Risk and protection in the development of problem behaviors in adolescents

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Abstract:

The development of problem behaviors among adolescents is affected by complex interactions between risk and protective factors. This study was designed to determine whether selected risk and protective factors described among participants in the National Longitudinal Study of Adolescent Health predicted problem behavior cluster membership. Approximately, 13,000 adolescents from the Add Health study were examined. Three clusters of adolescents (*exhibiting normal, problem*, and *deviant* behaviors) and changes in cluster membership over 1 year were examined for relationships to specific risk and protective factors. Findings revealed that factors for current behavior problems differ from those for changes in cluster membership. These results suggest that approaches to preventing problems may differ from those required to help adolescents who are already manifesting problems.

Keywords: adolescents | parenting | parent–child relationships | juvenile behavior problems | family disorganization

Article:

Problem behaviors, defined as externalizing behaviors that are socially disruptive and distressing to others (Bartlett, Holditch-Davis, & Belyea, 2005), occur at alarming rates in US adolescents. According to the 2003 Youth Risk Surveillance Survey, 17.1% of students in grades 9–12 had carried a weapon on at least one of the prior 30 days and 33%reported being in a physical fight one or more times in the prior year. Nearly half of the sample reported drinking one or more alcoholic drinks in the preceding month, and nearly 30% reported drinking five or more alcoholic drinks in a row in the prior month (Centers for Disease Control and Prevention, Department of Health and Human Services, 2004).

Problem behaviors do not occur randomly in adolescents. Rather, they occur as a result of complex interactions between risk factors, which are ‘‘characteristics, events, or processes that

increase the likelihood for the onset of a problem'' (Kazdin, 1995, p. 50), and protective factors, that are either internal or external to the individual and associated with positive (or less negative) outcomes (Deković, 1999). Further, the complex linkages of risk and protective factors and problem behaviors change over time. To design interventions to improve behavioral outcomes for adolescents, a better understanding of these complexities is required. Thus, the purpose of this study was to examine relationships between selected risk and protective factors and problem behavior clusters of adolescents.

Problem behavior theory (PBT; Donovan, 1996; Jessor, 1992, 1998; Jessor & Jessor, 1977), a risk and resilience model, provides a framework for looking at salient risk and protective factors for the development of problem behaviors in adolescents. PBT describes the bidirectional and dynamic relationships among a number of biological, social, and psychological domains of risk and protective factors for problem behaviors, focusing on how these domains influence each other and the likelihood that adolescents will develop risky (problem) behaviors, and ultimately health/life compromising outcomes. In this study, the risk factor examined from the biology/genetics domain was whether or not an adolescent had been identified as having an attention and/or other learning problem. The social environment domain was represented by the protective factors maternal and paternal support; the perceived environment domain was represented by the protective factor of having friends (role models for conventional behavior); and the personality domain was represented by the risk factor low self-esteem (see Fig. 1). All of the risk and protective factors except history of attention and/or learning problems were chosen because of their perceived amenability to nursing interventions.

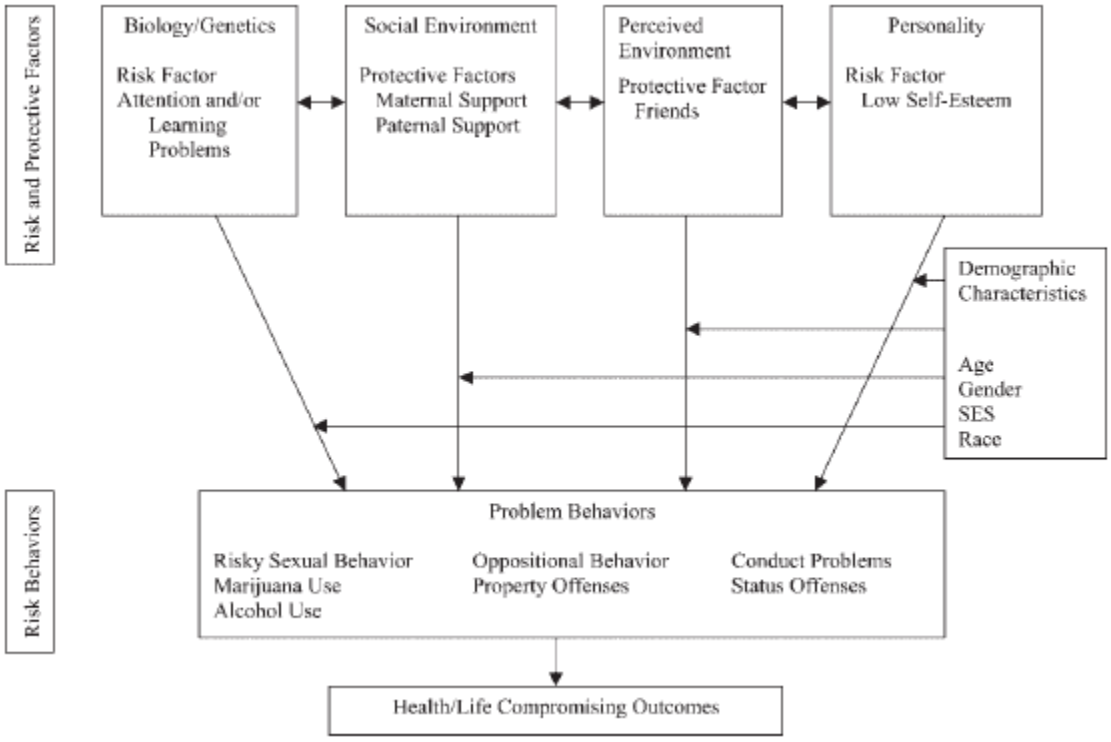

Figure 1. Problem behaviors in adolescents and the effect of risk and protective factors on these behaviors (Donovan, 1996; Jessor, 1992, 1998; Jessor & Jessor, 1977).

Several demographic variables also were studied. While not originally included in PBT, they were included in this study because of their perceived impact on the relationships between the risk and protective factors and the problem behaviors of interest. Socioeconomic status (SES) has been found to be associated with differences in risky sexual behaviors (Singh, Darroch, Frost, & the Study Team, 2001), race has been associated with differences in substance use behaviors (Jainchill, De Leon, & Yagelka, 1997), and both age and sex have been associated with differences in oppositional behaviors, aggression, and property and status offenses (Lahey et al., 2000). Thus, it is reasonable to conclude that these demographic factors may moderate the relationship between the risk and protective factors and problem behaviors. Information gleaned from the inclusion of these variables in the study could be important for tailoring nursing interventions to particular groups. Thus, the adolescent's age, sex, SES, and race were examined as moderators of these relationships.

Using a sample of adolescents from the National Longitudinal Study of Adolescent Health (Add Health; Udry, 2003), a nationally representative, longitudinal, probability-based survey, Bartlett et al. (2005) identified three clusters of adolescents varying in the type and severity of problem behaviors (stealing, fighting, failing to use birth control, having sex while using substances, property damage, alcohol use, weapon use, being loud/rowdy, selling drugs, lying to parents, running away, skipping school, marijuana use, and having multiple sex partners): a *normal*, a *problem*, and a *deviant* behavior cluster. Adolescents in the normal behavior cluster reported engaging in few problem behaviors; those in the problem behavior cluster reported more; and adolescents in the deviant behavior cluster not only reported the most problem behaviors, but also reported problems that differed qualitatively from those in the other clusters and included both weapon use and selling drugs.

Previous research guided the selection of the risk and protective factors studied. Attention deficit/hyperactivity disorder (AD/HD) and learning problems, for example, are known to be risk factors for the development of other disruptive behavior disorders (Frick et al., 1991). Children with attention problems (often diagnosed as AD/HD) sometimes go on to develop oppositional defiant disorder (ODD) and even symptoms of conduct disorder (CD; American Psychiatric Association, 2000). Reported comorbidity rates between AD/HD and learning disorders vary between 10% and 92% (Jensen, Martin, & Cantwell, 1997).

Low self-esteem is another risk factor for the development of problem behaviors in adolescents (Jessor, Van Den Bos, Vanderryn, Costa, & Turbin, 1995; Stacy, Sussman, Dent, Burton, & Flay, 1992). Low self-esteem has been linked to delinquency (F. R. Rosenberg, Rosenberg, & McCord, 1978), and to externalizing behavior problems (Aunola, Stattin, & Nurmi, 2000). However, recently researchers have questioned whether low self-esteem was the cause or the result of problem behaviors. Hoza, Pelham, Milich, Pillow, and McBride (1993), for example, found what they termed ''positive illusory bias'' in boys with AD/HD. That is, the boys tended to take responsibility for social successes but failed to take responsibility for social failures. Some authors have found that externalizing behavior problems actually served to enhance self-esteem (M. Rosenberg, Schooler, & Schoenbach, 1989). Further, children with aggressive behaviors have been found to have higher self-esteem than children who are withdrawn (Schneider & Leitenberg, 1989). In some aggressive people, an inflated view of the self (high self-esteem) that is threatened by others has been suggested to be a precipitant to aggression,

rather than a deterrent (Baumeister, Smart, & Boden, 1996). Some authors have found that AD/HD in childhood was related to low self-esteem in adolescence (Slomkowski, Klein, & Mannuzza, 1995), and in adulthood (Hechtman, Weiss, & Perlman, 1980). Clearly, more information is needed about the kinds and levels of self-esteem that lead to risk for problem behaviors in adolescents.

The effects of a child or adolescent's peer relationships on problem behavior development or exacerbation are also complex. Some problem behaviors in childhood lead to rejection by peers (Gresham, MacMillan, Bocian, Ward, & Forness, 1998), and peer rejection predicts later negative outcomes in the rejected child (Kupersmidt & Coie, 1990). For example, Dodge et al. (2003) found that peer rejection in school-aged children predicted an increase in aggressive behaviors, and Bierman, Smoot, and Aumiller (1993) found that children who were both aggressive and rejected by their peers had more serious behavioral problems than their aggressive peers who were not rejected. A low number of friends is not necessarily a predictor of problem behaviors in adolescents, however. Cairns, Cairns, Neckerman, Gest, and Gariépy (1988) found that by adolescence, aggressive youth were not friendless; rather, they now had friends who were also deviant.

Protective factors, including maternal and paternal support, may be associated with fewer or less severe problem behaviors. Mahoney, Lewis, and Donnelly (2001) found that more positive parent–child interactions were linked to decreases in problem behaviors. A close bond between father and child (Brook et al., 2002) or simply the presence of a father (Ellis et al., 2003) was associated with more positive behavioral outcomes. Parental support has been found to be protective against the development of externalizing problems in adolescents (Deković, 1999), particularly alcohol and drug abuse (Wills, Vaccaro, & McNamara, 1992). Maternal and paternal support, however, may have the greatest benefits for children with externalizing and attention problems (Usher, Mulvihill, & Mielcarek, 1999). Interestingly, Crosnoe, Erickson, and Dornbusch (2002) found that parental monitoring and parental involvement sometimes increased an adolescent's vulnerability and were related to increased risk for boys who had friends who used alcohol and tobacco. Also, Black males living in single-mother-headed families had fewer problem behaviors than did those with paternal involvement (Thomas, Farrell, & Barnes, 1996).

The relationships of risk and protective factors to problem behavior development are complex. The purpose of this study was to examine some of this complexity by conducting a secondary analysis of the existing Add Health database. The research questions were:

1. What are the relationships among risk factors (attention and/or other learning problems, and low self-esteem) and protective factors (maternal support, paternal support, and having friends) and problem behavior cluster membership at Time 1 and Time 2.

2. If individuals change clusters from Time 1 to Time 2, what risk or protective factors predict this change?

3. Do the demographic variables age, sex, race, and SES modify the relationship between the risk and protective factors of interest and cluster membership at Time 1?

METHOD

Data were taken from a sample of adolescents in the Add Health study, an on-going, nationally representative, probability-based, longitudinal survey of students who were in grades 7 through 12 in the 1994–95 school year (Udry, 2003). The aim of the Add Health study was to explore the causes of health-related behaviors, with a focus on the influence of the adolescent's social context. The methods of the overall Add Health study have been described elsewhere (Bartlett et al., 2005; Bearman & Moody, 2004).

Sample

Schools were the original sampling unit in the Add Health study (Chantala & Tabor, 1999) and were identified using a stratified, random sample of all high schools in the United States. The original sample of adolescents contained over 90,000 participants (Bearman, Jones, & Udry, 1997). Two time points of data collection were used in this analysis. Time 1 data were collected in 1994–95; Time 2 data approximately 1 year later, in 1996, on the same participants. Adolescent-, parent-, and peer-reported data were used in this analysis. The clustering technique, which is reported elsewhere (Bartlett et al., 2005), was performed on a sample size of 12,617. Their age range was 11.56–21.16 years. To reach that final dataset only those participants with responses on all of the problem behaviors of interest at both time points could be included, due to the assumptions of the clustering technique used. This meant that seniors in high school at Time 1 were eliminated from the analysis because there were no Time 2 data for these individuals. In addition, individuals missing sample weights at Time 2 were eliminated from the analysis. The sampling weights at Time 2 were used in the analysis so that nationally representative estimates could be made. Of the 12,617 participants clustered, the number of individuals with responses available for this analysis on the self-esteem variable was 12,615, on maternal support 12,004, on paternal support 9,073, on numbers of friends 9,038, and on attention and/or learning problems 11,041. The differences in number of responses per variable could be non-random. For example, there were *not applicable*, *legitimate skip*, *refused*, and *don't know* options that a participant could choose for the items used to construct the paternal support variable, yet some participants with no father in their lives may have chosen to skip these questions. For the item used as the number of friends variable, this measure was not calculated in schools where there were low response rates or in individuals with problem unique identifying numbers (National Longitudinal Study of Adolescent Health, 2005).

Measures

Problem behavior clusters. Using Ward's clustering method (Khattree & Naik, 2000), three clusters of problem behaviors were identified in the sample—normal, problem, and deviant. Selling drugs, weapon use, and having sex while under the influence of substances discriminated the deviant cluster from the normal and problem behavior clusters. Lack of use of birth control and having multiple sex partners discriminated the problem behavior from the normal behavior cluster. Those in the normal behavior cluster reported few problem behaviors as compared to the other clusters, yet they did report significant alcohol use, being loud and rowdy in public places, and lying to their parents. The percent of adolescents in the normal cluster was 73% at Time 1 (n = 9,190) and 47% at Time 2 (n = 5,896); 23% were in the problem cluster at Time 1 (n = 2,883)

and 45% at Time 2 (n = 5,687); and 4% were in the deviant cluster at Time 1 (n = 544) and 8% at Time 2 (n = 1,034). The normal cluster had a higher percentage of girls, and both of the other clusters had a higher percentage of boys. The percentage of boys in the deviant cluster was more than twice that of girls (Bartlett et al., 2005).

Risk and protective factors. The coding scheme used to determine SES was based on parent report items about the mother's and father's highest level of education and occupation. Separate mother and father SES scales were calculated; the range of scores was 1–10. A family SES score was defined as the maximum of the two scales. A score of six was considered middle-class, with higher scores reflecting a higher SES (Bartlett et al., 2005; Joyce Tabor, personal communication, July 22, 2002).

Race was based on questions posed to the participants and their parents about their racial background. For this study four race categories were used based on a constructed variable provided by the Carolina Population Center: White, Black, Native American, and Asian (Joyce Tabor, personal communication, July 22, 2002). Those of Hispanic origin were not identified using this method. Sex was determined by asking each participant to self-report. Age for each participant was calculated based on their birth date and date of their Time 1 interview (National Longitudinal Study of Adolescent Health, 2005).

The presence of attention and/or learning problems was measured by one item from the parent questionnaire. Parents were asked if their child had a ''specific learning disability such as difficulties with attention, dyslexia, or some other reading, spelling, writing, or math disability'' (National Longitudinal Study of Adolescent Health, 2005). Parents could respond *yes* or *no* to this item.

The self-esteem, maternal support, and paternal support variables were each constructed from several adolescent reported items (see Table 1). The constructed self-esteem variable is consistent with M. Rosenberg's (1965) scale, a valid and reliable measure of global self-worth or self-acceptance, arguably the standard for self-esteem measurement in adolescents. M. Rosenberg's original self-esteem scale consisted of 10 items answered by the adolescent on a 4-point scale, ranging from *strongly agree* to *strongly disagree* (Blascovich & Tomaka, 1991). The constructed self-esteem variable used in this study consisted of four items, three of which are very similar to three of M. Rosenberg's items. Internal consistency for each of the constructed variables used in this study was calculated at both data collection time points using Cronbach's alpha (Waltz, Strickland, & Lenz, 2005). All coefficients were within an acceptable range (.79–.88). Self-esteem also was divided into three categories (high, medium, low) to test for potential curvilinear effects, so that both the effects of high and low self-esteem could be examined. This categorization also aided in the interpretation of findings. To create the categories, the self-esteem scores for participants at Time 1 were divided into three groups: one category was approximately the highest quartile, the second category was approximately the middle half, and the third was approximately the lowest quartile.

During the in-school portion of data collection, each Add Health participant was asked to nominate up to five male and five female friends. The number of friendship nominations

received by each participant was used. Adolescents with no peer nominations were considered friendless, and all other participants were placed into the category of having friends.

Table 1. Individual Items Used to Create Constructed Variables Used in Analyses

Constructed Variable	Specific Items	Measurement
Self-esteem	1. You have a lot of good qualities	*1, Strongly agree*
	2. You have a lot to be proud of	*2, Agree*
	3. You like yourself just the way you are	*3, Neither agree nor disagree*
	4. You feel like you are doing everything just about right	*4, Disagree*
		5, Strongly disagree
Maternal support	1. How close do you feel to your {mother/adoptive mother/stepmother/foster mothers/etc}?	*1, Not at all*
		2, Very little
	2. How much do you think she cares about you?	*3, Somewhat*
		4, Quite a bit
		5, Very much
	3. Most of the time your mother is warm and loving toward you	*1, Strongly agree*
		2, Agree
	4. You are satisfied with the way your mother and you communicate with each other	*3, Neither agree nor disagree*
		4, Disagree
	5. Overall, you are satisfied with your relationship with your mother	*5, Strongly disagree*
Paternal support	1. How close do you feel to your {father/adoptive father/stepfather/foster father/etc}?	*1, Not at all*
		2, Very little
	2. How much do you think he cares about you?	*3, Somewhat*
		4, Quite a bit
		5, Very much
	3. Most of the time your father is warm and loving toward you	*1, Strongly agree*
		2, Agree
	4. You are satisfied with the way your father and you communicate with each other	*3, Neither agree nor disagree*
		4, Disagree
	5. Overall, you are satisfied with your relationship with your father	*5, Strongly disagree*

Data Analysis

The Add Health data were collected using a cluster sampling technique that resulted in observations that were not independent or identically distributed (Chantala & Tabor, 1999). SUDAAN software (Research Triangle Institute) was used so that corrections due to the design effects could be made. This included using a weight statement in the analyses in order to obtain nationally representative results. Descriptive techniques and logistic regression for both dichotomous and multiple nominal outcomes were the primary statistics used.

RESULTS

Risk and Protective Factors by Cluster Membership

The mean scores on the risk and protective factors for each problem behavior cluster at Time 1 are displayed in Table 2. The deviant behavior cluster differed significantly from the normal behavior cluster on attention and/or learning problems at Time 1 (Wald $F_{(2, 128)} = 4.65$, $p < .05$). However, at Time 2, there were no significant differences on this variable.

Table 2. Mean Self-Esteem, Maternal Support, Paternal Support and Number of Friends Scores and Percentage of Adolescents With Attention þ/or Learning Problem Scores at Time 1 by Problem Behavior Cluster Membership at Time 1 (and Standard Error of the Mean)

Cluster	Self-Esteem	Maternal Support	Paternal Support	Number of Friends	Attention +/or Learning Problem
Normal behavior	4.14 (0.00)	4.52 (0.00)	4.37 (0.00)	5.81 (0.13)	13%
Problem behavior	3.92 (0.01)	4.25 (0.01)	4.01 (0.01)	5.59 (0.17)	15%
Deviant behavior	3.88 (0.03)	4.19 (0.03)	3.77 (0.05)	5.42 (0.30)	19%

At Time 1 both the problem behavior and deviant behavior clusters also differed significantly from the normal behavior cluster on self-esteem and maternal support, but they did not differ from each other (see Table 3). There were no significant differences in numbers of friends per adolescent among the clusters. Of note, the mean levels of paternal support were lower in all clusters than the mean levels of maternal support. At Time 2 the problem and deviant behavior clusters differed from the normal behavior cluster on numbers of friends, but did not differ from each other (see Table 4).

Table 3. Risk and Protective Factors at Time 1 by Time 1 Problem Behavior Cluster Membership

Risk/Protective Factor	R^2	Cluster Membership and Effects	Contrast	Beta Coefficient	*SE* Beta	Wald *F*
Self-esteem	0.02[a]	Intercept		1.85	0.01	
		Normal		—	—	
		Problem		0.22*	0.02	
		Deviant		0.26*	0.04	
			All three clusters			88.45*
Maternal support	0.04[a]		Problem versus deviant			0.91
		Intercept		1.47	0.01	
		Normal		—	—	
		Problem		0.27*	0.02	
		Deviant		0.33*	0.05	
			All three clusters			94.90*
			Problem versus deviant			1.65
Paternal support	0.05[a]	Intercept		1.63	0.01	
		Normal		—	—	
		Problem		0.36*	0.03	
		Deviant		0.60*	0.06	
			All three clusters			95.69*
			Problem versus deviant			12.87*
Number of friends	<0.01[a]	Intercept		5.81	0.13	
		Normal		—	—	
		Problem		–0.23	0.13	
		Deviant		–0.40	0.30	
			All three clusters			1.89
			Problem versus deviant			0.32

* $p < .001$. [a]The Cox and Snell R^2 for a logistic regression is typically much smaller than one would see for a linear regression model, and is made even smaller by the use of a very large weighted sample size.

The three clusters differed significantly on self-esteem categories (high, medium, low) at each time period (Time 1: χ^2 (4, n = 17,447,096—weighted sample size) = 380,362, $p < .001$; Time 2: χ^2 (4, n = 17,447,096) = 286,321, $p < .001$). At both time points, the largest percentage of adolescents in the normal behavior cluster were in the middle self-esteem category (46% at Time

1 and 47% at Time 2), while similar percentages were in the high and the low self-esteem clusters (between 26% and 28% in each). At Time 1, over 40% of the adolescents in the problem behavior cluster were in the middle and low self-esteem categories, and only about 18% were in the highest self-esteem category. In the deviant behaviors cluster, the largest percentages of adolescents were in the lowest self-esteem category at both points, 46% at Time 1 and 43% at Time 2. Thus, adolescents in the problem and deviant behavior clusters had lower self-esteem than those in the normal cluster; low self-esteem appeared to be a risk factor, though this is speculative because the two waves were analyzed separately (personal communication, anonymous reviewer, May 18, 2006).

Table 4. Risk and Protective Factors at Time 1 by Time 2 Problem Behavior Cluster Membership

Risk/Protective Factor	R^2	Cluster Membership and Effects	Contrast	Beta Coefficient	*SE* Beta	Wald *F*
Self-esteem	0.017[a]	Intercept		1.83	0.01	
		Normal		—	—	
		Problem		0.14**	0.02	
		Deviant		0.25**	0.03	
			All three clusters			51.99**
Maternal support	0.03[a]		Problem versus deviant			12.25**
		Intercept		1.44	0.01	
		Normal		—	—	
		Problem		0.18**	0.02	
		Deviant		0.32**	0.03	
			All three clusters			92.70**
			Problem versus deviant			19.44**
Paternal support	0.034[a]	Intercept		1.59	0.02	
		Normal		—	—	
		Problem		0.24**	0.02	
		Deviant		0.40**	0.04	
			All three clusters			79.65**
			Problem versus deviant			14.39**
Number of friends	0.009[a]	Intercept		5.36	0.14	
		Normal		—	—	
		Problem		0.76**	0.13	
		Deviant		0.75*	0.25	
			All three clusters			19.34**
			Problem versus deviant			0.00

* $p < .01$. ** $p < .001$. [a]The Cox and Snell R^2 for a logistic regression is typically much smaller than one would see for a linear regression model, and is made even smaller by the use of a very large weighted sample size.

The clusters also differed significantly at each time point on the number of friends variable (friendless vs. having friends), at Time 1 χ^2 (2, n = 11,517,965—weighted sample size) = 5539.02, $p < .001$; and at Time 2 χ^2 (2, n = 11,517,965) = 32,723, $p < .001$). At Times 1 and 2, 8% and 9%, respectively, of the normal behavior cluster adolescents were in the friendless category, as compared to 6.5% and 7.5% of the problem behavior cluster and 5% and 6% of the deviant behavior cluster.

Demographic Factors as Moderators

To determine whether demographic variables moderated the relationships between the risk and protective factors and problem behavior cluster membership at Time 1, each demographic variable was entered into a multiple logistic regression in interaction with each risk and protective factor. SES significantly modified the relationship of self-esteem to cluster membership (Wald $F_{(2, 128)} = 3.24$, $p < .05$) as did sex (Wald $F_{(2, 128)} = 3.95$, $p < .05$). Age significantly modified the effect of both maternal support (Wald $F_{(2, 128)} = 11.51$, $p < .001$) and paternal support (Wald $F_{(2, 128)} = 4.15$, $p < .05$) on cluster membership.

To explore how the demographic variables modified the risk and protective factors, SES and age were divided into three categories (high [older], medium, and low [younger]), and the cluster mean for the risk or protective factor was calculated for each category of these demographic variables and plotted graphically (see Figs. 2–5). Paternal and maternal support were higher for the youngest category than for the older two categories and decreased as cluster membership moved toward more deviance. In the problem and deviant behaviors clusters, maternal support was higher for the oldest adolescents than for the middle age category. In all clusters, boys had higher self-esteem than girls. Among females, self-esteem decreased as cluster membership changed to a more deviant cluster, but among boys, self-esteem was essentially the same for the problem and deviant behavior clusters (see Fig. 5).

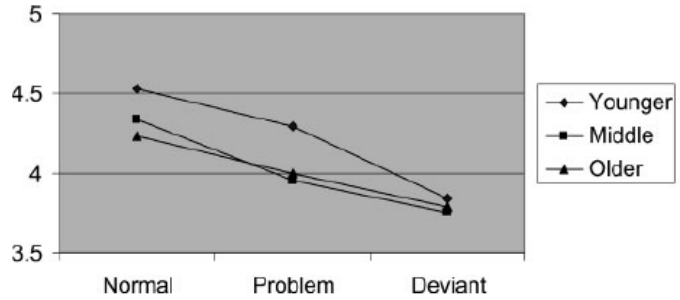

Figure 2. Problem behavior cluster means for paternal support by age.

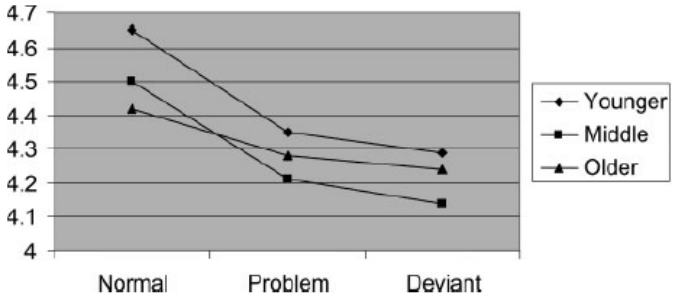

Figure 3. Problem behavior cluster means for maternal support by age.

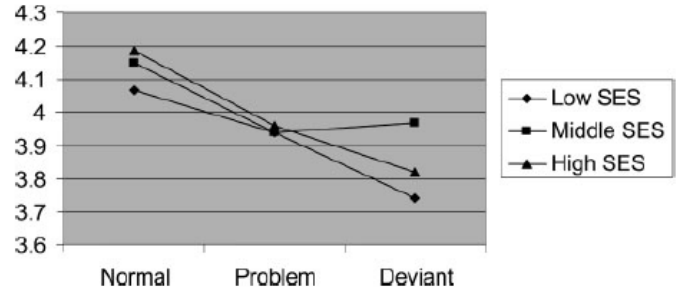

Figure 4. Problem behavior cluster means for self-esteem by SES group.

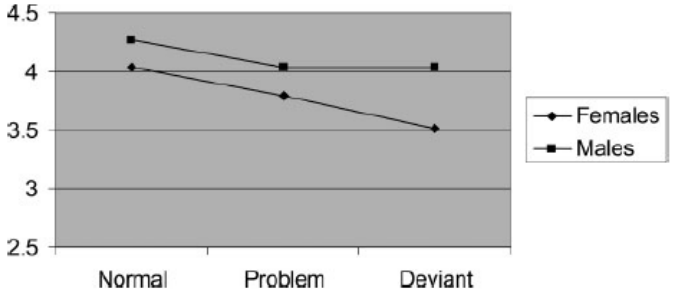

Figure 5. Problem behavior cluster means for self-esteem by gender.

More individuals in the middle SES group were in the deviant behavior cluster than in either of the other clusters. In both the low and the high SES groups, most participants were in the normal cluster, fewer were in the problem cluster, and the fewest were in the deviant behaviors cluster.

Risk and Protective Factors Associated With Cluster Change

To determine how risk and protective factors and demographic variables were related to cluster membership change, these variables were entered as independent covariates into a logistic regression model, with change as the dependent variable. Initially, only those who changed clusters were entered into this analysis. When comparing the adolescents who changed to worse behavior cluster with those who changed to a better behavior cluster, the variables associated with positive change were paternal support (Wald $F_{(1, 128)} = 7.14$, $p < .01$), number of friends (Wald $F_{(1, 128)} = 4.9$, $p < .05$), age (Wald $F_{(1, 128)} = 4.34$, $p < .05$), and race (Wald $F_{(1, 128)} = 2.9$, $p < .05$). Lower levels of paternal support and having no friends were associated with a positive cluster change. Those who made a positive cluster change from Time 1 to Time 2 were older than those who changed to a more deviant cluster, and those who changed cluster membership to a better behavior cluster were more likely to be Black.

When comparing those who changed to a worse behavior cluster to those who did not change clusters between the time points, those who did not change cluster reported more paternal support (Wald $F_{(1, 128)} = 4.54$, $p < .05$), had no friends (Wald $F_{(1, 128)} = 32.89$, $p < .001$), were younger (Wald $F_{(1, 128)} = 18.51$, $p < .001$), and were less likely to be male (Wald $F_{(1, 128)} = 4.61$, $p < .05$) than those who changed to a worse behavior cluster. Those who did not change reported more paternal support and were younger than those who changed to a better behavior cluster (Wald $F_{(1, 128)} = 11.48$, p .001; Wald $F_{(1, 128)} = 16.63$, $p < .001$).

In order to look for age effects, and to examine adolescents that could move to either a worse behavior cluster or to a better behavior cluster, cluster change from the problem behavior cluster was examined. Those who changed to the normal behavior cluster ($n = 578$) differed significantly from those who changed to the deviant behavior cluster ($n = 459$) only on self-esteem (Wald $F_{(1, 128)} = 7.71$, $p < .01$). Those who changed to a better behavior cluster had higher self-esteem than those who changed to a worse behavior cluster.

Those who changed from the normal cluster to the deviant cluster ($n = 309$) were then compared to those who remained in the normal cluster over the two time points ($n = 5{,}273$). Those who stayed in the normal behavior cluster more often had no friends (Wald $F_{(1, 128)} = 5.85$, $p < .05$), were younger (Wald $F_{(1, 128)} = 10.04$, $p < .01$), were less likely to be male (Wald $F_{(1, 128)} = 4.78$, $p < .05$), and more likely to be Black (Wald $F_{(1, 128)} = 4.62$, $p < .01$). Those who changed from the deviant cluster to the normal cluster ($n = 45$) were less likely to have attention and/or a learning problem than those who stayed in the deviant cluster over the two time points ($n = 266$; Wald $F_{(1, 128)} = 6.00$, p .05).

DISCUSSION

Problem behavior clusters found among adolescents in the National Longitudinal Study of Adolescent Health were examined to determine if specific risk and protective factors were associated with cluster membership. We found that all of our proposed risk and protective factors were related to problem behavior clusters. Adolescents with attention and/or other learning problems were at risk for behavior problems, and perhaps the most deviant ones. At Time 1, the numbers of adolescents with attention and/or some other learning problem became larger as problem behavior cluster worsened (normal, 13%; problem, 15%; deviant, 19%), consistent with

Loeber and Keenan's (1994) trajectory that begins with AD/HD and continues with the emergence of ODD and the onset of CD. However, as this was a community sample of adolescents and not clinic-referred, few adolescents (only 9% of boys, 4.5% of girls) had this risk factor.

Low self-esteem was a clear risk factor in this study, as in many other studies (Aunola et al., 2000; Jessor et al., 1995; M. Rosenberg et al., 1989; Stacy et al., 1992). Adolescents in the normal behavior cluster reported the highest self-esteem at both time points. The study provides some support for the view that low self-esteem might promote delinquent behaviors (M. Rosenberg et al.). However, delinquent behaviors also were associated with higher self-esteem. That is, many adolescents in the normal behavior cluster had low self-esteem while many adolescents in the problem and deviant behavior clusters had high self-esteem. Thus, self-esteem alone did not account for behavior cluster assignment. Unexpectedly, self-esteem was rarely related to cluster membership change. When self-esteem was significantly associated with cluster change, higher self-esteem always was associated with either a positive change or staying in a better behavior cluster. These findings suggest that higher self- esteem was protective against the risk of changing to a group with more problem behaviors. However, when examining the mean self-esteem score of the adolescents in each problem behavior cluster by SES group, the mean self-esteem of the middle SES group slightly increased in the deviant behavior cluster over the problem behavior cluster. This finding is unlike the pattern of decreasing mean self-esteem as behavior cluster worsened for both the low and the high SES groups, lending some support to the work of M. Rosenberg et al. that externalizing problem behaviors may serve to enhance self-esteem in some adolescents. Examining self-esteem by demographic variables may be very useful in determining which adolescents could benefit from self-esteem enhancement programs.

Our findings were consistent with the finding of Robins, Trzesniewski, Tracy, Potter, and Gosling (2001) that self-esteem declined across adolescence for both boys and girls. For girls in the study, mean self-esteem decreased as problem behavior cluster membership worsened, while boys' self-esteem was the same in the problem and deviant behavior clusters. Thus, low self-esteem seemed to be a stronger predictor of membership in the deviant behavior cluster for girls than for boys. If this is the case, then self-esteem may be an area where intervention will be fruitful for the prevention and/or treatment of problem behaviors, especially in girls.

Both maternal and paternal support appeared generally protective in this study, although an alternative hypothesis is that problem behavior in adolescents reduces parental support. The adolescents in the deviant cluster reported lower maternal and paternal support than other adolescents, similar to the findings in another study of a community sample of adolescents (Deković, 1999). Also, Zweig, Phillips, and Lindberg (2002), in another analysis of the Add Health adolescents, found that girls and boys in their lowest risk cluster had higher scores on both ''parental closeness'' and ''relationship with parents'' than adolescents in higher risk clusters.

There were, however, some complexities in the protectiveness of parental support. Maternal support was unrelated to cluster change, and higher paternal support was associated with remaining in the same cluster. These findings suggest that high levels of paternal support may provide a stabilizing force in the lives of some adolescents. Similarly, Ellis et al. (2003) found a

strong association between having a father present in a girl's life with delayed sexual activity and fewer adolescent pregnancies.

Stabilization of cluster membership from Time 1 to Time 2 was not always positive (e.g., when the adolescent was in the deviant cluster). It appeared that in some instances father support helped adolescents maintain their deviant behavior. Similarly, Crosnoe et al. (2002) found that parental involvement was risk producing, especially for boys, increasing their vulnerability to friends who used alcohol and tobacco, which led to drinking and tobacco use behaviors. They postulated that this may be the result of permissive parenting that is perceived as positive by the adolescent, or alternatively, the result of the boys' security in the relationship with the parent, not fearing damage to the relationship subsequent to substance use. Given these conflicting findings related to paternal support and the lack of empirical evidence in general about the role of fathers in the lives of children, this is an area needing further examination.

The clusters did not differ on the adolescent's friends at Time 1. At Time 2, however, the deviant behavior cluster had a lower percentage of friendless adolescents than the other clusters. In addition, when adolescents changed cluster membership between Time 1 and Time 2, having no friends was associated with moving to a cluster with fewer problem behaviors. This may provide support for the view that having friends who engage in deviant behaviors is a risk factor (Deković, 1999; Keenan, Loeber, Zhang, Stouthamer-Loeber, & van Kammen, 1995). However, few of the adolescents in this analysis were friendless (less than 10% at either time point), and while these adolescents were not at risk for problem behaviors, they may have been at risk for internalizing problems (e.g., depression and anxiety). Adolescence is a time when children move away from their parents and toward their friends as their primary support group. Counting numbers of friends provides only a proxy for understanding the effects of these relationships and does not account for their complexity. This remains an area in need of further study.

More participants changed to a worse cluster than to a better one (n = 4,376 vs. n = 856) across the two time points in this study, though most participants did not change cluster membership (n = 7,385; 59%). Those who moved from a worse cluster to a better cluster were significantly older than other adolescents. This supports the adolescent-limited view of problem behaviors (Moffitt, 1993), according to which adolescence is a time of experimentation and for most adolescents, experimentation culminates with a return to more normal behaviors. However, this finding could be just an artifact of the way the data were analyzed. The younger participants in the normal cluster could only change to a worse cluster if they changed membership, and the older adolescents in the deviant cluster could only change to a better cluster if they changed clusters. While age is certainly an issue in terms of the progression or remission of problem behaviors, our findings suggest that it is not the strongest predictor. However, as only youth in grades 7–11 were assessed at Time 1, the older participants in this study were still largely in adolescence. Longitudinal data about their behaviors for several additional years are needed to better capture the relationships between these phenomena.

Limitations

This was an analysis of existing data and the questions posed to adolescents and their parents could not be controlled. Thus, for example, the presence of attention and/or learning problems in

the sample was identified by only one item on the parent questionnaire. While single-item measures have been reported to be useful in nursing research (Youngblut & Casper, 1993), they have also been found unreliable and poorly correlated with multiple-item measures (Krieger, Smith, Naishadham, Hartman, & Barbeau, 2005). Thus, the nature of this item limits the validity of the findings reported here. The question posed to parents asked not only about attention problems, but also about various other learning difficulties. Thus, when parents responded to this question they could have been responding affirmatively about their child having attention problems or any of the other learning disabilities. While the Add Health database is a rich source of information about many aspects of adolescent development, any time a study designed for another purpose is used to answer questions for which it was not intended, limitations exist. Thus, the findings of this study are necessarily preliminary.

One must be cautious when converting continuous data to categories as we did when examining the effect of self-esteem on problem behavior development. With a procedure such as this that results in categories having unequal cell sizes, the result may be that self-esteem is correlated with other variables simply as an artifact of the unequal cell sizes (personal communication, anonymous reviewer, May 18, 2006). That is why we did not categorize data for any of our major analyses (logistic regression) but rather used the continuous variables. We only categorized the self-esteem variable for the limited purpose of identifying curvilinear effects that cannot be identified using the linear analysis of logistic regression and to aid in the interpretation of our findings. We also categorized a few other variables for the limited purpose of identifying the nature of interactions. All of these limited categorizations were statistically appropriate and did not distort our data.

CONCLUSIONS

All of the risk and protective factors and demographic variables examined in this study were related to problem behavior cluster. These results add to the understanding of the very complex issues associated with problem behavior development, exacerbation, and remission.

Because AD/HD is a childhood disorder that has been associated with more severe disruptive behavior disorders (Jensen et al., 1997), even preliminary findings about how it might more specifically affect adolescents is important information that will guide future work in this area. Numbers of peer friendship nominations is a very preliminary step toward understanding the effects of peer relationships on adolescent behavior. However, because peer relationships are so important in an adolescent's development, and because counting friendship nominations is a recognized and psychometrically sound technique (Degirmencioglu, Urberg, Tolson, & Richard, 1998; Gest, Graham-Bermann, & Hartup, 2001; Mouttapa, Valente, Gallaher, Rohrbach, & Unger, 2004; Rubin, Wojslawowicz, Rose-Krasnor, Booth-LaForce, & Burgess, 2006), this is an important first step that will guide future work.

Although we did not examine interactions between various risk and protective factors, some findings suggest that this would be an important area for future inquiry. For example, learning how self-esteem interacts with paternal and maternal support would be useful for intervening to prevent or reduce the severity of problem behaviors in adolescents.

Several issues are important to consider when intervening to prevent or reduce the severity of problem behaviors in adolescents. The findings suggest that it is girls who are in need of self-esteem enhancement. If our interpretation of the findings about the relationship of self-esteem in boys to problem behavior development is correct, providing self-esteem building exercises to boys might actually increase their risk for problem behaviors. Also, parents need information about their role and the role of peers in their child's successful navigation of this challenging developmental period.

The findings point to the need for new approaches to the prevention of problem behaviors and improvements for those already manifesting problem behaviors. Flay (2002), in a review and commentary article, suggests that all behaviors are highly correlated with each other and proposes that for interventions to be successful, they must be comprehensive (including families, schools, and communities and continuing over time), they must be coherent (of sufficient length and intensity, and developmentally appropriate for the audience), and they must be integrated (with family, school, and community and across development). The findings of the current study contribute evidence on the role of specific risk and protective factors in problem behaviors in adolescents that could be included in the development of such intervention programs.

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