

Prospective Relations Between Organized Activity Participation and Psychopathology During Adolescence

Amy M. Bohnert · Judy Garber

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Abstract This longitudinal study examined psychopathology as a predictor and outcome of organized activity involvement during high school among 198 adolescents who varied in risk for psychopathology as a function of their mother's depression history. Higher levels of internalizing and externalizing symptoms in eighth grade significantly predicted lower levels of involvement in academic clubs during high school, over and above risk and SES. Tobacco use prior to high school predicted lower levels of involvement overall and in academic clubs and performance arts. Controlling for psychopathology prior to high school, higher levels of activity involvement were associated with lower levels of externalizing symptoms, less tobacco use, and fewer diagnoses of behavior disorders and substance abuse in 12th grade. The positive association between risk and adolescent psychopathology was not buffered by adolescent activity involvement. Overall, these findings suggest that involvement in organized activities may contribute to lower levels of externalizing psychopathology during high school even when controlling for prior psychopathology.

Keywords Organized activities · Externalizing psychopathology · Internalizing psychopathology · Substance use · Adolescence

A growing body of research suggests that extracurricular activity involvement during adolescence is associated with fewer adjustment problems. These findings are consistent with the view that activity involvement may protect against psychopathology, although it is not possible to determine from such covariation whether benefits are accrued through involvement, if youth who choose to participate are better adjusted than those who do not participate (see Darling 2005; Eccles and Barber 1999; Fredricks and Eccles 2006b; McHale et al. 2001 for exceptions), or if some third variable (e.g., SES) accounts for both. The current prospective study sought to provide greater clarity about associations between activities and psychopathology during adolescence. To increase the variability in levels of adolescent psychopathology, we examined these relations in a community sample of adolescents who differed regarding their risk for psychopathology as a function of their mothers' histories of depression.

Participation in organized extracurricular activities has been found to be significantly associated with fewer problem behaviors related to externalizing problems such as delinquency and alcohol and marijuana use (e.g., Barber et al. 2001; Darling 2005; Eccles and Barber 1999; Hanks and Eckland 1976; Youniss et al. 1997). Mahoney (2000) reported that involvement in school-based extracurricular activities during grades 6 through 10 predicted reduced rates of criminal arrests during early adulthood, particularly among those who were at high risk for criminal behavior. School-based extracurricular activity involvement both prior to and during high school also was inversely associated with school dropout, particularly for those who were at increased risk for early dropout in middle school (Mahoney and Cairns 1997).

In contrast to externalizing problems, less is known about relations between activity involvement and internal-

A. M. Bohnert (✉)
Department of Psychology, Loyola University-Chicago,
6525 N. Sheridan Rd,
Chicago, IL 60626, USA
e-mail: abohner@luc.edu

J. Garber
Vanderbilt University,
Nashville, TN 37240, USA

izing symptoms, and what has been found is mixed. For example, whereas one recent cross-sectional study reported no significant relation between internalizing and activity involvement during middle childhood (Fletcher et al. 2003), another cross-sectional study of adolescents showed that involvement in activities was associated with lower levels of depressed mood (Mahoney et al. 2002). In one of the few longitudinal studies, Darling (2005) found no relation between involvement in school-based activities and depressive symptoms when prior depressive symptoms were controlled.

The relation between involvement and symptoms appears to vary, however, depending on the type of activity. In two longitudinal studies following the same cohort, relations between 10th grade activity involvement and adjustment in 12th grade (Eccles and Barber 1999) and at age 24 were examined (Barber et al. 2001). Involvement in prosocial activities (defined as church attendance and/or involvement in volunteer and community service activities) during 10th grade was associated with fewer problem behaviors and less drug and alcohol use in 12th grade (Eccles and Barber 1999), and lower rates of alcohol use and higher self-esteem at age 24 (Barber et al. 2001). Participation in 10th grade performance arts, however, was associated with higher rates of suicide attempts and visits to a psychologist by 24 years of age (Barber et al. 2001). A recent study of predominately African American youth found that participation in school clubs was associated with decreased externalizing symptoms for all participants, although involvement predicted lower alcohol and marijuana use only for boys. None of these effects were maintained one year post-high school, however. Contrary to expectation, involvement in prosocial activities was not associated with any form of psychopathology (Fredricks and Eccles 2006b).

The majority of research on particular types of involvement has focused on sports, where the relation between participation and outcomes has been mixed. In one longitudinal study, McHale et al. (2001) reported that sports involvement was associated with lower levels of depressive symptoms during childhood, although this relation was not significant once prior depressive symptoms were controlled. Fredricks and Eccles (2006b) found that sports participation predicted fewer self-reported depressive symptoms, fewer parent-reported internalizing symptoms, and lower alcohol use in 11th grade. Sports involvement, however, was associated with fewer parent-reported externalizing symptoms and lower marijuana use only for boys (Fredricks and Eccles 2006b). In another longitudinal study, involvement in team sports during adolescence predicted higher levels of alcohol consumption in 10th grade (Eccles and Barber 1999) and at age 24 (Barber et al. 2001).

In a study of patterns of sports involvement, Rodriguez and Audrain-McGovern (2004) found that decreasing or

erratic participation in sports during high school was associated with increased likelihood of smoking. In contrast, another study found that involvement in school sports was not related to alcohol consumption, but was associated with lower rates of cigarette smoking and illegal drug use (Page et al. 1998). Thus, organized activity participation is a heterogeneous construct that may relate differently to adolescent outcomes. One goal of the present study was to examine the relation between participation in specific types of activities to both externalizing and internalizing symptoms as well as diagnosed disorders and tobacco use.

Despite an accumulating body of research showing a significant link between activity involvement and psychopathology, several important gaps in this literature limit what can be concluded about the direction of this relation. First, despite the longitudinal nature of some of these studies, only a few have controlled for prior problem behaviors when predicting subsequent behaviors (i.e., Eccles and Barber 1999; Fredricks and Eccles 2006b; McHale et al. 2001). Thus, the extent to which activity involvement increments the prediction of adolescent symptoms beyond the level of existing problems is not entirely clear. Second, adolescents' psychopathology has most commonly been assessed using brief checklists or self-report items, rather than well-validated measures of symptoms and diagnoses (e.g., CBCL, diagnostic interviews, respectively). Therefore, the present study examined the relation between activity involvement and adolescent symptoms and disorders with psychometrically sound measures of both and controlling for prior psychopathology.

Third, only a few studies have examined curvilinear relations between activity participation and psychopathology in order to examine possible adverse effects on youth of very high levels of activity involvement (see Fredricks and Eccles 2006a; Luthar et al. 2006; Mahoney et al. 2006). Contrary to popular belief about the detriments of overscheduling, only a few studies have shown that very high levels of involvement puts youth at risk for psychopathology. For example, in a sample of high SES middle school youth, girls with very high activity involvement were more likely to exhibit excessive substance use as compared with those who were involved in medium and low levels of activity (Luthar et al. 2006). Mahoney et al. (2006) compared adolescents who were involved in very high rates of activities (i.e., 20 or more hours per week) with those with no involvement, and found there was no greater risk of psychopathology associated with very high rates of participation. Fredricks and Eccles (2006a) showed that participating in a greater number of activities was associated with higher rates of delinquency only for older adolescents. The present study expands on this literature by examining curvilinear relations between activities and psychopathology

in an at-risk sample while controlling for prior symptoms and diagnoses.

Another goal of this study was to explore whether participation in organized activities buffered the relation between maternal depression and adolescent psychopathology. Offspring of depressed mothers are at increased risk for psychopathology (Beardslee et al. 1998; Goodman and Gotlib 1999; Hammen and Brennan 2001). Beardslee and Podorefsky (1988) suggested that high-risk offspring benefit from being involved in extracurricular activities because this serves to focus their attention more on their own development and less on caring for their depressed parent. The current study tested whether activity involvement buffered the relation between risk (maternal depression history) and adolescents' internalizing and externalizing psychopathology.

Finally, the present study examined whether psychopathology during the middle school years predicted level of activity involvement during high school. The importance of adolescents' individual characteristics in predicting activity choices has been highlighted in the expectancy-value model of Eccles et al. (1983), although few empirical studies have considered how prior adjustment may influence youth's participation. Posner and Vandell (1999) reported that children who were less emotionally adjusted in third grade spent less time in after-school extracurricular activities in fifth grade. McHale et al. (2001) found a negative association between depressive symptoms at age ten and time spent in sports at age twelve. These studies suggest that better adjusted children become more involved in adaptive activities. Another study, however, found little evidence that prior levels of aggressive behavior predicted school-based extracurricular involvement during high school (Mahoney 2000), although aggression was assessed several years prior to high school. The final aim of the current study was to examine whether psychopathology prior to high school predicted involvement in organized activities during high school, and if so, which types of psychopathology are most predictive.

In summary, the present study addressed the following questions. First, do greater levels of activity involvement during high school predict lower levels of psychopathology at both the symptom and diagnostic level using well-validated measures, above and beyond prior levels of psychopathology? Second, is there a curvilinear relation between activity involvement and psychopathology suggesting that the benefits of activity involvement may diminish at higher levels of involvement? Third, do different types of activities (e.g., sports, prosocial, academic clubs) predict lower levels of externalizing and internalizing symptoms and disorders? Fourth, does activity involvement buffer the relation between maternal depression history (i.e., risk) and adolescent psychopathology? Finally, to what

extent does psychopathology during middle school predict involvement in organized activities during high school?

Method

Participants

Participants were 198 adolescents (85 males, 113 females) who were part of a larger longitudinal study examining risk and psychopathology. The original sample consisted of 240 mothers and children who were first assessed when they were in sixth grade (Mean age=11.86 years; SD=0.57). The sample was racially representative of the surrounding metropolitan area (i.e., 82% Caucasian, 15% African-American, and 3% Hispanic, Asian, or Native American) and was predominantly lower-middle to middle class (Mean SES=41.84, SD=13.25; Hollingshead 1975). Forty two adolescents in the original sample did not complete the activity measure and therefore were not included in these analyses. The analytic sample was similar to the original sample in terms of demographics including race (i.e., 83% Caucasian, 14% African-American, and 3% Hispanic, Asian, or Native American), and SES (Mean SES=42.61, SD=13.28; Hollingshead 1975).

Procedure

Using a high-risk research design similar to that of Hammen (1991), and Radke-Yarrow (1998), mothers with histories of depression were over-sampled in order to obtain greater variation in adolescents' psychopathology. Parents of fifth grade children from metropolitan public schools were invited to participate in a study about parents and children. A brief health history questionnaire composed of 24 medical conditions (e.g., cancer, heart disease, depression) and 34 medications (e.g., Prozac, Elavil, Valium) was sent with a letter describing the project to over 3,500 families. Of the 1,495 mothers who indicated an interest in participating, the 587 who had endorsed either a history of depression, use of antidepressants, or no history of psychopathology were screened further by telephone. The remaining families were excluded because the mother did not indicate depression, reported only nonaffective psychiatric disorders, or indicated other kinds of serious health problems (e.g., cancer, multiple sclerosis). On the basis of the screening calls of the 587 families, 349 had mothers who reported either a history of depression or no history of psychiatric problems. The 238 families not further screened were excluded because they did not indicate sufficient symptoms to meet criteria for a depressive disorder (38%), had other psychiatric disorders that did not also include a depressive disorder (19%), they or the target child had a

serious medical condition (14%), were no longer interested (21%), the target child either was in the wrong grade or was in special education (6%), or the family had moved out of the area (2%). The Structured Clinical Interview for DSM diagnoses (SCID; Spitzer et al. 1990) then was conducted with the 349 mothers who had indicated that they had had a history of some depression or had had no psychiatric problems. Based on the SCID, 185 mothers (high risk) indicating a history of a mood disorder (e.g., Major Depressive Disorder, Dysthymia) and 55 reporting no lifetime history of a psychiatric disorder (low-risk) were retained in the sample. Forty two of the original 240 participants had missing or incomplete data on the measures of interest in this study and therefore were excluded. The final analytic sample in the current study consisted of 198 families (146 high risk; 52 low risk).

A research assistant who was unaware of the mothers' psychiatric history individually administered a battery of questionnaires separately to each mother and adolescent. Adolescents were first assessed when they were in sixth grade and re-evaluated annually through 12th grade. At each assessment, families were compensated \$100 for their time. Only those measures relevant to the current study are described here.

Measures

Maternal Depression Mothers were interviewed with the Structured Clinical Interview for DSM diagnoses (SCID; Spitzer et al. 1990), a widely-used, semi-structured diagnostic interview that assesses current and previous episodes of psychopathology according to DSM criteria (American Psychiatric Association 1987, 1994). Interviews were audio taped, and inter-rater reliability was calculated on a random subset of 20% of these interviews. Agreement was 94% ($\kappa=.88$) for diagnoses of depressive disorders.

Socioeconomic Status (SES) was calculated using the Four Factor Index of Social Status (Hollingshead 1975). To calculate the SES score of a household, scale values for occupation (range from 1 to 9) and for education (range from 1 to 7) were multiplied by factor weights of 5 and 3, respectively. These two products then were summed. When calculating the household SES, adjustments were made for marital status and related factors (e.g., receipt of child-support or alimony payments from an absent spouse) as outlined in Hollingshead (1975).

The Adolescent Activity Involvement Inventory (AII), developed for this study, is a checklist that assesses adolescents' involvement in school and community-based

activities during high school.¹ The AII was administered separately to mothers and adolescents at the end of 12th grade. Respondents indicated in which activities the adolescent had participated during each grade (i.e., 9th, 10th, 11th, 12th). For each high school year, adolescents received a score of 1 (participation) or 0 (no participation) with regard to each listed activity (e.g., sports at school, sports in community, drama, church/religious activities, community service, etc.). An activity endorsed by either the mother or adolescent was counted as participation. This method of combining parent and child information is consistent with the approach used by other developmental psychopathology researchers (e.g., Achenbach et al. 1987; De Los Reyes and Kazdin 2005; Hart et al. 1994). Mothers' and adolescents' reports of adolescents' activity involvement were significantly correlated ($r=0.59$, $p<0.001$).

Two indices of activity involvement were calculated. First, the mean number of activities in which adolescents participated each school year was used as an overall index of activity involvement during high school. This index (range 0–9.75) was calculated by dividing the total number of activities in which adolescents were involved during grades 9 through 12 by the number of years that they were enrolled in school during that time (i.e., 1 to 4 years). Second, similar to other measures of extracurricular participation (e.g., Eccles and Barber 1999), activities listed on the AII were collapsed into seven mutually exclusive and exhaustive pre-determined categories including sports (e.g., both individual and team), performance/fine arts (e.g., dance, orchestra, drama), prosocial (e.g., volunteer organizations, church groups), academic clubs (e.g., debate, honors society), school involvement (pep club; cheerleading), press (e.g., yearbook, school newspaper), and leadership (e.g., student government, Scouts). For activities that qualified for multiple categories (e.g., church choir), grouping was guided by the predominant task associated with that activity (e.g., singing). For each category, the mean number of activities in which adolescents participated each school year was calculated by dividing the total number of activities within each category in which adolescents were involved during grades 9 through 12 by the number of years that they were enrolled in high school (i.e., 1 to 4 years).

Internalizing and Externalizing Symptoms The Child Behavior Checklist (CBCL; Achenbach 1991) completed by mothers when children were in eighth grade and again at the end of 12th grade was used to assess the broad-band factors of internalizing and externalizing symptoms. The CBCL consists of 113 items scored on a 3-point scale (0 = not true, 1 = somewhat or sometimes true, and 2 = very or often true). The internalizing scale measures symptoms of depression/anxiety, withdrawal, and somatic complaints; the externaliz-

¹ The AII is available from the first author upon request.

ing scale measures aggression and delinquency. Coefficient alphas in this sample ranged from 0.90 (Internalizing scale) to 0.93 (Externalizing scale).

Adolescent Psychiatric Diagnoses and Tobacco Use At the first assessment (i.e., sixth grade), the Schedule for Affective Disorders and Schizophrenia for School-Age Children—Present and Lifetime Version (K-SADS-PL; Kaufman et al. 1997), a semi-structured diagnostic interview was administered to parents and adolescents to ascertain information regarding lifetime and current tobacco use and psychiatric disorders according to DSM criteria (American Psychiatric Association 1987, 1994). At each data collection after sixth grade, the Longitudinal Interval Follow-up Evaluation (LIFE; Keller et al. 1987) was used to assess the development of new disorders and recovery from previous conditions. A random subset of the audio-taped interviews (25%) was used to assess inter-rater reliability. There was 86% agreement on diagnoses ($k_{appas} \geq 0.72$).

Information from the LIFE interviews from sixth through eighth grade and at the end of 12th grade was used in the present study. Disorders were grouped as follows: mood disorders (e.g., major depression, dysthymia), anxiety disorders (e.g., generalized anxiety, separation anxiety, panic, phobias), behavior disorders (i.e., oppositional, conduct, attention deficit disorders), substance (i.e., alcohol, drugs) abuse and dependence, and tobacco use. For each of these categories, adolescents received a score of 1 (presence of a threshold diagnosis within the category) or 0 (no threshold diagnosis within the category). Diagnoses were collapsed across sixth through eighth grade, such that scores in each category reflected the presence of a threshold diagnosis at any time prior to ninth grade.

Results

Descriptive Statistics and Correlations

Examination of the descriptive statistics for the activity categories indicated that all but two (i.e., prosocial activities and academic clubs) of the seven categories were significantly skewed. Following square root transformations, two additional categories (i.e., sports and performance arts) were appropriate for further analyses. This type of transformation is recommended when data are in the form of counts and values are small (Howell 1992). Participation in three of the activity categories (i.e., press, leadership, and school involvement) was very low ranging from 0.05 to 0.12 activities per year. As a result, these categories were still significantly skewed after being transformed, and were not included in subsequent analyses. Thus, only overall level of activity involvement and four activity categories

were used (i.e., sports, performance, prosocial, and academic activities).

Means, standard deviations, and correlations for study variables are presented in Table 1. Overall, the majority of adolescents participated in some form of extracurricular activities. Gender differences in mean levels of overall activity involvement were not significant. However, boys participated in a significantly greater number of sports [$t(196)=2.8, p<0.01$], whereas girls participated in more performance arts activities [$t(196)=-2.9, p<0.01$]. High risk adolescents (i.e., offspring of mothers with a history of depression) participated in significantly fewer overall activities, sports, prosocial, and academic activities than low risk youth (see Table 2).

As shown in Table 3, the number of participants meeting criteria for each of the psychiatric disorders and tobacco use increased across the study period. Boys were more likely than girls to have a behavior disorder diagnosis prior to ninth grade [$\chi^2(1)=10.94, p<0.01$], and a substance abuse/dependence diagnosis in 12th grade [$\chi^2(1)=4.30, p<0.05$]. High risk adolescents were more likely than low risk youth to be diagnosed with a mood and behavior disorder prior to ninth grade. By the end of 12th grade, high-risk adolescents were significantly more likely than low-risk youth to be diagnosed with all four types of psychiatric disorders, but did not exhibit higher levels of tobacco use (see Table 3).

Does Organized Activity Involvement Predict Externalizing and Internalizing Symptoms?

To test whether levels of activity participation during high school predicted 12th grade symptoms after controlling for eighth grade symptoms, a series of regression analyses were conducted. In each analysis, 12th grade symptom scores were regressed onto activity involvement scores, after first entering SES, risk, and eighth grade symptom scores. As shown in Table 4, lower levels of SES and high risk status were associated with higher levels of 12th grade externalizing symptoms. Higher levels of symptoms in eighth grade were associated with higher levels of 12th grade symptoms. Overall mean level of high school activity involvement significantly predicted 12th grade externalizing symptoms, indicating that lower activity involvement predicted higher levels of externalizing symptoms, even after controlling for prior levels of symptoms. High risk status and high levels of eighth grade internalizing symptoms were associated with higher levels of 12th grade internalizing symptoms. Mean level of activity involvement did not significantly predict internalizing symptoms in 12th grade after controlling for eighth grade internalizing symptoms (see Table 4).

In addition to linear effects, we also considered whether number of activities per year during high school had

Table 1 Descriptive information and correlations among variables

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	
1. SES	–																						
2. Risk ^a	-0.30**	–																					
3. Gender ^a	-0.00	r.11	–																				
4. CBCL-externalizing (8th)	-0.26**	0.37**	-0.18*	–																			
5. CBCL-internalizing (8th)	-0.18*	0.23**	-0.14	0.60**	–																		
6. CBCL-externalizing (12th)	-0.25**	0.32**	0.02	0.54**	0.33**	–																	
7. CBCL-internalizing (12th)	-0.17*	0.31**	0.01	0.39**	0.42**	0.69**	–																
8. Activities (9–12th)	-0.18*	-0.29**	0.08	-0.22**	-0.12	-0.30**	-0.22**	–															
9. Sports	-0.04	-0.27**	-0.18*	-0.04	-0.03	-0.21**	-0.17*	0.59**	–														
10. Performance	-0.09	-0.08	0.21**	-0.18*	-0.04	-0.16*	-0.10	0.70**	0.10	–													
11. Prosocial	-0.24**	-0.28*	0.15*	-0.23**	-0.07	-0.29**	-0.21**	0.73**	0.26**	0.48**	–												
12. Academic	-0.22**	-0.19**	-0.19**	-0.28**	-0.26**	-0.24**	-0.23**	0.54**	0.27**	0.28**	0.36**	–											
13. Mood disorders (8th) ^a	0.04	0.30***	0.01	0.29***	0.27***	0.22**	0.16*	-0.17*	-0.15*	-0.02	-0.11	0.22**	–										
14. Anxiety disorders (8th) ^a	-0.08	0.08	-0.02	0.11	0.13	0.10	0.05	0.01	0.00	-0.03	-0.04	0.01	0.16*	–									
15. Behavior disorders (8th) ^a	-0.01	0.15*	-0.27***	0.40***	0.24**	0.22**	0.10	-0.12	-0.02	-0.06	-0.13	-0.07	0.18**	0.16*	–								
16. Substance abuse (8th) ^a	0.03	0.05	-0.11	0.16*	0.00	-0.08	-0.08	-0.16*	-0.11	-0.12	-0.10	-0.10	0.06	-0.02	0.34***	–							
17. Tobacco use (8th) ^a	-0.12	0.13	0.02	0.22**	0.06	0.15*	0.10	-0.27***	-0.17*	-0.20**	-0.17*	-0.20**	0.11	-0.06	0.16*	0.19**	–						
18. Mood disorders (12th) ^a	-0.04	0.29***	0.08	0.25**	0.21**	0.42***	0.43***	-0.21**	-0.19*	-0.08	-0.19**	-0.12	0.15*	0.11	0.25**	-0.07	-0.03	–					
19. Anxiety disorders (12th) ^a	-0.08	0.15*	0.10	0.11	0.16*	0.16*	0.26***	0.10	-0.02	0.13	0.08	0.08	0.14	0.14	0.13	-0.03	-0.06	0.26***	–				
20. Behavior disorders (12th) ^a	-0.11	0.19**	0.01	0.25**	0.04	0.39***	0.22**	-0.22**	-0.12	-0.08	-0.16*	-0.15*	0.13	0.00	0.23**	-0.03	0.27***	0.33***	0.06	–			
21. Substance abuse (12th) ^a	-0.08	0.16*	-0.13	0.26**	0.09	0.36***	0.22**	-0.39***	-0.21**	-0.25***	-0.30***	-0.35***	0.08	0.07	0.18*	0.22**	0.19**	0.27***	-0.01	0.42***	–		
22. Tobacco use (12th) ^a	-0.15*	0.12	-0.03	0.11	0.04	0.22**	0.12	-0.26***	-0.17*	-0.21**	-0.22**	-0.11	0.15*	0.04	0.09	-0.04	0.19**	0.33***	0.01	0.15*	0.37***	–	
Mean	42.61	0.74 ^b	0.57 ^b	48.88	48.94	45.46	47.04	2.87	0.67	0.68	0.63	0.38	0.23 ^b	0.05 ^b	0.06 ^b	0.05 ^b	0.01 ^b	0.06 ^b	0.00 ^b	0.00 ^b	0.08 ^b	0.08 ^b	0.08 ^b
Standard deviation	13.28	NA	NA	10.81	9.51	11.78	11.94	2.36	0.65	0.63	0.73	0.42	NA										
Range	6–66	NA	NA	32–75	31–78	32–80	1–82	0–9.75	0–2.06	0–2.45	0–3	0–1	NA										

Risk: 0 = no maternal depression history; 1 = maternal depression history; Gender: 0 = male; 1 = female

CBCL Child Behavior Checklist

^a Spearman rank-order correlations

^b Percent (dichotomous variable)

* $p < 0.05$

** $p < 0.01$

*** $p < 0.001$

Table 2 Means and standard deviations of activity involvement in grades 9 through 12 by risk and adolescent gender

Risk group	Overall activities <i>M</i> (SD)	Sports <i>M</i> (SD)	Performance arts <i>M</i> (SD)	Prosocial <i>M</i> (SD)	Academic <i>M</i> (SD)
High risk (<i>n</i> =146)					
Girls (<i>n</i> =88)	2.66 (2.15)	0.52 (0.57)	0.73 (0.61)	0.59 (0.67)	0.35 (0.41)
Boys (<i>n</i> =58)	2.09 (2.07)	0.61 (0.65)	0.53 (0.58)	0.37 (0.66)	0.30 (0.40)
Low risk (<i>n</i> =52)					
Girls (<i>n</i> =25)	4.05 (2.34)	0.67 (0.63)	1.00 (0.64)	1.07(0.76)	0.57 (0.44)
Boys (<i>n</i> =27)	4.12 (2.79)	1.24 (0.65)	0.56 (0.67)	0.88 (0.79)	0.45 (0.43)

curvilinear links with 12th grade externalizing and internalizing symptoms. To do so, regression analyses were used with activities scores entered as a main effect and then as a centered, quadratic term after accounting for SES, risk, and eighth grade symptom scores. By examining quadratic effects, it is possible to determine whether there are negative effects on symptoms at highest levels of participation (i.e., over-scheduling hypothesis). In both regression analyses, the quadratic term was not significant, indicating there were no curvilinear trends between activity involvement and symptoms.

The contribution of participating in particular activities during high school on 12th grade symptoms was examined next. For these analyses, the four categories of activity involvement (i.e., sports, performance arts, prosocial, and academic activities) were entered simultaneously in the final step of the hierarchical regression equation. Neither the final step of the equation nor any of the specific activity categories significantly predicted 12th grade externalizing or internalizing symptoms after controlling for eighth grade symptom levels.

Table 3 Percent of adolescents meeting criteria for psychiatric diagnoses and tobacco use

Category	8th grade			12th grade		
	High risk (%)	Low risk (%)	$\chi^2(1)$	High risk (%)	Low risk (%)	$\chi^2(1)$
Mood disorders	27	0	18.38***	36	6	15.98***
Anxiety disorders	7	2	0.94	8	0	4.54*
Behavior disorders	10	0	3.84*	13	0	7.48**
Substance abuse	1	0	0.66	23	8	5.21*
Tobacco use	7	0	3.47	18	8	2.40

**p*<0.05
 ***p*<0.01
 ****p*<0.001

Does Organized Activity Involvement Predict Psychiatric Diagnoses and Tobacco Use?

To test whether high school activity involvement predicted diagnoses and tobacco use in 12th grade, a series of logistic regressions was calculated. In all analyses, SES and risk were first entered in a block, and diagnoses or tobacco use prior to ninth grade were entered in the second step predicting each of the four disorders and tobacco use. Risk was a significant predictor of mood disorders and substance abuse diagnoses in 12th grade (see Table 5). Diagnoses prior to ninth grade predicted behavior disorders in 12th grade. The addition of activity involvement on the third step resulted in a significant incremental improvement in the fit of the model predicting 12th grade behavior disorders, substance abuse disorders, and tobacco use, and a nonsignificant trend for activity involvement to predict 12th grade mood disorders and anxiety disorders (see Table 5). For each of the significant logistic regression models, lower overall levels of activity involvement were associated with increased odds of having a behavior and substance use disorder, and increased tobacco use, over and above SES, risk, and diagnoses prior to ninth grade. As the number of activities decreased by one per year, the odds of having a behavior disorder increased by a factor of 0.71, the odds of having a substance use disorder increased by a factor of 0.57, and the odds of using tobacco increased by a factor of 0.76.

In addition to linear effects, we also considered whether number of activities per year during high school had curvilinear links with 12th grade diagnoses and tobacco use. In these logistic regression analyses, activities was entered as a main effect and then as a centered, quadratic term after accounting for SES, risk, and diagnoses or tobacco use prior to ninth grade. In all of the analyses, the quadratic term was not significant suggesting there were no curvilinear trends between activity involvement and psychiatric diagnoses or tobacco use.

The contribution of participating in particular activities during high school on 12th grade diagnoses and tobacco use also was examined. For these analyses, the four categories of activity involvement (i.e., sports, performance arts, social, and academic activities) were entered simultaneously in the

Table 4 Predicting 12th grade symptoms from mean levels of activity involvement during high school

Symptoms								
CBCL externalizing symptoms								
Step	Predictors	B	SE B	β	Adjusted R ²	R ² change		
1	SES	-0.15	0.07	-0.16*	0.11	0.12***		
	Risk	6.51	2.0	0.26**				
2	8th grade externalizing Sxs	0.53	0.08	0.48***			0.30	0.19***
3	Activities 9–12th grade	-0.80	0.35	-0.16*			0.32	0.02*
4	Risk X activities	-0.86	0.71	-0.43	0.32	0.01		
CBCL internalizing symptoms								
1	SES	0.00	0.07	-0.08	0.10	0.11***		
	Risk	7.51	2.1	0.29**				
2	8th grade internalizing Sxs	0.46	0.09	0.37***			0.22	0.13***
3	Activities 9–12th grade	-0.67	0.38	-0.13			0.23	0.02
4	Risk X activities	-0.60	0.77	-0.30	0.23	0.00		

Risk: 0 = no maternal depression history; 1 = maternal depression history

CBCL Child Behavior Checklist, SES Socioeconomic Status, Sxs symptoms

* $p < 0.05$

** $p < 0.01$

*** $p < 0.001$

final step of the regression equation. Controlling for SES, risk, and prior disorders, the addition of the specific activity categories significantly predicted substance abuse disorders in 12th grade [$\chi^2(4)=29.1, p < 0.001$]. Lower involvement in academic activities in grades 9 to 12 significantly predicted substance abuse disorders in 12th grade (standardized $\beta = -2.5; p < 0.01$). The addition of the other activity categories did not significantly predict the other diagnostic categories or tobacco use.

Does Activity Involvement Buffer the Relation between Risk and Adolescent Psychopathology?

We examined whether activity involvement buffered the relation between risk (i.e., maternal depression history) and subsequent psychopathology in the adolescents. Controlling for SES, interactions between risk and overall level of activity involvement in the prediction of adolescent symptoms and disorders were examined. Hierarchical regressions analyses showed that the relations between risk and internalizing and externalizing symptoms were not moderated by overall activity involvement (see Table 3). In addition, activities did not moderate the relation between risk and psychiatric diagnoses and tobacco use in 12th grade (see Table 5).

Do Symptoms, Psychiatric Diagnoses and Tobacco Use Predict Activity Involvement?

To determine whether eighth grade levels of symptoms incremented the prediction of activity participation during high school beyond SES and risk, hierarchical regression analyses were conducted. Results indicated that higher

levels of externalizing ($\Delta R^2 = 0.04, p < 0.05$) and internalizing symptoms ($\Delta R^2 = 0.04, p < 0.01$) in eighth grade significantly predicted less participation in academic clubs during high school. Eighth grade externalizing and internalizing symptoms did not significantly predict overall activity involvement, prosocial, sports, or performance arts involvement during high school.

Hierarchical regression analyses controlling for SES and risk also were conducted to examine whether psychiatric diagnoses or tobacco use prior to high school predicted high school activity participation. Results indicated that tobacco use prior to ninth grade significantly predicted less overall activity involvement ($\Delta R^2 = 0.03, p < 0.01$) and less involvement in academic ($\Delta R^2 = 0.03, p < 0.05$) and performance arts activities ($\Delta R^2 = 0.03, p < 0.05$) during high school. No psychiatric diagnosis prior to high school predicted level of activity participation during high school.

Discussion

The present longitudinal study examined the temporal relations between organized activity involvement and externalizing and internalizing problems in a sample of adolescents who varied in their risk for psychopathology. Results indicated that less involvement in activities during high school was related to higher levels of subsequent externalizing problems. That is, higher levels of activity involvement during high school significantly predicted lower levels of both externalizing symptoms and disorders. With regard to diagnoses in particular, more involvement in activities during high school was associated with signifi-

Table 5 Predicting psychiatric diagnoses and tobacco use in 12th grade from mean levels of activity involvement during high school

Disorders				
Mood disorders				
Step	Predictors	OR	Wald χ^2	$\Delta\chi^2$ for step
1	SES	1.01	0.69	
	Risk	13.51	11.73**	21.65***
2	Mood disorders (8th)	1.49	1.02	1.01
3	Activities 9–12th grade	0.86	3.00	3.16
4	Risk X activities	1.00	0.06	0.06
Anxiety disorders				
1	SES	0.00	1.02	
	Risk	0.00	0.00	7.66*
2	Anxiety disorders (8th)	3.99	2.36	1.96
3	Activities 9–12th grade	1.32	3.55	3.51
4	Risk X activities	1.03	0.38	0.45
Behavior disorders				
1	SES	0.98	1.25	
	Risk	0.00	0.00	12.39***
2	Behavior disorders (8th)	4.71	4.94*	4.34*
3	Activities 9–12th grade	0.71	4.43*	5.63*
4	Risk X activities	0.97	0.71	0.58
Substance use disorders				
1	SES	0.99	0.74	
	Risk	5.76	5.26*	10.59**
2	Substance use (8th)	0.00	0.00	6.36*
3	Activities 9–12th grade	0.57	13.67***	20.02***
4	Risk X activities	0.99	0.07	0.07
Tobacco use				
1	SES	0.97	2.29	
	Risk	3.58	2.73	7.85*
2	Tobacco use (8th)	2.89	1.86	1.69
3	Activities 9–12th grade	0.76	4.30*	5.00*
4	Risk X activities	1.00	0.01	0.01

Risk: 0 = no maternal depression history; 1 = maternal depression history

SES Socioeconomic Status, OR odds ratio

* $p < 0.05$

** $p < 0.01$

*** $p < 0.001$

cantly lower odds of behavior and substance use disorders, and tobacco use at the end of high school.

The finding that activities predicted lower levels of externalizing psychopathology is consistent with results reported in previous research (e.g., Barber et al 2001; Darling 2005; Eccles and Barber 1999; Mahoney 2000). The current investigation expanded on these previous studies by using comprehensive, well-validated measures of psychopathology at both the symptom and diagnostic levels, and by controlling for prior problem behaviors in predicting subsequent psychopathology. Because eighth grade symptoms, diagnoses, and tobacco use were controlled in these analyses, it is possible to conclude that less participation in organized activities during high school contributed over and above prior levels of symptoms to higher levels of externalizing problems at the end of high

school. Thus, despite the considerable stability in externalizing symptoms and disorders over time (e.g., Loeber 1982), levels of involvement in activities predicted additional variance in externalizing symptoms and diagnoses, as well as use of tobacco.

What may account for the link between lower activity involvement and more externalizing problems? Lack of supervision has been shown to be associated with an increased likelihood of conduct problems (Dishion et al. 1996; Osgood et al. 1996). In contrast, the structure and supervision provided by activities limits adolescents' opportunities to engage in more problematic leisure activities (Mahoney and Stattin 2000; Osgood et al. 1996). Rather than being unsupervised during the time between the end of school and when parents come home from work, activity involvement typically provides a safe

and well-monitored environment. Adolescents also may be less likely to engage in disruptive or illegal behaviors if they have something important to lose, such as their place on a team or club.

Organized activities also provide opportunities to associate and form relationships with nondeviant peers (Barber et al. 2001; Eccles and Barber 1999; Mahoney and Stattin 2000). Mahoney (2000) reported that for youth at high risk for antisocial behavior, participation of their peer network in activities was essential to reducing antisocial behavior. In addition, adolescents involved in organized activities have an opportunity to receive mentoring from a caring and supportive adult (e.g., Barber et al. 2005; Eccles and Barber 1999; Fletcher et al. 2000; Mahoney et al. 2002).

Activity involvement also can help to both fuse and reinforce personal identities (Barber et al. 2005; Eccles and Barber 1999), provide adolescents with a sense of pride and accomplishment, teach them respect for others, and help them learn self-regulation and leadership skills (Hansen et al. 2003; McHale et al. 2001). Finally, activities can promote the development of initiative (Larson 2000; Larson et al. 2005). Thus, many explanations for why activities are beneficial have been proposed, although only a few studies have explicitly examined mediators of the relation between activity involvement and externalizing symptoms and disorders (Eccles and Templeton 2002).

To date, few studies also have examined whether adjustment varies at different levels of activity participation. There is a popular notion that today adolescents are “overscheduled” with activities, which then may compromise their adjustment. Several recent studies, however, have reported even at the highest level of participation, most adolescents appear to be well-adjusted (Fredricks and Eccles 2006a; Luthar et al. 2006; Mahoney et al. 2006). Results from this study similarly showed that adolescents who were highly involved in a number of different activities did not show greater levels of maladjustment.

Involvement in particular types of activities did not differentially predict adolescents’ psychopathology. Previous research has shown that youth who participate in sports report drinking alcohol and getting drunk more frequently during high school (Eccles and Barber 2001; Fredricks and Eccles 2006b) and adulthood (Barber et al. 2001), and erratic participation in sports during high school is associated with increased likelihood of smoking (Rodriguez and Audrain-McGovern 2004). The present study, however, did not find that involvement in sports, in particular, significantly predicted substance use disorders or tobacco use. One possible explanation for the different findings may be that whereas alcohol consumption was measured continuously in these prior studies (Eccles and Barber 2001), the current study assessed diagnoses of substance use disorders. Adolescents who are involved with sports may experiment

more with alcohol and tobacco, but may be no more likely than non-sports participants to develop clinical diagnoses of substance use disorders.

Regarding internalizing problems, the relation between involvement in organized activities during high school and internalizing symptoms in 12th grade was marginal. That is, there was a nonsignificant trend for higher levels of activity involvement during high school to be associated with lower levels of internalizing symptoms and mood and anxiety disorders, in 12th grade. To date, only one cross-sectional study has reported a significant relation between depressive symptoms and activity involvement (Mahoney et al. 2002). Mahoney et al., however, did not control for prior symptoms, which is likely to overestimate the relation of activity participation to symptoms (Fredricks and Eccles 2006b; Larson 2000). In fact, one of the few longitudinal investigations to control for prior symptoms reported that school-based activity involvement was not associated with depressive symptoms (Darling 2005). The present study found that activity involvement was marginally associated with lower levels of internalizing symptoms, over and above initial levels of these symptoms. This may have been due, in part, to there being greater variability in internalizing symptoms due to the predominantly high risk nature of the sample.

In addition to examining psychopathology as an outcome, the current study tested the reverse relation. That is, does prior psychopathology predict activity involvement during high school? Results showed that higher levels of both internalizing and externalizing symptoms and tobacco use prior to high school predicted lower levels of involvement in academic clubs, in particular. Tobacco use in eighth grade also significantly predicted lower levels of involvement in overall activities, particularly performance arts and academic clubs. Smoking prior to high school may serve as a marker of other processes (e.g., family environment, peer influences, genetic vulnerability) that predict both lower activity involvement and subsequent externalizing psychopathology. The possibility that experimenting with tobacco keeps adolescents from becoming involved in activities due to interpersonal difficulties, lack of confidence, as well as decreased academic performance, which would prohibit them from participating, should be studied further (Mahoney and Cairns 1997).

A link also has been found between involvement in organized after-school activities and educational outcomes, including lower rates of school dropout (e.g., Mahoney and Cairns 1997; McNeal 1995) and higher school achievement (e.g., Eccles and Barber 1999; Mahoney et al. 2003). Involvement in academic clubs, in particular, may reflect students’ higher educational aspirations. In contrast, psychopathology and tobacco use prior to high school has been found to be associated with both

lower levels of activity involvement and increased risk of poor academic outcomes, including early school dropout (Mahoney and Cairns 1997).

Participants in the current study varied with regard to their risk for psychopathology as a function of their mothers' history of mood disorders. This sampling strategy has both strengths and limitations. An advantage is that it allowed for greater variability in the study constructs, particularly psychopathology. Risk was included in all models as a predictor of psychopathology, and was entered prior to the other variables to account for the fact that offspring of depressed mothers are known to be at increased risk for experiencing depression and as well as other disorders (Beardslee et al. 1998; Goodman and Gotlib 1999; Hammen and Brennan 2001). Consistent with this, by the end of high school, the high risk adolescents had significantly higher rates of internalizing and externalizing symptoms and were more likely than low risk youth to be diagnosed with all psychiatric disorders.

Another advantage of this sampling strategy was that we were able to examine whether involvement in organized activities buffered the relation between risk and outcome. Results indicated that the strength of the relation between maternal depression history and adolescent psychopathology did not vary as a function of activity involvement. The fact that activities did not serve as a buffer between risk and outcome in this study may be due to the complex nature of the relation between maternal depression and adolescent psychopathology. Whether an offspring of a depressed mother develops psychopathology or not is influenced by multiple factors including genetic, biological, cognitive, and interpersonal (Garber 2006; Goodman and Gotlib 1999). Activity involvement alone might not be sufficiently powerful to overcome the effects of these other variables in high risk adolescents. In addition, the failure to find a significant interaction might have been partially due to having a relatively small low risk sample, thereby limiting our power to detect a significant effect. Thus, the potential buffering role of activity involvement on the relation between maternal and child psychopathology should be explored further with a larger high- and low-risk sample.

One limitation of this sampling strategy, however, is that depressed mothers may tend to report negatively biased perceptions of their children's symptoms (Chi and Hinshaw 2002), although the evidence in support of this depression–distortion hypothesis has been inconsistent (see Conrad and Hammen 1989; Richters 1992). We controlled for maternal depression history in all analyses, but this analytic strategy does not necessarily account for mothers' current depressive symptoms. A second limitation of the high-risk sampling strategy is that the results may not generalize to a purely normative community sample.

Other limitations of the current investigation provide directions for future research. First, the measure of activity involvement was obtained when adolescents were seniors in high school. Recall of involvement in the earlier years of high school may have been affected by adolescents' more recent levels of participation and may have been a less accurate account of activity involvement than had the measure been obtained annually. In addition, measures also should assess how much time adolescents spend in each activity and the relative importance of each activity to the adolescent, as these may be salient indices of the influence of the activity in the adolescent's daily life. Finally, although mother and adolescent reports of activity involvement were highly correlated, our strategy of counting an activity if it was reported by either the mother or adolescent might have resulted in an overestimation of how involved adolescents were in activities. Despite these limitations, however, the activity inventory used in this study provided a comprehensive assessment of participation by examining both school and community-based activities and by obtaining reports from more than one informant.

Examining the relative benefits of being involved in several different activities versus being committed to one particular activity is another important issue for future research. Some investigators have suggested that extensive involvement in one type of extracurricular activity cannot be equated with involvement in a broad range of activities (Fletcher et al. 2000; Fletcher and Shaw 2000). Although the current study cannot address this issue, research using person-oriented analytic approaches (e.g., Bartko and Eccles 2003; Rodriguez and Audrain-McGovern 2004) may help to further clarify the effect of different patterns of involvement on adolescents' functioning. Additionally, future studies should identify which aspects of activity involvement affect outcomes and the mechanisms underlying these effects. By evaluating which features of activities (e.g., supportive relationships; monitoring) mediate relations between activities and psychopathology, it may be possible to determine what aspects of activity involvement are most likely to promote positive development (see Eccles and Gootman 2002 for further discussion). Future studies also should focus on potential moderators of the relation between activities and outcomes. For example, identifying which adolescents benefit most from what kinds of activities as well as when in development different activities are most likely to have a positive effect will allow for teens to be matched with the activities during a point in development in which they likely will gain the most.

In summary, findings from this study suggest that involvement in organized, extracurricular activities during high school is associated with lower levels of externalizing psychopathology and internalizing symptoms, to a lesser extent. Unlike most studies to date, the present investiga-

tion controlled for prior psychopathology to provide greater clarity about associations between activities and psychopathology during adolescence. These results support the importance of organized, extracurricular activities in the lives of today's youth. In addition to providing opportunities to develop unique life skills (e.g., Larson 2000), involvement in organized activities may help promote better adjustment. Individuals who work with adolescents should consider both the individual and societal value of enhancing opportunities for structured, after-school programming for today's youth.

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