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ORIGINAL PAPER

Organized Activity Participation and Internalizing and Externalizing Symptoms: Reciprocal Relations during Adolescence

Amy M. Bohnert · Peter Kane · Judy Garber

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Abstract The aim of this prospective study was to examine the relations between organized activity involvement and internalizing and externalizing symptoms across four years of high school. Participants were 240 adolescents who varied in their risk for psychopathology. Information about adolescents' activity involvement and internalizing and externalizing symptoms were provided by both self- and mother-reports. Structural equation modeling revealed that the prospective models fit the data well. In addition to showing that activity involvement and psychopathology were quite stable over the high school years, we found reciprocal effects for activity involvement and internalizing symptoms at some, although not all, time points. Specifically, controlling for prior symptoms and risk (i.e., maternal depression history), more activity involvement in tenth grade predicted fewer internalizing symptoms in eleventh grade, which then predicted more activity involvement in twelfth grade. No reciprocal relations were found for externalizing problems. These findings highlight the importance of examining internalizing symptoms as both a predictor and outcome of activity involvement during adolescence.

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

P. Kane
Department of Psychiatry and Behavioral Sciences, Northwestern University Medical School, Chicago, IL, USA

J. Garber
Psychology and Human Development, Vanderbilt University, Nashville, TN, USA

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Introduction

Involvement in organized activities has been linked with lower levels of psychopathology, and may protect against it (e.g., Mahoney and Cairns 1997; McHale et al. 2001). To date, however, studies have not simultaneously examined the direction of the relations between psychopathology and activity involvement across adolescence. The current investigation tested models that included both prospective and reciprocal relations between these variables across the four years of high school (see Fig. 1). These relations were examined in a community sample of adolescents who varied with regard to their risk for psychopathology as a function of their mothers' histories of depression in order to obtain a sample with considerable variability in internalizing and externalizing symptoms (i.e., Goodman and Gotlib 1999).

Much of the research on activities and adjustment has suggested that activity involvement leads to better adjustment, particularly fewer externalizing problems. Adolescents who participate in organized activities exhibit significantly less delinquency, aggression, and fewer criminal arrests (Linville and Huebner 2005; Mahoney 2000; Wong 2005), less alcohol and marijuana use (e.g., Darling 2005; Hanks and Eckland 1976; Youniss et al. 1997), and lower rates of school dropout (Mahoney and Cairns 1997). Although some of these prior studies have been longitudinal, few have controlled for prior psychopathology in predicting subsequent adjustment. Not accounting for adolescent's prior symptoms may lead to an

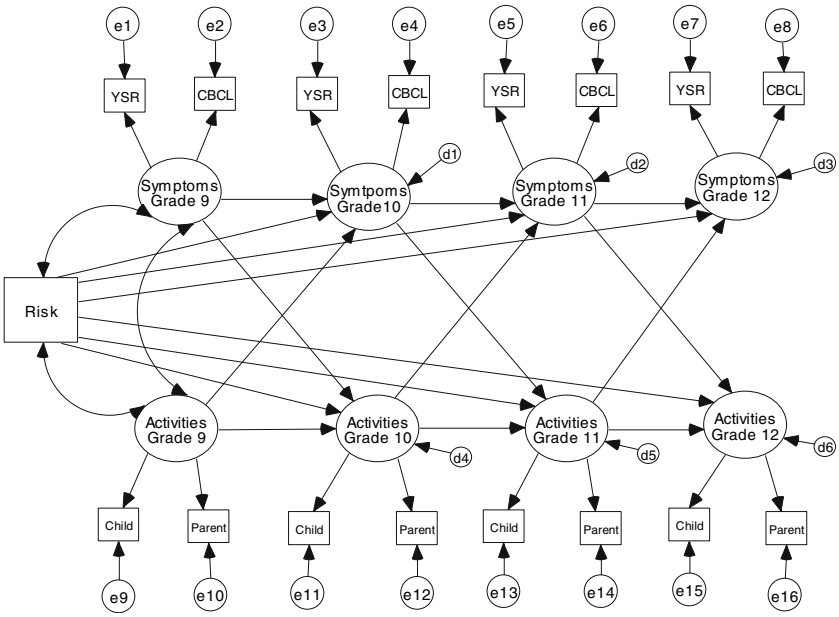

Fig. 1 Proposed cross-lag model for symptoms and activity variables (Grades 9–12)

inflated estimate of the strength of the relation between activities and psychopathology (Fredricks and Eccles 2006b; Larson 2000). That is, the reported benefits of activity involvement on adjustment may reflect a manifestation of pre-existing differences in functioning between participants and non-participants rather than a true benefit gained from activity involvement.

Only a few prospective studies have examined the relation between externalizing psychopathology and organized activity involvement controlling for prior symptoms. Darling (2005) reported that more years of participation in school-sponsored activities during high school were associated with less marijuana and other substance use, after controlling for prior use. In their illustrative Breakfast club study, Eccles and colleagues (Barber et al. 2001; Eccles and Barber 1999) reported that involvement in prosocial activities (i.e., volunteering) during tenth grade was associated with fewer self-reported problem behaviors in twelfth grade and at age 24, after controlling for tenth grade problem behaviors (Barber et al. 2001; Eccles and Barber 1999). In a predominantly African American sample, Fredricks and Eccles (2006b) showed that participation in school clubs was associated with lower levels of externalizing symptoms, and that sports participation predicted fewer externalizing symptoms for boys. Thus, involvement in some types of activities has been linked with less externalizing psychopathology, even when controlling for prior symptoms.

In contrast, less evidence exists of a relation between activity participation and internalizing symptoms. In a cross-sectional study, involvement in activities was found to be associated with lower levels of self-reported depressed mood (Mahoney et al. 2002). Another cross-sectional study reported that more time spent in school activities (e.g., student government, pep-club) was associated with fewer self-reported depressive symptoms (Fredricks and Eccles 2005). In one of the few prospective studies that controlled for prior symptoms, Fredricks and Eccles (2006b) showed that sports participation predicted fewer self-reported depressive symptoms and fewer parent-reported internalizing symptoms. Similarly, in a study of free time activities during middle childhood, McHale et al. (2001) reported that sports involvement at age ten predicted lower levels of self-reported depressive symptoms two years later controlling for prior symptoms. Other studies, however, have reported that involvement in activities during high school was unrelated to levels or changes in depressed mood once prior depressive symptoms were controlled for (Barber et al., 2001; Darling 2005). Thus, findings regarding the relation between activity involvement and internalizing symptoms are mixed.

The majority of studies in this area have focused on how adolescents' activity involvement predicts psychopathology, and little information exists about whether adolescents who are better adjusted become more involved in organized activities. The expectancy-value model of activity involvement proposed by Eccles et al. (1983), however, highlights the importance of adolescents' individual characteristics in making activity choices, although it does not directly address the role of psychopathology in particular. Posner and Vandell (1999) showed that school-age children who were less emotionally adjusted in third grade spent less time in organized, after-school activities in fifth grade. McHale et al. (2001) found that children with more self-reported depressive symptoms at age ten were less

involved in sports at age twelve. Behavior problems at age ten, however, did not predict level of sports involvement later. Similarly, Mahoney (2000) reported that aggressive behavior did not predict school-based activity involvement during high school. Thus, some evidence exists indicating that prior psychopathology, particularly internalizing symptoms, predicts subsequent activity involvement. No study as of yet has examined the directionality of the relation between psychopathology and activity involvement in the same children across time. That is, does being involved in activities predict subsequent psychopathology and/or do levels of psychopathology predict the extent of activity involvement?

Finally, the present study not only examined the directional relation between activities and psychopathology, but it also used a comprehensive measure of activity involvement. Many studies have assessed involvement in school-based activities (e.g., Darling 2005; Mahoney and Stattin 1997) or a narrow range of specific type of activities such as sports and community service (e.g., Eccles and Barber 1999; Fredricks and Eccles 2005). The activity inventory used in the present study allowed us to examine involvement in a broad range of both school- and community-based organized activities. Additionally, findings by Darling (2005) suggest that adjustment improves during years when adolescents are involved in activities compared to years when they are not involved. The present study sought to expand on current literature by examining activity involvement and psychopathology on a yearly basis in order to explore variation in these relations over time. In addition to assessing adolescents' involvement in both school and community-based activities, we obtained reports about both activity involvement and psychopathology from multiple informants (i.e., mother- and adolescent-report).

Hypotheses

The primary objective of the present longitudinal study was to test a model that incorporated auto-regressive, prospective, and reciprocal relations between adolescents' psychopathology and their organized activity involvement across the adolescent years using multiple informants (see Fig. 1). It was expected that more activity involvement would predict fewer externalizing symptoms, and that higher levels of internalizing symptoms would predict less activity involvement.

The second goal of this study was to explore whether the proposed model of activities and psychopathology fit equally well for girls and boys. The relation between activity involvement and psychopathology generally has not been found to vary by gender (see Eccles et al. 2003; Mahoney 2000; Mahoney and Stattin 2000; Mahoney et al. 2002), although a recent study reported that boys may benefit more from certain types of activity involvement than girls (Fredricks and Eccles 2006b). Findings related to gender as a predictor of activity involvement are also mixed, with some studies reporting greater participation for girls (i.e., Eccles and Barber 1999) and others reporting no gender differences (i.e., Mahoney et al. 2003). The present study examined whether the proposed model of activities and psychopathology varied as a function of gender. It was expected that the relations between overall level of activity involvement and externalizing and internalizing symptoms would be similar for boys and girls.

Method

Participants

Participants were 240 adolescents who were part of a longitudinal study examining risk for psychopathology. The sample consisted of 240 mothers and children who were first assessed when they were in sixth grade (M age = 11.86; SD = .57). The sample was ethnically/racially representative of the surrounding metropolitan area [i.e., 82% Caucasian, 15% African-American, and 3% other (Hispanic, Asian, or Native American)], and was predominantly lower-middle to middle class (M SES = 41.84, SD = 13.25; Hollingshead 1975). Of the 240 families in the study, 198 completed the activity measure. Those who completed the activity measure were not significantly different from the full sample with regard to adolescent gender or family SES, but were less likely to have a mother with a history of depression, χ^2 (1, N = 240) = 7.17, $P < .01$, and had lower levels of mother-reported externalizing symptoms in tenth, $t(145) = 2.70$, $P < .01$, and eleventh grade, $t(187) = 2.80$, $P < .01$.

Procedure

Parents of fifth grade children from metropolitan public schools were invited to participate in a longitudinal study about parents and children. A brief health history questionnaire composed of 24 medical conditions (e.g., heart disease, depression) and 34 medications (e.g., Prozac, Elavil, Valium) was sent with a letter describing the project to over 3,500 families. Given that offspring of depressed mothers have been found to have higher levels of both internalizing and externalizing symptoms compared to offspring of non-depressed mothers (low risk), a high-risk research design, similar to that of Beardslee et al. (1988), Hammen (1991), and Radke-Yarrow (1998) was used in which mothers with histories of depression were over-sampled in order to obtain greater variability in adolescents' psychopathology.

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 further screened by telephone. The remaining families were excluded because the mother did not indicate a history of depression, reported nonaffective psychiatric disorders, or indicated other kinds of serious health problems (e.g., cancer, multiple sclerosis). Based on the screening calls to 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) was then conducted with 349 mothers who indicated during the screening calls that they had had a history of some depression or had had no psychiatric problems. The final sample consisted of 185 high-risk adolescents whose mothers had had a depressive disorder (e.g., Major Depressive Disorder, Dysthymia), and 55 low-risk youth whose mothers were life-time free of psychiatric disorders. 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.

A research assistant who was unaware of the mothers' psychiatric histories individually administered a battery of questionnaires separately to each mother and adolescent. Annual assessments of the adolescents across the four years of high school were used in the analyses. Only those measures relevant to the current study are described here.

Measures

The Adolescent Activity Involvement Inventory (AAII) assesses adolescents' involvement in school and community-based activities during high school.[1] The AAII was administered separately to mothers and adolescents in twelfth grade. Respondents indicated the activities in which 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. Activities included in the inventory fell into one of the following categories: 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). Activity involvement scores were calculated by summing the number of activities that the adolescent had participated in during each year of high school.

Internalizing and Externalizing Symptoms. To assess the broad-band factors of internalizing and externalizing, mothers completed the Child Behavior Checklist (CBCL; Achenbach 1991) and adolescents completed the Youth Self Report (YSR; Achenbach 1991) annually when adolescents were in grades 9 through 12. Both measures include 112 items to which respondents indicate whether the item is (0) ''*not true*,'' (1) ''*somewhat or sometimes true*'' or (2) ''*very often true*.'' Scores for the internalizing and externalizing broad-band scales were calculated by summing responses to items that comprised the scales. The internalizing scale measures symptoms of depression/anxiety, withdrawal, and somatic complaints; the externalizing scale measures aggression and delinquency. Coefficient alphas for the subscales of the CBCL and YSR in the present sample ranged from .85 to .93.

Plan of Analyses

Descriptive statistics and bivariate correlations among the observed variables used in structural equation models were computed. Next, a series of nested structural equation models were analyzed to test the appropriateness of the latent variable measurement models and stability of the activities as well as internalizing and externalizing constructs across time. The chi-square difference test was used to determine the significance of changes in model fit when comparing nested models.

Structural equation models were fit with AMOS 5.0 (Arbuckle and Wothke 1999). Full information maximum likelihood (FIML) estimation of missing data (0% to 39% for specific variables) was used in all analyses. FIML is less biased than traditional approaches to missing data that eliminate subjects from analyses, such as listwise and pairwise deletion (Wothke 1998). Thus, the full sample of 240 adolescents and mothers was analyzed.

Results

Descriptive Statistics and Bivariate Correlations

Means, standard deviations, and correlations for the observed variables are presented in Table 1. Mother reported and adolescent self-reported internalizing and

[1] The AAII is available from the first author upon request.

externalizing scores at each of the four time points were significantly positively skewed. A natural log transformation was applied to each of these variables. The transformed variables were used in all analyses. Concurrent correlations between parent and adolescent reports of internalizing symptoms ranged from .24 to .46 and were significant (all *p*s < .01). Similarly, correlations between parent and adolescent reports of externalizing symptoms ranged from .37 to .39 and were significant (all *p*s < .01). Concurrent correlations among the mother- and adolescent-reports of activities ranged from .69 to .82 and were significant (all *p*s < .01). Contemporaneous relations between activity involvement and internalizing symptoms ranged from .04 (*ns*) to –.31 ($P < .01$), and externalizing symptoms ranging from –.07 (*ns*) to –.38 ($P < .01$). Autocorrelations of each measure over the four time points ranged from .53 to .90 (all *p*s < .01).

Stability Models

To estimate the stability of individual differences in the latent constructs, a series of nested auto-regressive models was computed. First, a model for activities was fit. Covariances among error terms within informants and across time points were included. To achieve identification, one lag 3 error covariance was not estimated. This model fit the data well χ^2 (6) = 7.26, $P < .30$, root mean square error of approximation (RMSEA) = .03, Tucker-Lewis index (TLI) = .99, comparative fit index (CFI) = .99, and all factor loadings were significant at $P < .01$. Thus, the measurement model was suitable. Additionally, the latent activities variables at ninth, tenth, and eleventh grade significantly predicted subsequent activity involvement ($\beta = .97$, .93, and .92, respectively, $P < .01$), indicating that individual differences in activity involvement among adolescents were highly stable.

Next, a series of models was fit testing the stability of the error and factor structures as well as the lag 1 regression coefficients. In the final model, the factor loadings at each time point (i.e., the lag 1 regression coefficients from ninth to tenth grade, tenth to eleventh grade, and eleventh to twelfth grade, and the within informant error variances) were constrained to be equal. This model also fit the data well χ^2 (17) = 15.12, $P < .59$, RMSEA = .00, TLI = 1.0, CFI = 1.0 and was not significantly different from the unconstrained model $\Delta\chi^2$ (11) = 7.86, *ns*. The latent activities constructs and the relations among them were highly stable over the four year period and the constrained model represented a more parsimonious model of the data.

Next, baseline models for internalizing and externalizing symptoms were fit. Again, to achieve identification, one error covariance in each model was not estimated. For internalizing symptoms, the model fit the data well, χ^2 (6) = 4.09, $P < .67$, RMSEA = .00, TLI = 1.00, CFI = 1.00, and all factor loadings were significant at $P < .01$. For externalizing symptoms, the model also fit the data well χ^2 (6) = 8.04, $P < .24$, RMSEA = .04, TLI = .99, CFI = .99, and all factor loadings were significant ($P < .01$). The measurement models for the symptom subscales were suitable, and individual differences were stable from ninth through twelfth grades (internalizing; $\beta = .81$, .83, and .89, $P < .01$) and (externalizing; $\beta = .81$, .96, and .94, $P < .01$).

Last, a series of models was fit testing the stability of the error and factor structures and the lag 1 regression coefficients. In the final model for internalizing symptoms, the factor loadings at each time point (i.e., the lag 1 regression coefficients from ninth to tenth grade, tenth to eleventh grade, and eleventh to twelfth grade), and the within informant error variances were constrained to be equal. This model fit the data well χ^2 (17) = 18.56, $P < .35$, RMSEA = .02, TLI = .99, CFI = .99 and was not significantly different from the unconstrained model $\Delta\chi^2$ (11) = 14.47, *ns.* A similar model with the same constraints was fit for externalizing symptoms. This model also fit the data well χ^2 (17) = 19.13, $P < .32$, RMSEA = .02, TLI = .99, CFI = .99 and was not significantly different from the unconstrained model $\Delta\chi^2$ (11) = 11.09, *ns*. Thus, the latent internalizing and externalizing constructs were highly stable over time and the constrained models provided more parsimonious representations of the data without decreasing model fit.

Cross-lag Models

Separate two-variable cross-lag models (Joreskog and Sorbom 1993) were fit to test whether activities at one time predicted symptoms at another time, and vice versa. Each cross-lag model consisted of two auto-regressive models with the equality constraints from the previous analyses. The covariance between activities and symptoms in ninth grade, reciprocal predictive paths between latent variables, and covariances among error terms within informant, within grade, and across measures were added. Risk was allowed to covary with activities and the latent symptom variables in ninth grade, as well as to predict the latent activities and symptom variables in tenth through twelfth grade.

Figure 1 provides a general representation of the estimated models, showing covariances and predicted paths between risk and activities and symptom measures, as well as stability and cross-lag paths. For legibility, covariances among error terms are not included in Fig. 1. Additionally, Figs. 2 and 3 show cross-lag models of activities and internalizing and externalizing symptoms, respectively. For clarity, the risk covariate and covariances among error terms are not included in these figures but were part of the models analyzed.

Table 1 Descriptive information and correlations among variables

Variables	1	2	3	4	5	6	7	8	9	10	11	12	
1. Risk	–												
2. TI A-ACT INV	–.28	–											
3. T1 M-ACT INV	–.37	.69	–										
4. T1 CBCL INT	.29	–.14	–.06	–									
5. T1 CBCL EXT	.34	–.27	–.22	.58	–								
6. T1 YSR INT	.16	–.11	–.09	.28	.10	–							
7. T1 YSR EXT	.20	–.19	–.18	.19	.38	.51	–						
8. T2 A-ACT INV	–.33	.91	.66	–.14	–.28	–.12	–.21	–					
9. T2 M-ACT INV	–.38	.71	.88	–.09	–.23	–.10	–.17	.74	–				
10. T2 CBCL INT	.31	–.08	–.05	.59	.27	.28	.20	–.10	–.11	–			
11. T2 CBCL EXT	.40	–.23	–.28	.47	.67	.03	.28	–.24	–.30	.53	–		
12. T2 YSR INT	.25	.17	.09	.27	–.01	.53	.26	.14	.06	.41	.15	–	
13. T2 YSR EXT	.26	–.01	–.09	.25	.27	.34	.56	–.08	–.08	.24	.37	.56	
14. T3 A-ACT INV	–.29	.82	.64	–.13	–.30	–.07	–.14	.88	.69	–.10	–.27	.14	
15. T3 M-ACT INV	–.36	.68	.75	–.09	–.31	–.03	–.16	.72	.84	–.13	–.37	.10	
16. T3 CBCL INT	.31	–.19	–.14	.62	.41	.16	.19	–.18	–.14	.67	.50	.29	
17. T3 CBCL EXT	.40	–.28	–.31	.55	.69	.06	.31	–.29	–.30	.46	.80	.16	
18. T3 YSR INT	.17	–.08	–.04	.24	.12	.54	.40	–.08	–.05	.25	.05	.59	
19. T3 YSR EXT	.20	–.10	–.12	.21	.32	.33	.58	–.13	–.10	.19	.31	.37	
20. T4 A-ACT INV	–.27	.75	.63	–.14	–.28	–.05	–.14	.77	.65	–.14	–.27	.11	
21. T4 M-ACT INV	–.28	.63	.68	–.17	–.32	–.03	–.16	.64	.73	–.20	–.33	.13	
22. T4 CBCL INT	.31	–.22	–.23	.48	.35	.22	.17	–.23	–.23	.51	.47	.37	
23. T4 CBCL INT	.32	–.24	–.29	.44	.60	.20	.28	–.24	–.31	.41	.71	.18	
24. T4 YSR INT	.26	–.07	–.08	.24	.15	.51	.37	–.08	–.07	.32	.18	.57	
25. T4 YSR EXT	.26	–.14	–.19	.18	.30	.36	.51	–.17	–.18	.19	.32	.36	
Mean	.77	2.71	2.52	6.22	8.06	7.62	9.04	2.65	2.50	5.83	6.75	9.60	
SD	.42	2.38	2.28	6.15	8.74	6.83	6.49	2.44	2.29	5.62	7.57	7.98	
N	240	185	185	183	183	187	187	185	185	147	147	150	
Variables	13	14	15	16	17	18	19	20	21	22	23	24	25
13. T2 YSR EXT	–												
14. T3 A-ACT INV	–.03	–											
15. T3 M-ACT INV	–.08	.79	–										
16. T3 CBCL INT	.22	–.19	–.14	–									
17. T3 CBCL EXT	.34	–.33	–.33	.66	–								
18. T3 YSR INT	.42	–.05	–.05	.24	.12	–							

Table 1 continued

Variables	1	2	3	4	5	6	7	8	9	10	11	12	
19. T3 YSR EXT	.60	–.06	–.09	.22	.38	.54	–						
20. T4 A-ACT INV	–.07	.88	.76	–.17	–.33	–.08	–.06*	–					
21. T4 M-ACT INV	–.04	.75	.88	–.15	–.31	–.03	–.07	.82	–				
22. T4 CBCL INT	.31	–.25	–.21	.63	.46	.26	.20	–.27	–.25	–			
23. T4 CBCL INT	.39	–.32	–.35	.45	.69	.18	.32	–.34	–.37	.65	–		
24. T4 YSR INT	.43	–.08	–.03	.34	.17	.63	.35	–.10	–.01	.46	.26	–	
25. T4 YSR EXT	.63	–.13	–.16	.26	.34	.48	.65	–.15	–.10	.36	.39	.63	–
Mean	10.41	2.50	2.35	6.39	7.23	7.79	9.45	2.44	2.17	5.93	5.86	8.90	9.12
SD	6.93	2.44	2.30	7.21	8.60	7.27	7.16	2.51	2.39	7.13	8.02	8.93	6.56
N	150	185	185	189	189	188	188	185	185	190	190	183	183

Note: Correlations $\geq \pm .17$ are significant at $P < .05$. ACT INV = Activities Inventory; A = Adolescent report; M = Mother report; CBCL = Child Behavior Checklist; YSR = Youth Self-Report; INT = Internalizing; EXT = Externalizing; T1 = Time 1 (9th grade); T2 = Time 2 (10th grade); T3 = Time 3 (11th grade); T4 = Time 4 (12th grade)

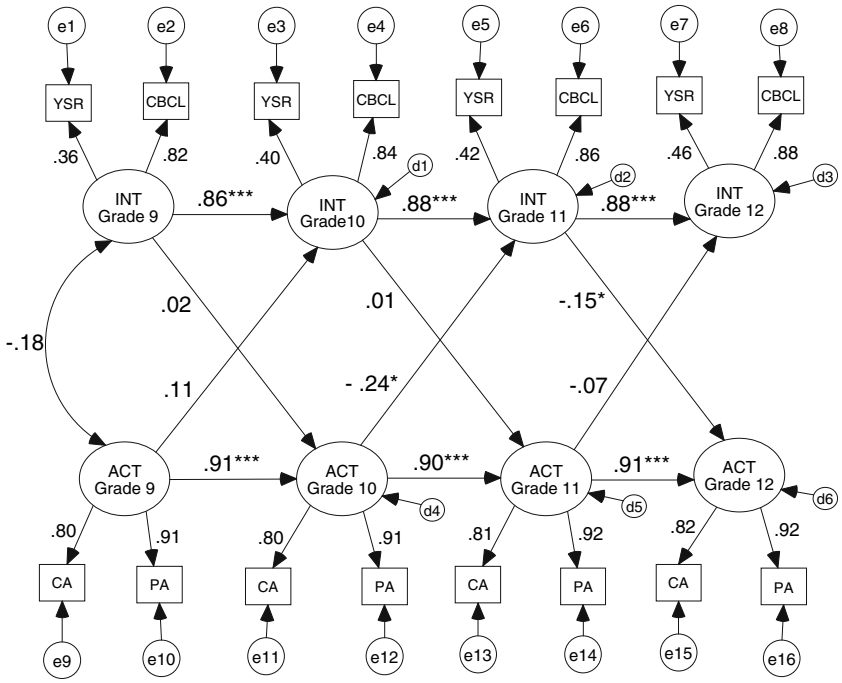

Fig. 2 Cross-lag model for latent internalizing symptoms and activity variables (Grades 9–12). INT = Internalizing Score; CBCL = Child Behavior Checklist; YSR = Youth Self Report; ACT = Organized Activity Participation; CA = Adolescent report on the AAII; PA = Parent report on the AAII; e = error; d = disturbance term

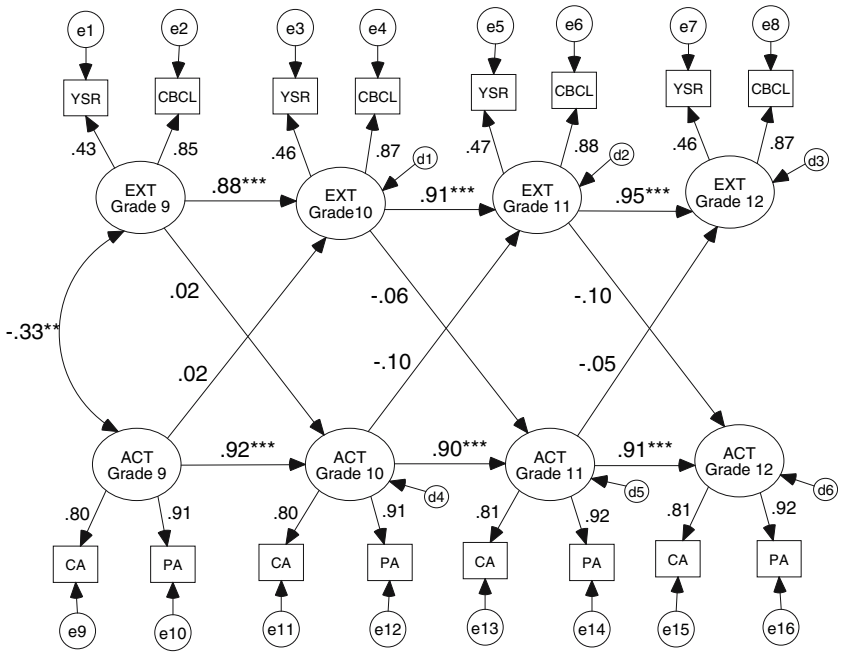

Fig. 3 Cross-lag model for latent externalizing symptoms and activity variables. (Grades 9–12). EXT = Externalizing Score; CBCL = Child Behavior Checklist; YSR = Youth Self Report; ACT = Organized Activity Participation; CA = Adolescent report on the AAII; PA = Parent report on the AAII; e = error; d = disturbance term

The cross-lag model of activities and internalizing symptoms fit the data well χ^2 (88) = 93.80, $P < .32$, RMSEA = .02, TLI = .99, CFI = .99. As shown in Fig. 2, the path between activity involvement and internalizing symptoms in ninth grade was not significant. In subsequent years, however, reciprocal effects between activity involvement and internalizing symptoms were observed. Activity involvement in tenth grade negatively predicted internalizing symptoms in eleventh grade; that is, lower levels of activity involvement in tenth grade significantly predicted *higher* levels of internalizing symptoms in eleventh grade, when controlling for risk and prior internalizing symptoms. Furthermore, internalizing symptoms in eleventh grade negatively predicted activity involvement in twelfth grade, indicating that higher levels of internalizing symptoms in eleventh grade significantly predicted *lower*

activity involvement in twelfth grade, controlling for risk and prior activity involvement.

The cross-lag model of activities and externalizing symptoms fit the data well χ^2 (88) = 89.29, $P < .44$, RMSEA = .01, TLI = 1.0, CFI = 1.0. As shown in Fig. 3, the correlation between externalizing symptoms and activity involvement in ninth grade was significant. Thus, in ninth grade higher levels of adolescent externalizing symptoms were associated with lower levels of activity involvement. Reciprocal paths between externalizing symptoms and activity involvement, however, were not significant.

Finally, a multiple group comparison was conducted to test for gender differences in the reciprocal cross-paths. Separate multiple group models were analyzed for activity involvement with internalizing and externalizing symptoms. In each analysis, an unconstrained model allowing different reciprocal paths for boys ($N = 110$) and girls ($N = 130$) between activity involvement and symptoms was compared to a model that constrained these parameters to be equal. The constrained model for activity involvement and neither internalizing symptoms, $\Delta\chi^2$ (12) = 12.29, $P > .05$, nor externalizing symptoms, $\Delta\chi^2$ (12) = 16.77, $P > .05$, yielded a significant decrement in fit. Thus, the predictive relations between activity involvement and internalizing and externalizing symptoms did not differ significantly for boys and girls.

Discussion

The current prospective study examined the direction of the relations between overall levels of organized activity involvement and internalizing and externalizing symptoms across the high school years. Using structural equation modeling, we tested whether being involved in activities predicted fewer symptoms as well as the reverse. Results indicated that both internalizing and externalizing symptoms as well as activity involvement were highly stable over time. In addition, significant reciprocal relations were found between activity involvement and internalizing symptoms in some, but not all grades. Specifically, higher levels of activity involvement during tenth grade significantly predicted lower levels of internalizing symptoms in eleventh grade, controlling for prior internalizing symptoms and risk. In turn, higher levels of internalizing symptoms in eleventh grade significantly predicted less activity involvement in twelfth grade, controlling for prior activity involvement and risk.

Whereas some prior studies have not found that activity involvement predicts internalizing symptoms (Barber et al. 2001; Darling 2005; Fletcher et al. 2003), others have shown that activity involvement is associated with lower levels of self-reported depressed mood and fewer internalizing symptoms (Fredricks and Eccles 2006b; Mahoney et al. 2002; McHale et al. 2001). The current study found that activity involvement in tenth grade predicted lower levels of internalizing symptoms in eleventh grade, which is when these adolescents were approximately 16 years of age. Activities keep adolescents busy and may provide a source of self-esteem and a sense of belonging, which may help to decrease the chances of developing depression. It is not clear, however, why this relation was significant from tenth to eleventh grade, but not for the other grades. Community-based studies have shown that depression significantly increases between ages 15 through 18 (Ge et al. 2001; Hankin et al. 1998; Kandel and Davies 1982). It may be that in this predominantly high-risk sample, other factors (e.g., stress, family discord) were more powerful predictors of symptoms than was participating in activities, per se. The potential role of such other variables as possible predictors or moderators of the relation between activity involvement and symptoms should be explored in future studies.

In addition, higher levels of internalizing symptoms in eleventh grade significantly predicted lower levels of activity involvement in twelfth grade. Adolescents who are feeling anxious about their grades, college, jobs, and their future in general may decrease their activity involvement at this point so that they can focus on their school work and college or job applications. Moreover, depressive symptoms may lead adolescents to reduce their participation in activities due to low energy, loss of interest, and negative mood. From a clinical perspective, encouraging anxious and depressed adolescents to stay involved in activities even when they do not feel like it may help to diminish their symptoms.

The paths between activity involvement and externalizing psychopathology, however, were not significant. This may be partially due to the particularly high degree of stability in externalizing symptoms as well as activity level over time. That is, the probability of finding statistically significant reciprocal relations was low due to this high stability. Although cross-sectional studies have documented that involvement in activities is associated with fewer problem behaviors (i.e., Mahoney 2000), most of these studies have not controlled for prior problems, thereby possibly overestimating this relation (see Fredricks and Eccles 2006b; Larson 2000). In the current study, although several of the bivariate correlations between activities and externalizing symptoms were significant, there was little evidence of a relation once risk and prior psychopathology were controlled. However, these findings should not be interpreted to suggest that activities may be of little benefit for decreasing the likelihood of problem behaviors. Rather, externalizing symptoms and activities

may have a negligible effect on each other on a year-to-year basis, even though they may covary with each other across the high school years.

Adolescents' externalizing symptoms also did not predict their degree of involvement in activities across the high school years. Thus, consistent with the study by Mahoney (2000), we found that adolescents with problem behaviors were not necessarily less involved in activities. Two recent cross-sectional studies have documented that youth who were involved in sports were more frequently involved in physical fights and delinquent behaviors (Linville and Huebner 2005; Wong 2005). Thus, adolescents who exhibit problem behaviors may participate more in some kinds of activities (e.g., athletics) than others (e.g., prosocial activities or academic clubs). To date, most longitudinal studies have included prior psychopathology as a covariate to partial out rather than examining how it predicts activity involvement (see McHale et al. 2001; Posner and Vandell 1999, for exceptions). Future prospective studies should explore the relation of involvement in particular types of activities and different types of psychopathology to understand more about the potential role of different symptom clusters as selection factors for different activities.

This study also examined whether prospective relations between activity involvement and internalizing and externalizing symptoms differed as a function of gender. Consistent with previous research (Eccles et al. 2003; Mahoney 2000; Mahoney and Stattin 2000; Mahoney et al. 2002; although see Fredricks and Eccles 2006b for an exception), the current study found no significant gender differences in the relations between adolescent activity involvement and symptoms. To test for gender differences, we conducted a multiple group SEM analysis that examined separate models for boys and girls. Given that this resulted in reduced sample sizes, however, the null findings for tests of gender differences may be due, in part, to decreased power to detect differences, and should therefore be interpreted with caution.

A limitation as well as strength of the present study was the use of multiple informants in the creation of the latent constructs of activity involvement and adolescent symptoms. Some research has found only modest correlations between parent and child reports of psychopathology (Achenbach et al. 1987). Separating informants in analyses may highlight important rater dissimilarities including attributional biases (see De Los Reyes and Kazdin 2004). Nevertheless, although parents and adolescents have been shown to differ in their reports about adolescents' symptoms, they generally are positively correlated (Achenbach et al. 1987). Thus, they are not reporting on entirely different phenomena. Other studies have similarly combined informants about adolescent psychopathology (Conger et al. 1995; Ge et al. 1994) and have found reciprocal effects across time between children's symptoms and other constructs of interest. Additionally, using structural equation modeling to create latent variables of activity involvement and internalizing and externalizing symptoms may have provided a methodological advantage by identifying the amount of true variance shared by the different informants. In the present study, we were able to model reciprocal relations among latent variables over time while simultaneously modeling and separating error from the constructs.

Another asset as well as a limitation of the current study was the use of a sample that differed with regard to risk for psychopathology as a function of mothers' histories of mood disorders. This sampling strategy allowed for greater variability in the study constructs, particularly psychopathology. We included risk in all cross-lag models as a predictor of activity involvement and symptoms. Thus, any observed effects were incrementally predictive above and beyond risk. One limitation of this sampling strategy, however, is that depressed mothers may tend to report negatively biased perceptions of their children's symptoms (i.e., depression-distortion hypothesis; Chi and Hinshaw 2002), although the evidence in support of this hypothesis has been inconsistent (see Conrad and Hammen 1989; Richters 1992). We controlled for maternal depression history in all analyses, although this analytic strategy does not necessarily account for mothers' current depressive symptoms. Nevertheless, using latent variables based on multiple informants, as we did here, likely produced a shared construct less affected by the bias of one respondent. A second limitation of our high-risk sampling strategy was that the results may not generalize to a purely normative community sample, although there is little reason to believe based on existing literature that the relations would be different.

The measure of activity involvement used in the current study also had pros and cons. During the adolescents' senior year, they and their mothers were asked to report about the adolescent's activity involvement during high school. Recall of the earlier years may be a less accurate account of activity involvement than had the measure been obtained annually. In addition, recent work suggests different indices of involvement such as breadth (i.e., number of different types of activities) and intensity (i.e., amount of time) are associated with different adjustment outcomes (see Rose-Krasnor et al. 2006; Fredricks and Eccles 2006a). Future work also should consider the relative importance of each activity to the adolescent, as this may be a salient index of the influence of the activity in the adolescent's daily life. Despite these limitations, 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 both adolescents and their mothers. More work is needed, however, to understand how all these different indices of activity involvement (e.g., breadth, intensity, importance) relate to specific types of psychopathology (e.g., aggression, substance use, anxiety, depression).

In summary, this study showed that despite the stability of activity involvement and psychopathology across the high school years, participation in activities had a reciprocal relation with internalizing symptoms during the time in adolescence when the rates of depression are known to be increasing. Consistent with the behavioral activation (BA) component of cognitive-behavioral treatment (Beck et al. 1979) and prevention (Clarke et al. 2001), and the recent finding of the efficacy of BA therapy for the treatment of depression in adults (Dimijian et al. 2006), adolescents should be encouraged to stay involved in activities even when they feel distressed or uninterested as it may help promote greater emotional well-being.

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Author Biographies

Amy M. Bohnert Ph.D. is an assistant professor in the Department of Psychology at Loyola University Chicago. Her research focuses on predictors and outcomes of involvement in various after-school contexts, especially organized extracurricular activities.

Peter Kane Ph.D. is an assistant professor in the Department of Psychiatry and Behavioral Sciences at Northwestern University's Feinberg School of Medicine. His research interests include developmental sequelae of high-risk offspring of depressed parents and the role of interpersonal conflict in adolescent psychopathology.

Judy Garber Ph.D. is a professor in Psychology and Human Development at Vanderbilt University. Her research focuses on the etiology, course, outcome, treatment, and prevention of depression in children and adolescents.