressive symptoms, both concurrently and longitudinally. Prevention approaches that target risk and protective factors for externalizing problems may have crossover effects on depressive symptoms during adolescence.

Keywords

depressive symptoms; risk and protective factors; problem behavior; adolescence

Adolescence is marked by increased prevalence in both externalizing (Farrington, 2009) and internalizing psychopathology (Graber & Sontag, 2009), and the co-occurrence of these emotional and behavioral problems is common during adolescence (Angold & Costello, 1993; Angold, Costello, & Erkanli, 1999; Miller-Johnson, Lochman, Coie, Terry, & Hyman, 1998; Patton et al., 1998). Both externalizing and internalizing problems during adolescence carry the risk for health and mental health problems in adulthood. As a consequence, many have argued that adolescence is a key developmental period to focus on shared risk and protective factors in order to prevent adolescent psychopathology (Hawkins, Catalano, & Miller, 1992; National Research Council and Institute of Medicine, 2009).

To date, however, the bulk of prevention approaches have focused on the prevention of adolescent violence and delinquent behavior, school dropout, drug use, bullying, and other externalizing behaviors, partially because these problems tend to be the most visible. This is especially true with respect to community-based approaches to prevention; few community-wide prevention efforts have sought to prevent internalizing problems, such as depression, among adolescents. This is concerning given that 14% of adolescents in the United States have experienced a major depressive episode (Office of Applied Studies, 2005) and many depressed youth do not seek or receive psychiatric evaluation or treatment (Substance Abuse and Mental Health Services Administration Office of Applied Studies, 2009). Further, onset of depression during adolescence predicts a more severe and recurrent course of the disorder, higher levels of impairment, and lower life satisfaction (Hammen, Brennan, & Keenan-Miller, 2008). Thus, it is important that prevention and intervention focus not just on externalizing problems during adolescence, but also internalizing problems such as depressive symptoms.

A risk and protection focused prevention approach focuses on identifying factors that increase or decrease the likelihood of an outcome. The central tenant of the approach is that identifiable individual and contextual factors (risk factors) are associated with poor developmental outcomes or failure to achieve positive developmental milestones (Nash & Bowen, 2002). Conversely, other individual and contextual factors (protective factors) lead to positive developmental outcomes even in the face of risk (Nash & Bowen, 2002). Notably, a given risk factor may or may not be disorder specific. Some have argued that focusing on risk and protective factors predictive of diverse adolescent problems may serve to reduce the likelihood of a broad range of behavioral health problems (Coie et al., 1993). Further, it is likely that reduction of risk and elevation of protective factors are mutually required to alter psychopathology (Rutter, 1982).

Researchers have long noted that there is co-occurrence or comorbidity between behavioral and emotional problems during the adolescent years. Evidence from the National Comorbidity Study finds that between the ages of 13 and 18, 21.1% of males and 23.3% of females report two or more concurrent disorders in the past year. Below clinical thresholds, there is evidence that problem behaviors tend to co-occur: delinquency and substance use frequently co-occur during the adolescent years (Huang, White, Kosterman, Catalano, & Hawkins, 2001; Jessor & Jessor, 1977). Moreover, despite their heterotypic presentation, there is a high correlation between depressive symptoms and delinquency (Diamantopoulou, Verhulst, & van der Ende, 2011) and substance use (O'Neil, Conner, & Kendall, 2011) during adolescence. Conceptually, the relatively high co-occurrence of depression with these other problems could arise from multiple pathways (Wolff & Ollendick, 2006). One possibility is sequential causation where one disorder increases risk for another. For example, the failure models suggests that conduct problems among youth lead to deficits in multiple domains such as interpersonal relations and academic performance which could in turn lead to social isolation and low self-esteem which puts one at risk for depression (Capaldi, 1992). Co-occurring problems may also arise from shared underlying risk factors (Angold et al., 1999; Caron & Rutter, 1991; Wolff & Ollendick, 2006). That is, risk or causal factors for one problem may be the same for another.

Much research has explored risk and protective factors for depressive symptoms, antisocial behavior, and alcohol use during adolescence in separate studies, suggesting that there may indeed be shared risk factors across these disorders. However, very few studies have estimated the associations between risk and protective factors and these outcomes in the same data set. Thus, it is possible that risk factors for externalizing problems such as conduct disorder and substance use could also place youth at increased risk for internalizing problems either through an indirect pathway through conduct and/or drug problems (i.e., exposure to a risk factor causes conduct or drug problems which subsequently increase risk for internalizing problems) or a direct pathway (e.g., exposure to a risk factor for conduct or drug problems is also a risk factor for internalizing problems). Further elucidation into whether risk factors for externalizing problems also lead to internalizing problems has important implications for prevention.

Rooted in the framework that risk and protective factors should have implications for multiple forms of psychopathology (either through sequential or direct processes), a two-step process must be undertaken to achieve the goal of prevention adolescent internalizing and externalizing psychopathology. First, risk and protective factors for the problems to be prevented must be identified. Second, prevention programs can be tailored to diminish risk factors and increase protective factors, hopefully, thereby reducing behavioral health problems. Over the past 25 years, much research has identified risk and protective factors for emotional problems and problem behavior. A number of risk factors, including community disorganization, school failure, family conflict, family and peer attitudes favorable toward drug use and antisocial behavior, and individual variation in impulse control have been found to be related to externalizing problems. Similarly, a number of protective factors, such as social bonding to community and school, academic success, parental attachment, positive peer associations, and resilient temperament have been found to be associated with fewer externalizing problems during adolescence (Hawkins et al., 1992; National Research Council and Institute of Medicine, 2009; Pollard, Hawkins, & Arthur, 1999).

While many studies have documented how specific risk and/or protective factors are associated with outcomes, there is wide variety in the risk and protective factors and outcome variables studied. For example, Crew and colleagues (2007) conducted a meta-analysis of meta-analyses on the impact of a small set of risk and protective factors on externalizing and internalizing psychopathology. While this study is certainly strengthened by aggregation across many studies, the small list of risk and protective factors and grouping together of all externalizing problems (i.e., antisocial behavior, delinquency) and internalizing psychopathology (i.e., depression and anxiety) prevents understanding of the specific associations between risk and protective factors and outcomes. In contrast, other studies have examined an extensive list of risk and protective factors, but only examine how they are related to antisocial behavior (Fagan, Van Horn, Hawkins, & Arthur, 2007; Pollard et al., 1999) or depression (Bond, Toumbourou, Thomas, Catalano, & Patton, 2005). Moreover, these studies focus on concurrent associations, not longitudinal associations between risk and protective factors. A single study focus on a broad list of risk and protective factors and a broad range of internalizing and externalizing outcomes studied both concurrently and longitudinally is needed.

The present study aims to fill this gap by examining how risk and protective factors in individual, peer, family, school, and community domains are related to depressive symptoms, antisocial behavior, and alcohol use concurrently and longitudinally. To the extent that the same risk and protective factors predict depressive symptoms, antisocial behavior, and alcohol use, preventive interventions that address these shared risk and protective factors could have positive effects on youth development in emotional and behavioral domains (Pollard et al., 1999). Indeed, some evidence suggests that risk factors for externalizing behaviors are linked concurrently with depression (Biglan, Brennan, Foster, & Holder, 2004; Bond et al., 2005). However, the extent to which these associations are found longitudinally remains untested. If risk and protective factors are linked with both concurrent and longitudinal internalizing and externalizing behaviors, it suggests that risk and protection focused prevention programs may have effects on both externalizing and internalizing psychopathology.

Methods

Participants and Procedures

The present study examines 2002 public school students (52% male; 58% Non-Hispanic Caucasian, 27% Hispanic Caucasian, 15% other race/ethnicity) surveyed in 8th and 10th grades from 12 small to mid-sized communities across the United States. Youth were surveyed as part of the Community Youth Development Study, a community-randomized controlled trial of the Communities That Care (CTC) prevention system (Hawkins et al., 2008). The student data analyzed in this study are drawn from the longitudinal sample of youth in the control communities. Of youth eligible for participation in the control communities (N = 2611), 76.6% agreed to participate. This participant rate was identical to the participation rate in the experimental communities (Brown, Graham, Hawkins, Arthur, & Baldwin, 2009; Hawkins et al., 2012)(Brown et al., 2009; see Hawkins et al., 2012 for complete flow of communities and participants in the randomized trial). Retention in the study was excellent; 93.3% of the students in the panel constituted in 5th and 6th grades completed the survey in the 10th grade.

Participants completed the Youth Development Survey (based on the Communities That Care Youth Survey (CTC-YS) (Glaser, Van Horn, Arthur, Hawkins, & Catalano, 2005) during one classroom period (approximately 45 minutes). The CTC-YS was designed to be used as a community prevention planning tool. Specifically, communities can administer the instrument to students within their community and identify elevated risk factors or depressed protective factors within the community. To ensure confidentiality, identification numbers, but no names or other identifying information, were included on the surveys. Parents of the students provided written informed consent for their children's participation in the study; students read and signed assent statements indicating that they were fully informed of their rights as research participants. Upon completing the surveys, students received small incentive gifts worth approximately $5 to $8. The study procedures were approved by the University of Washington's Human Subjects Review Committee.

Measures

Depressive symptoms—Depressive symptoms were assessed by the 4-item CTC-YS Brief Depressive Symptoms scale (“Sometimes I think life’s not worth it.”; “I think I am no good at all.”; “I am inclined to think I am a failure.”; “In the past year, I have felt sad most days.”). Students responded on a 4-point scale from “NO,” “no,” “yes,” and YES.” Items were averaged and higher scores indicate greater depressive symptoms. The CTC-YS measure shows high convergent validity (r = .77 among younger adolescences [mean age 15] and r = .77 among older adolescents [mean age = 18]) with the Short Mood and Feelings Questionnaire (SMFQ), a common and well-validated 13-item epidemiologic assessment of depressive symptoms among youth (Angold, Costello, Messer, & Pickles, 1995). Research using the SMFQ has shown that cognitive symptoms as assessed by the CTC-YS Brief Depressive Symptoms Scale best identify the propensity for depression among youth (Sharp, Goodyer, & Croudace, 2006). Confirmatory factor analyses of the 4 CTC-YS depression items in the present study supported the use of a 1-factor solution for males and females, and Cronbach’s alpha coefficients indicated good internal reliability (α = .85 at both 8^{th} and 10^{th} grades). Consequently, the 4 items were averaged to create a measure of depressive symptoms.

Alcohol use—Students self-reported if they had used alcohol in the past 30 days (“On how many occasions (if any) have you had beer, wine, or hard liquor during the past 30 days?” “0 occasions”, “one or two occasions”, “3–5 occasions”, “6–10 occasions”, “10–19 occasions”, “20–39 occasions”, “40 or more occasions”). Because responses to this question showed little variation beyond the first response options, responses were dichotomized to indicate any versus no use of alcohol in the past 30 days.

Antisocial behavior—Adolescents were asked to report how many times during the past year (e.g., “never,” “1 or 2 times,” “3 to 5 times,” etc.) they had engaged in 7 separate types of delinquent behavior (i.e., stealing, damaging property, shoplifting, attacking someone with intention of hurting them, carrying a gun, beating someone up, and being arrested). Dichotomizing each behavior (engaged in the behavior at least once versus never) and summing across all 7 of them created a measure of the number of different types of antisocial behavior in which a youth engaged in the past year. These counts of the variety of different problem behaviors that a youth commits are a common method of assessing antisocial behavior because they are highly correlated with measures of seriousness of antisocial behavior, yet are less prone to recall errors than frequency scores. Some have argued that variety scores and frequency scores represent the same propensity to engage in antisocial behavior, and given the problems associated with frequency scores, variety scores represent a preferred method of measuring antisocial behavior(Hindelang, Hirschi, & Weis, 1981; Thornberry & Krohn, 2000). Because the measure of antisocial behavior used in this study is a count of the number of delinquent behaviors in which students engaged, it followed a Poisson distribution.

Risk and protective factors—This study included 24 risk factors and 12 protective factors covering domains of community, school, family, peer, and individual (Arthur, Hawkins, Pollard, Catalano, & Baglioni, 2002). Table 1 presents information about each of

the scales including a sample item, number of items in the measure, and Cronbach's alpha. Response options used a 4-point scale, anchored by Very False (1) to Very True (4); None of My Friends (0) to Four of My Friends (4); or NO (1), no (2), yes (3) to YES (4), depending on the item. Items were averaged to create the measure of each risk and protective factor.

In the peer-individual risk factor domain, we assessed rebelliousness, attitudes favorable towards antisocial behavior, attitudes favorable to drug use, low perceived risk of drug use, friends' drug use, rewards for antisocial involvement, intention to use drugs and interaction with antisocial peers. In the peer-individual protective factor domain, we assessed religious attendance, social skills, belief in the moral order, interaction with prosocial peers, prosocial involvement, and rewards for prosocial involvement.

In the family domain, we assessed poor family management, family conflict, family history of antisocial behavior, parental attitudes favorable towards drug use, parental attitudes favorable towards antisocial behavior, and family history of substance use. For family protective factors, we assessed opportunities for prosocial involvement, rewards for prosocial involvement, and attachment.

In the school domain, we assessed the risk factors of academic failure and low commitment to school. For school protective factors, we assessed opportunity for prosocial involvement and rewards for prosocial involvement.

Finally, in the community risk factor domain, we assessed low neighborhood attachment, laws and norms favorable to drug use, and perceived availability of drugs. Two community protective factors were assessed: opportunity for prosocial involvement and rewards for prosocial involvement. All scales showed good internal consistency, strong validity, and measurement equivalence across racial/ethnic groups and gender (Arthur et al., 2002; Glaser et al., 2005).

Demographics

To account for variation in student characteristics that may confound the relation between risk and protective factors and depressive symptoms, alcohol use, and antisocial behavior, several covariates were included in all analyses: race (Black and other race, both compared to White), ethnicity (Hispanic or not), and youth-reported parental education (6-point scale from "completed grade school or less" to "graduate or professional school after college). Sex (male vs. female) was also used as a covariate in analyses.

Plan of Analyses

Three sets of regression models were conducted to examine the association between 8th-grade risk and protective factors and (1) concurrent depressive symptoms, antisocial behavior, and alcohol use in 8^{th} grade; (2) depressive symptoms, antisocial behavior, and alcohol use two years later in 10^{th} grade; and (3) depressive symptoms, antisocial behavior, and alcohol use two years later in 10^{th} grade controlling for the level of the outcome variable in 8^{th} grade (for presentation purposes, we refer to this increases or decreases in the outcome variable from 8^{th} to 10^{th} grade). Each model adjusted for demographic characteristics and

included one risk or protective factor at a time to avoid estimation problems due to the correlation among some of the risk and protective factors. Subsequent models tested the interaction between each risk and protective factor and gender. Linear regression was used to examine how risk and protective factors were related to depressive symptoms, Poisson regression was used to examine antisocial behavior, and logistic regression was used for models where any past-month alcohol use was the dependent variable. Analyses were conducted using Mplus version 5.0 (Muthén & Muthén, 2008). Among the youths participating in this study, the percentage of missing data for outcomes or risk and protective scales ranged from 2.2% to 29.7%. Planned missingness accounted for most of the larger amounts of missing data on risk and protective factors where random subsets of participants evenly distributed within each community would receive certain sets of risk and protective survey items. The missing data due to planned missingness was expected to be missing completely at random and would not be expected to bias our findings to any important degree. Our primary analyses did not account for the nesting of youth within community as the proportion of between community variance was small (less than 5%) and other studies have found that the community clustering in this sample does not bias estimates (Rhew, Hawkins, & Oesterle, 2011). As a sensitivity test, we re-ran analyses using multilevel models that included community as a random intercept. As expected, results for all three outcomes were essentially unchanged compared to the original single-level models. Thus, for ease of interpretation, only findings from the single-level models are presented.[1] All significance tests were adjusted using the Benjamini-Hochberg procedure for multiple tests.

Results

Table 2 presents correlations between depressive symptoms, antisocial behavior, and alcohol use in the past 30 days.

Concurrent Associations Between Risk and Protective Factors and Depressive Symptoms, Alcohol Use, and Antisocial Behavior

Adjusted for covariates, all risk and protective factors assessed in the eighth grade were significantly associated with eighth-grade depressive symptoms, antisocial behavior, and alcohol use (see Table 3). Specifically, in the individual and peer domains, higher levels of rebelliousness, attitudes favorable towards antisocial behavior, attitudes favorable towards drug use, perceived risk of drug use, peer drug use, peer rewards for antisocial involvement, intention to use drugs, and interacting with antisocial peers were all linked to greater risk for depressive symptoms, antisocial behavior, and the odds of alcohol use. Conversely, higher religious attendance, social skills, belief in the moral order, interactions with prosocial peers, involvement in prosocial peer behaviors, and receiving rewards for prosocial involvement were linked with lower likelihood of depressive symptoms, less antisocial behavior, and lower odds of alcohol use. In the family conflict domain, poor family management, family conflict, a familial history of antisocial behavior, parental attitudes favorable to drug use, parental attitudes favorable towards antisocial behavior, and a family history of substance

[1] In analyses not presented here, we did test the main effects models for risk and protective factors and outcome variables. The pattern of results was identical. These tables are available from the first author.

use were associated with higher depressive symptoms, greater antisocial behavior, and greater odds of alcohol use. With respect to familial protective factors, greater attachment to parents, opportunities for familial prosocial involvement, and rewards for familial prosocial behavior were associated with less depressive s symptoms, lower antisocial behavior, and lower odds of using alcohol. In the school domain, academic failure and low commitment to school were associated with higher depressive symptoms, greater antisocial behavior, and higher odds of using alcohol, while opportunities and rewards for prosocial school involvement were protective against depressive symptoms, antisocial behavior, and alcohol use. Finally, in the community domain, low neighborhood attachment, laws and norms favorable to drug use, and high perceived variability of drugs were associated with higher depressive symptoms, antisocial behavior, and odds of alcohol use. Opportunities and rewards at the community level for prosocial involvement protected against depressive symptoms, antisocial behavior, and alcohol use.

Some risk and protective factors were found to be more strongly related to outcomes for males or females (see Table 3). In general, risk factors tended to be more strongly associated with internalizing and externalizing problems among females, while protective factors were more strongly associated with internalizing and externalizing problems among males.

Longitudinal Associations Between Risk and Protective Factors and Depressive Symptoms, Alcohol Use, and Antisocial Behavior

In the longitudinal analyses, higher levels of risk factors in individual, peer, family, school, and community domains in 8th grade were associated with greater depressive symptoms, antisocial behavior, and alcohol use two years later in 10th grade, as shown in Table 4. Similarly, higher levels of protective factors in individual, peer, family, school, and community domains were associated with less psychopathology two years later. These findings were identical to the concurrent associations between risk and protective factors (see previous section) with one exception: individual prosocial involvement in clubs, organizations, and volunteer work reported in eighth grade, was unrelated to depressive symptoms, antisocial behavior, or alcohol use 2 years later.

Few significant gender interactions were found in the longitudinal analyses (see Table 4). Individual attitudes favorable towards antisocial behavior, interactions with antisocial peers, and academic failure in eighth grade were more strongly linked to antisocial behavior among males compared to females 2 years later. Social skills in eighth grade were more protective against depressive symptoms 2 years later among females compared to males.

Associations Between Risk and Protective Factors and Depressive Symptoms, Alcohol Use, and Antisocial Behavior

Risk factors in the individual and peer domain measured in 8th grade were positively associated with increases in antisocial behavior and alcohol use over the next two years, but were not significantly associated with increases or decreases in depressive symptoms from 8th to 10th grade (see Table 5). Students with higher levels of most familial risk factors in the 8th grade showed greater increases in both antisocial behavior and alcohol use from 8th to 10th grade. However, family history of alcohol and drug use was associated only with

increases in antisocial behavior. Only family conflict and family history of antisocial behavior reported in 8th grade predicted increases in depressive symptoms from 8th to 10th grade. Similarly, higher levels of school and community risk factors were significantly associated with increases in both antisocial behavior and alcohol use, but not with increases or decreases in depressive symptoms from 8th to 10th grade. Note that low neighborhood attachment was not associated with increases or decreases in depressive symptoms, antisocial behavior or alcohol use from 8th to 10th grade.

While all individual and peer domain protective factors were associated with decreases in antisocial behavior or alcohol use among adolescents over two years, no protective factors in this domain were associated with increases or decreases in depressive symptoms from 8th to 10th grade. All familial protective factors were associated with decreases in antisocial behavior and alcohol use, but only opportunities for prosocial involvement within the family were associated with declines in depressive symptoms from 8th to 10th grade. Rewards for prosocial involvement in school were associated only with declines in alcohol use from 8th to 10th grade. However, rewards for prosocial involvement within one's community were associated with declines in depressive symptoms, antisocial behavior, and alcohol use from 8th to 10th grade. Opportunities for prosocial involvement in the community were associated with declines in antisocial behavior and alcohol use from 8th to 10th grade.

In general, risk and protective factors across each domain operated similarly to predict increases or decreases in internalizing and externalizing problems among males and females with 2 exceptions: (1) intention to use alcohol or drugs was a stronger predictor of increases in antisocial behavior for females compared to males, and (2) belief in the moral order was a stronger protective factor against antisocial behavior among males than among females (see Table 5).

Discussion

This study found that risk and protective factors known to be associated with externalizing behavior problems are also associated with depressive symptoms in adolescence. This finding is important because it suggests that prevention programs designed to address antisocial behavior and alcohol use also have the potential to affect the level of depressive symptoms among youth within a community. This is consistent with the idea that prevention programs that target risk and protective factors for one type of problem, such as substance use, can have benefits or "crossover effects" for a broad range of adolescent problem behaviors predicted by these risk and protective factors (Ellickson, McCaffrey, & Klein, 2009).

One interesting result of the present study is that the same risk and protective factors appear to operate for depressive symptoms as for antisocial behavior and alcohol use. This is especially important given that these behaviors are temporally related. For example, delinquent behavior is often a precursor to substance use (Monahan, Rhew, Hawkins, & Brown, in press), conduct problems are associated with depressive symptoms (Patterson & Stoolmiller, 1991), and depressive symptoms are linked with subsequent substance use (Bukstein, Glancy, & Kaminer, 1992). Nevertheless, it is the case that some individuals do

not go on to develop co-occurring problem behaviors (Monahan et al., in press), suggesting that the same risk and protective factors may impact an underlying propensity for psychopathology that may be differentially manifested behaviorally as depressive symptoms, antisocial behavior, or alcohol use. Such differing expressions of psychopathology in the presence of common exposure to a specific risk or protective factor may be due, in part, to how these factors interact differently with genetic and other environmental characteristics specific to the etiology of the problem behavior.

While the present study does find evidence of shared overlap between risk and protective factors for depression, antisocial behavior and alcohol use, it is interesting that once we control for levels of depressive symptoms in 8th grade, there are few associations between risk and protective factors measured in 8th grade and depressive symptoms reported in 10th grade. In contrast, risk and protective factors measured in 8th grade are consistently predictive of externalizing problems of antisocial behavior and alcohol use in 10th grade, even after controlling for antisocial behavior and alcohol use in 8th grade. Analyses controlling for a previous time point are essentially predicting *increases or decreases* in the outcome variable between the two time points. If there is little increase or decrease in a variable over time, accounting for variance due to the previous level of a construct would leave little variance left to predict. We have some evidence that this may be the case here. For example, antisocial behavior in the 8th grade is correlated with antisocial behavior at grade 10, r = .35. In contrast, the correlation between depressive symptoms in the 8th and 10th grade is higher, r = .52. This high correlation between assessments of depressive symptoms across time may explain why risk and protective factors are associated with level of depressive symptoms in grades 8 and 10, but not associated longitudinally once we account for previous levels of depressive symptoms. In contrast, with less stability in antisocial behavior and alcohol use, we continue to see associations between risk and protective factors and externalizing two years later, even after accounting for previous levels of the problem behavior.

It is particularly notable in the present study that while there are some differences in strength of associations, most risk and protective factors are predictive for both males and females. This is consistent with other research which finds that, although some risk and protective factors may operate more strongly for one gender, risk and protective factors are linked to externalizing problems for both males and females (Fagan et al., 2007). While we do find some evidence that risk factors may be more important for females and protective factors for males with respect to concurrent associations with depressive symptoms, antisocial behavior, and alcohol use, these findings are not evident in the longitudinal analyses. Consequently, we are hesitant to draw speculative conclusions about why this may be the case. Importantly, this suggests that by addressing shared risk and protective factors for males and females, prevention programs may have beneficial effects for both genders.

Prevention efforts have less frequently focused on depressive symptoms among adolescents than on externalizing problems. Yet, the widespread prevalence of depressive symptoms among adolescents indicates that there is need to work to prevent depression among youth. From a community-prevention perspective, as communities plan programs to promote healthy youth development, it is important that they assess the mental health status of youth

community wide. The 4-item CTC-YS Brief Depression Symptom Scale used in this study is a feasible tool for this purpose. While not designed as a diagnostic tool to assess individual depression, it provides a reliable measure of the prevalence of depressive symptoms among community youth, and can be included in school-based surveys of youth behavioral health outcomes and risk and protective factors.

Although the present study was strengthened by its large sample size and focus on adolescents followed prospectively from grade 8 to grade 10, the study is limited in several respects. Youth in the present study were sampled from small to mid-sized communities. The associations presented here may not be generalizable to urban or suburban youth. Moreover, the demographics of the sample prevented us from being able to assess how risk and protective factors may operate differently for youth of different race/ethnicity. Further, the developmental similarities in the association between risk and protective factors and depressive symptoms observed here from 8th to 10th grade may reflect a limited developmental period of adolescence. Although findings from this study provide evidence that some risk and protective factors for substance abuse, antisocial behavior, and depressive symptoms are shared, further research is needed to better understand how overlapping risk factors may contribute to comorbidity between internalizing and externalizing psychopathology. For example, findings suggest that conduct problems are associated with subsequent depression among youth, but not vice versa (Capaldi, 1992). Further research on these overlapping risk factors and temporal onset of disorders may explicate whether these risk factors lead to depression through the onset of conduct problems or through independent mechanisms.

Depressive symptoms, antisocial behavior, and alcohol use all increase during adolescence, placing youth at risk for a number of concurrent and long-term maladaptive outcomes. The evidence reported here that shared risk and protective factors predict depressive symptoms, antisocial behavior, and alcohol use, suggesting that decreasing risk and increasing protection in adolescents' lives may have broad effects on multiple types of adolescent psychopathology. Given the widespread nature of these problems during adolescence, community-wide approaches to reducing exposure to risk and increasing protection may be key to promoting adolescent health and well-being.

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Table 1

Risk and Protective Factors

Domain	Title	Number of items	Example item	α
Community				
Risk Factors	Low neighborhood attachment	3	"I like my neighborhood."	.84
	Laws and norms favorable to drug use	6	"If a kid smoked marijuana in your neighborhood would he or she be caught by the police?"	.88
	Perceived availability of drugs	4	"If you wanted to get some marijuana, how easy would it be for you to get some?"	.88
Protective Factors	Opportunities for prosocial involvement	6	the types of activities available for a youth such as sports teams, boys and girls clubs, 4-H clubs	.74
	Rewards for prosocial involvement	3	"There are people in my neighborhood who are proud of me when I do something well."	.84
School				
Risk Factors	Academic failure	2	"Putting them all together, what were your grades like last year?"	.71
	Low commitment to school	7	"In the past year, how often have you hated being at school?"	.81
Protective Factors	Opportunities for prosocial involvement	5	"In my school, students have lots of chances to help decide things like class activities and rules."	.65
	Rewards for prosocial involvement	4	"My teacher(s) notices when I am doing a good job and lets me know about it."	.74
Family				
Risk Factors	Poor family management	8	"When I am not at home, one of my parents knows where I am and who I am with."; reverse coded	.85
	Family conflict	3	"People in my family often insult or yell at each other."	.77
	Family history of antisocial behavior	10	"Has anyone in your family done other things that could get them in trouble with the police like stealing, selling stolen goods, mugging or assaulting others?"	.83
	Favorable attitudes toward drug use	3	"How wrong do you parents feel I would be for you to smoke marijuana?"	.78
	Favorable attitudes toward antisocial behavior	3	"How wrong do your parents feel it would be for you to pick a fight with someone?"	.73
	Family history of alcohol/drug problems	1	"Has anyone in your family ever had a severe alcohol or drug problem?"	--
Protective Factors	Parental attachment	4	"Do you feel very close to your mother?"	.76
	Opportunities for prosocial involvement	3	"My parents ask me what I think before most family decisions affecting me are made."	.78
	Rewards for prosocial involvement	4	"My parents notice when I am doing a good job and let me know about it."	.78
Peer and individual				
Risk Factors	Rebelliousness	3	"I ignore rules that get in my way."	.73
	Early initiation of drug use	4	"How old were you when you first used marijuana?"	.77
	Favorable attitudes toward antisocial behavior	5	"How wrong do you think it is for someone your age to take a handgun to school?"	.81
	Favorable attitudes toward drug use	4	"How wrong do you think it is for someone your age to drink beer, wine or hard liquor regularly?"	.87
	Perceived risk of drug use	4	"How much do you think people risk harming themselves if they smoke marijuana regularly?"	.83

Domain	Title	Number of items	Example item	α
	Friend drug use	4	"In the past year, how many of your best friends have smoked marijuana?"	.85
	Rewards for antisocial involvement	4	"What are the chances you would be seen as cool if you smoked marijuana?"	.83
	Intentions to use drugs	3	"When I'm an adult, I will smoke marijuana."	.82
	Interaction with antisocial peers	6	"In the past year, how many of your best friends have been suspended from school?"	.80
Protective Factors	Religious service attendance	1	"How often do you attend religious services/activities?"	--
	Social skills	4	Asks students to report what they would do in various social problem situations	.67
	Belief in the moral order	4	"I think it is okay to take something without asking if you can get away with it."; reverse coded	.74
	Affiliation with prosocial peers	5	"How many of your best friends have made a commitment to stay drug-free?"	.70
	Involvement in prosocial activities	3	number of times youth participated in prosocial activities	.79
	Rewards for prosocial involvement	4	"Would you be seen as cool if you worked hard at school?"	.74

Table 2

Correlations Between Depressive Symptoms, Antisocial Behavior, and Alcohol Use

Bivariate Correlations Between Variables	**1**	**2**	**3**	**4**	**5**	**6**
1. Depressive Symptoms, 8th grade		.26**	.13**	.52**	−.05	−.04
2. Antisocial Behavior, 8th grade			.13**	.14**	.35**	−.05*
3. Alcohol Use, 8th grade				−.04	−.10	.20**
4. Depressive Symptoms, 10th grade					.19**	−.01
5. Antisocial Behavior, 10th grade						.19**
6. Alcohol use, 10th grade						

** $p < .01$.

* $p < .05$.

Table 3

Risk and protective factors in eighth grade and eighth-grade depression, alcohol use, and antisocial behavior

Risk and protective factors by domain	Depression β(SE)	Antisocial behavior β(SE)	Alcohol use Odds Ratio
Peer-individual risk factors			
Rebelliousness	0.382(0.038)*	0.798(0.031)*	2.858*
Attitudes favorable towards antisocial behavior	0.296(0.027)*F	0.611(0.019)*F	2.883*
Attitudes favorable to drug use	0.279(0.026)*F	0.538(0.016)*F	3.501*
Low perceived risk of drug use	0.229(0.047)*	0.573(0.037)*	3.117*
Friends' drug use	0.265(0.027)*	0.61(0.018)*F	3.297*
Rewards for antisocial involvement	0.199(0.026)*	0.43(0.018)*F	2.054*
Intention to use drugs	0.311(0.027)*	0.592(0.021)*F	4.212*
Interaction with antisocial peers	0.263(0.03)*F	0.586(0.016)*F	2.560*
Peer-individual protective factors			
Religious attendance	−0.094(0.036)*	−0.187(0.029)*	0.760*
Social skills	−0.351(0.032)*M	−0.969(0.028)*M	0.159*
Belief in the moral order	−0.383(0.042)*	−0.837(0.032)*	0.255*
Interaction with prosocial peers	−0.298(0.036)*M	−0.583(0.039)*M	0.391*
Prosocial involvement	−0.151(0.043)*	−0.213(0.043)*	0.602*
Rewards for prosocial involvement	−0.137(0.031)*	−0.328(0.03)*M	0.670*
Family risk factors			
Poor family management	0.357(0.033)*F	0.675(0.026)*F	2.838*
Family conflict	0.422(0.027)*	0.478(0.027)*	1.857*
Family history of antisocial behavior	0.422(0.027)*	0.817(0.032)*F	4.043*
Parental attitudes favorable towards drug use	0.327(0.043)*	0.621(0.025)*	4.470*
Parental attitudes favorable towards antisocial behavior	0.236(0.029)*	0.514(0.021)*F	2.489*
Family history of substance use	0.416(0.049)*	0.75(0.047)*	2.469*
Family protective factors			
Opportunities for prosocial involvement	−0.344(0.027)*M	−0.396(0.024)*M	0.593*M
Rewards for prosocial involvement	−0.417(0.041)*	−0.443(0.032)*M	0.577*
Attachment	−0.347(0.042)*	−0.404(0.033)*M	0.587*
School risk factors			
Academic failure	0.27(0.026)*	0.444(0.025)*F	1.672*
Low commitment to school	0.526(0.049)*F	0.797(0.038)*F	3.146*
School protective factors			
Opportunity for prosocial involvement	−0.241(0.049)*	−0.372(0.037)*M	0.507*
Rewards for prosocial involvement	−0.247(0.032)*F	−0.479(0.035)*M	0.407*
Community risk factors			

Risk and protective factors by domain	Depression β(SE)	Antisocial behavior β(SE)	Alcohol use Odds Ratio
Low neighborhood attachment	0.213(0.04)*	0.269(0.031)*F	1.366*
Laws and norms favorable to drug use	0.256(0.043)*	0.698(0.033)*F	2.889*
Perceived availability of drugs	0.266(0.039)*	0.647(0.028)*	2.829*
Community protective factors			
Opportunity for prosocial involvement	−0.293(0.032)*M	−0.467(0.04)*M	0.538*M
Rewards for prosocial involvement	−0.222(0.028)*	−0.338(0.029)*M	0.638*

Note. All tests account for age, race/ethnicity, gender, and parental education and are adjusted using the Benjamini-Hochberg Adjustment.

F = Effect is significantly stronger among females, and M = Effect is significantly stronger among males, after Benjamini-Hochberg adjustments.

Table 4

Risk and protective factors in 8th grade and 10th-grade depression, alcohol use, and antisocial behavior

Risk and protective factors by domain	Depression β(SE)	Antisocial behavior β(SE)	Alcohol use Odds Ratio
Peer-individual risk factors			
Rebelliousness	0.197(0.029)*	0.549(0.032)*	2.100*
Attitudes favorable towards antisocial behavior	0.124(0.027)*	0.452(0.021)*M	1.840*
Attitudes favorable to drug use	0.136(0.026)*	0.443(0.018)*	2.088*
Low perceived risk of drug use	0.153(0.045)*	0.476(0.04)*	2.042*
Friends' drug use	0.109(0.028)*	0.443(0.02)*	2.042*
Rewards for antisocial involvement	0.079(0.025)*	0.333(0.02)*	1.510*
Intention to use drugs	0.202(0.037)*	0.458(0.025)*	2.096*
Interaction with antisocial peers	0.127(0.031)*	0.427(0.018)*M	1.982*
Peer-individual protective factors			
Religious attendance	−0.078(0.024)*	−0.093(0.029)*	0.831
Social skills	−0.207(0.031)*F	−0.688(0.03)*	0.388*
Belief in the moral order	−0.141(0.041)*	−0.663(0.036)*	0.444*
Interaction with prosocial peers	−0.221(0.046)*	−0.419(0.043)*	0.544*
Prosocial involvement	−0.099(0.04)	−0.127(0.044)	0.899
Rewards for prosocial involvement	−0.103(0.029)*	−0.251(0.032)*	0.825*
Family risk factors			
Poor family management	0.233(0.032)*	0.517(0.029)*	2.192*
Family conflict	0.266(0.027)*	0.370(0.028)*	1.468*
Family history of antisocial behavior	0.21(0.036)*	0.662(0.034)*	2.826*
Parental attitudes favorable towards drug use	0.192(0.044)*	0.459(0.031)*	2.337*
Parental attitudes favorable towards antisocial behavior	0.149(0.04)*	0.345(0.026)*	1.536*
Family history of substance use	0.25(0.047)*	0.586(0.049)*	1.631*
Family protective factors			
Opportunities for prosocial involvement	−0.276(0.025)*	−0.312(0.036)*	0.685*
Rewards for prosocial involvement	−0.322(0.036)*	−0.312(0.036)*	0.695*
Attachment	−0.303(0.037)*	−0.362(0.035)*	0.690*
School risk factors			
Academic failure	0.194(0.025)*	0.144(0.028)*M	1.634*
Low commitment to school	0.27(0.038)*	0.524(0.04)*	2.192*
School protective factors			
Opportunity for prosocial involvement	−0.163(0.044)*	−0.192(0.042)*	0.751*
Rewards for prosocial involvement	−0.175(0.043)*	−0.209(0.038)*	0.682*
Community risk factors			
Low neighborhood attachment	0.166(0.034)*	0.154(0.034)*	1.293*

Risk and protective factors by domain	Depression β(SE)	Antisocial behavior β(SE)	Alcohol use Odds Ratio
Laws and norms favorable to drug use	0.191(0.044)*	0.49(0.037)*	2.214*
Perceived availability of drugs	0.138(0.029)*	0.192(0.035)*	1.848*
Community protective factors			
Opportunity for prosocial involvement	−0.234(0.041)*	−0.283(0.042)*	0.674*
Rewards for prosocial involvement	−0.181(0.026)*	−0.239(0.03)*	0.645*

Note. All tests account for age, race/ethnicity, gender, and parental education and are adjusted using the Benjamini-Hochberg Adjustment.

F = Effect is significantly stronger among females, and M = Effect is significantly stronger among males, after Benjamini-Hochberg adjustments.

Table 5

Risk and Protective Factors in 8th grade and 10th-grade depression, alcohol use, and antisocial behavior, controlling for 8th grade levels of outcomes

Risk and protective factors by domain	Depression β(SE)	Antisocial behavior β(SE)	Alcohol use Odds Ratio
Peer-individual risk factors			
Rebelliousness	−0.045(0.038)	0.219(0.038)*	1.650*
Attitudes favorable towards antisocial behavior	0.013(0.032)	0.186(0.026)*	1.464*
Attitudes favorable to drug use	0.033(0.031)	0.217(0.024)*	1.619*
Low perceived risk of drug use	0.038(0.054)	0.202(0.043)*	1.536*
Friends' drug use	−0.027(0.035)	0.181(0.026)*	1.602*
Rewards for antisocial involvement	0.039(0.031)	0.134(0.023)*	1.260*
Intention to use drugs	0.033(0.035)	0.203(0.03)*F	1.667*
Interaction with antisocial peers	0.019(0.037)	0.14(0.027)*	1.611*
Peer-individual protective factors			
Religious attendance	−0.083(0.03)	−0.003(0.029)	0.878
Social skills	−0.052(0.04)	−0.344(0.036)*	0.546*
Belief in the moral order	0.029(0.093)	−0.389(0.042)*M	0.594*
Interaction with prosocial peers	−0.063(0.042)	−0.204(0.044)*	0.665*
Prosocial involvement	−0.179(0.076)	−0.075(0.042)	1.016
Rewards for prosocial involvement	0.004(0.035)	−0.147(0.033)*	0.921
Family risk factors			
Poor family management	0.076(0.041)	0.239(0.033)*	1.765*
Family conflict	0.113(0.035)*	0.172(0.03)*	1.256*
Family history of antisocial behavior	0.113(0.035)*	0.32(0.041)*	2.050*
Parental attitudes favorable towards drug use	0.044(0.055)	0.093(0.035)*	1.649*
Parental attitudes favorable towards antisocial behavior	0.048(0.035)	0.07(0.03)*	1.247*
Family history of substance use	0.12(0.058)	0.282(0.051)*	1.285
Family protective factors			
Opportunities for prosocial involvement	−0.107(0.034)*	−0.139(0.027)*	0.786*
Rewards for prosocial involvement	−0.179(0.109)	−0.196(0.038)*	0.780*
Attachment	−0.2(0.097)	−0.167(0.038)*	0.774*
School risk factors			
Academic failure	0.078(0.031)	0.144(0.028)*	1.478*
Low commitment to school	0.056(0.05)	0.184(0.046)*	1.689*
School protective factors			
Opportunity for prosocial involvement	0.042(0.09)	−0.04(0.042)	0.875
Rewards for prosocial involvement	−0.047(0.038)	−0.004(0.038)	0.791*
Community risk factors			
Low neighborhood attachment	−0.009(0.083)	0.05(0.035)	1.206

Risk and protective factors by domain	Depression β(SE)	Antisocial behavior β(SE)	Alcohol use Odds Ratio
Laws and norms favorable to drug use	0.117(0.109)	0.2(0.041)*	1.765*
Perceived availability of drugs	0.015(0.036)	0.192(0.035)*	1.422*
Community protective factors			
Opportunity for prosocial involvement	−0.076(0.038)	−0.118(0.043)*	0.759*
Rewards for prosocial involvement	−0.123(0.032)*	−0.116(0.03)*	0.703*

Note. All tests account for age, race/ethnicity, gender, parental education, and eighth-grade level of outcome variable and are adjusted using the Benjamini-Hochberg Adjustment.

F = Effect is significantly stronger among females, and M = Effect is significantly stronger among males, after Benjamini-Hochberg adjustments.