

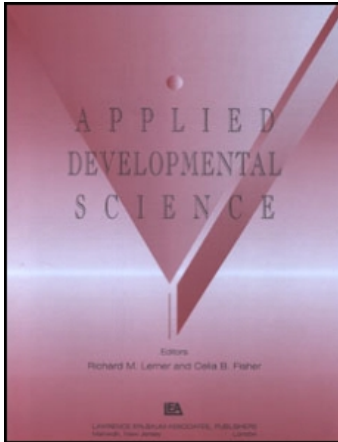
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Publisher Psychology Press

Informa Ltd Registered in England and Wales Registered Number: 1072954 Registered office: Mortimer House, 37-41 Mortimer Street, London W1T 3JH, UK



Applied Developmental Science

Publication details, including instructions for authors and subscription information:

<http://www.informaworld.com/smpp/title-content=t775648085>

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Online Publication Date: 01 April 2009

To cite this Article Denault, Anne-Sophie, Poulin, François and Pedersen, Sara(2009)'Intensity of Participation in Organized Youth Activities During the High School Years: Longitudinal Associations With Adjustment',Applied Developmental Science,13:2,74 — 87

To link to this Article: DOI: 10.1080/10888690902801459

URL: <http://dx.doi.org/10.1080/10888690902801459>

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Intensity of Participation in Organized Youth Activities During the High School Years: Longitudinal Associations With Adjustment

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The goal of this study was to explore the longitudinal associations between youth activity participation and adjustment over the high school years by examining (a) correlations between participation and adjustment growth curves, and (b) bidirectional links between participation and adjustment from one year to the next. Participation was operationalized as the total number of hours spent in sports, performance and fine arts, and youth clubs over a school year. Indicators of adjustment included school grades, alcohol use, and depressive symptoms. Youth ($n = 362$; mean age = 13.38, $SD = 0.42$; 59% girls) were surveyed annually from grades 7 to 10 using questionnaires and phone interviews. Growth curve results revealed that: (a) sports were positively associated with alcohol use; (b) performance and fine arts were negatively linked to depressive symptoms, and (c) youth clubs were positively associated with school grades, and negatively linked to alcohol use and depressive symptoms. The bidirectional analyses revealed few significant links from one year to the next, with the exception of performance and fine arts and grades.

There is growing empirical evidence that spending time in structured leisure activities during adolescence is positive for youth development (Eccles & Gootman, 2002; Feldman & Matjasko, 2005; Larson, 2000; Mahoney, Larson, & Eccles, 2005). The main characteristics of these activities include the presence of an adult leader, other peers in the activity, rule-guided engagement, and regular participation schedules (Larson, 2000; Mahoney & Stattin, 2000). As proposed by recent

studies, organized activities provide youth with multiple growth experiences likely to be reflected in the youth's adjustment. Indeed, these activities promote the development of identity, initiative, and social skills, in addition to giving youth the opportunity to form meaningful relationships with the activity peers and leaders (Hansen, Larson, & Dworkin, 2003; Larson, 2000; Larson, Hansen, & Moneta, 2006).

This study was supported by research grants to the second author from the Social Sciences and Humanities Research Council of Canada and from the Fonds Québécois pour la Recherche sur la Société et la Culture. The authors wish to thank the teachers and the children of the Commission scolaire de Laval. This research was conducted as part of the first author's doctoral dissertation.

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Outcomes Associated With Youth Activity Participation

Previous studies on participation effects have focused on multiple domains of youth adjustment, especially academic orientation, risk behaviors, and psychological adjustment. With respect to academic orientation, longitudinal studies have revealed that participation in organized activities during high school is linked to

higher school grades and educational aspirations (Darling, 2005; Darling, Caldwell, & Smith, 2005; Eccles & Barber, 1999; Fredricks & Eccles, 2006), as well as a higher probability of college attendance (Barber, Eccles, & Stone, 2001; Eccles & Barber, 1999; Mahoney, Cairns, & Farmer, 2003; Zaff, Moore, Papillo, & Williams, 2003) and a reduced likelihood of dropping out of high school (Mahoney & Cairns, 1997; McNeal, 1995). For risk behaviors, longitudinal studies have revealed that participation in adolescence is linked to lower rates of delinquency (Eccles & Barber, 1999; Mahoney, 2000). However, mixed results have been reported in regard to alcohol use. Some studies found a positive link between sports participation and alcohol use (Crosnoe, 2002; Eccles & Barber, 1999; Fredricks & Eccles, 2006), whereas others found no link between extracurricular activities and alcohol (Darling, 2005). Concerning psychological adjustment, participation has been linked to lower levels of depressive symptoms (Barber, Eccles, & Stone, 2001; Fredricks & Eccles, 2006; Mahoney, Schweder, & Stattin, 2002), even though other studies have found no such association (Darling, 2005).

Although recent empirical findings suggest that participation and youth adjustment are related over time, there are some gaps in the literature that do not allow for a clear understanding of participation outcomes. For example, longitudinal studies on participation effects rarely use longitudinal assessments of participation. Previous studies have usually measured participation at one time point, fairly late in adolescence, to predict subsequent adjustment over time. Among studies that did use more than one time point, participation was usually coded in categories reflecting, for instance, "no participation," "one year of participation," and "two years of participation" (e.g., Darling, 2005; Mahoney, Cairns, & Farmer, 2003; Zaff, Moore, Papillo, & Williams, 2003). Yet, using multiple time points for both the participation variables and the indicators of adjustment allows for a more detailed examination of the developmental relations between participation and youth adjustment.

Taking a Longitudinal Perspective

Using a longitudinal assessment of participation gives more information about the variability in youth participation practices over time. For instance, one youth might only participate at the beginning of high school and then stop. Another youth might also participate at the beginning of high school, then stop, but start again a year later. Another related issue is whether participation increases, decreases, or remains stable during the high school years. Among studies that have used more than three time points to model participation over time,

results have been mixed. Using the number of activities, Pedersen (2005) found decreasing rates of sports and school-based activities, and increasing rates of religious activities. Using the number of hours spent in organized activities, Denault and Poulin (in press) found stable rates of participation in sports, performance and fine arts, and youth clubs.

In addition, with longitudinal assessments of both activity participation and adjustment, two complementary pieces of information can be explored, including associations between youths' participation over time and adjustment over time and bidirectional relations over time. In other words, such data allow for the identification of any links between growth in participation and growth in adjustment by examining the correlated rates of change between the two growth curves. However, this strategy does not inform about more micro-effects from year to year, and most importantly, about the direction of associations. This information can be uncovered by using the same data to examine the bidirectional associations from one time point to the next.

A major strength of looking at bidirectional effects is that such an analysis allows for the separation of potential selection effects from the effects of participation. Participation in organized activities is, in most cases, voluntary. As a result, well-adjusted youth might be over-represented in these contexts (McNeal, 1998), which could explain the observed benefits of activity participation. Researchers usually control for variables likely to reflect these selection effects, such as socio-demographic information, prior participation, or prior behavior (Darling, 2005; Darling, Caldwell, & Smith, 2005; Eccles & Barber, 1999; Fredricks & Eccles, 2006; McNeal, 1995). Even though these controls add to the robustness of the findings, examining the bidirectional effects between participation and youth adjustment from year to year would bring further insights into the dynamic interplay between participation and adjustment. In sum, whereas looking at the correlated rates of change gives us general information about the associations between participation and adjustment over time, the bidirectional effects give us more specific information about the direction of the associations.

Operationalization of Activity Participation

A final issue concerns the operationalization of participation. Participation can be defined as the number of activities, intensity (number of hours of participation), breadth (when youth are involved in more than one type of activity), or simply a dichotomous yes or no variable. Although all of these conceptions are valuable, the total number of hours youth spend in their activities over

time might be especially important with respect to participation effects. The more time that youth spend in their activities, the greater their opportunities will be to strengthen their skills and knowledge, and to engage in interpersonal transactions with the activity peers and leaders (Busseri, Rose-Krasnor, Willoughby, & Chalmers, 2006). In addition, the more time they spend in activities, the less time they will have to engage in risky behaviors (Osgood, Wilson, O'Malley, Bachman, & Johnston, 1996). In previous studies, intensity was usually indexed as the average number of weekly or monthly hours of participation (Busseri, Rose-Krasnor, Willoughby, & Chalmers, 2006; Mahoney, Harris, & Eccles, 2006). However, not all activities follow a regular schedule and some are likely to fluctuate or be interrupted within a school year. Accordingly, a measure of the total number of hours spent in organized activities during a school year could reflect more accurately the intensity of youth participation in this specific period of time. For example, such a measure can take into account the possibility that some youth may have only participated two or three months over the year.

Activities can also be grouped into different types. The most frequent types in the literature include sports (hockey, basketball, soccer, karate), performance and fine arts (dance, drama, band), academic activities (tutoring, chess club, debate club), faith-based and service activities (volunteering), and community and vocational clubs (scouts, 4H) (Eccles & Barber, 1999; Hansen, Larson, & Dworkin, 2003). Previous research suggests that outcomes (Eccles & Barber, 1999; McNeal, 1995), learning experiences (Hansen, Larson, & Dworkin, 2003; Larson, Hansen, & Moneta, 2006), and predictors (McNeal, 1998; Pedersen, 2005) differ depending on the type of activities investigated. To remain consistent with past research, the activities were categorized into the five types mentioned above. However, given the small frequencies of academic, faith-based and service, and community and vocational activities in the communities where this study was conducted (Denault & Poulin, in press), these were combined into "youth clubs" resulting in three separate types (sports, performance and fine arts, and youth clubs).

Important Covariates

Gender differences have been documented on some participation variables, such as sports (Eccles & Barber, 1999; McNeal, 1998; Pedersen, 2005), and on some indicators of adjustment typically studied in adolescence, such as depressive symptoms (Ge, Natsuaki, & Conger, 2006; Hankin, Moffitt, Silva, McGee & Angell, 1998; Wichstrom, 1999). However, few consistent differences have been found in the extent to which

boys and girls benefit from their activity participation (Fredricks & Eccles, 2006; Mahoney, Cairns, & Farmer, 2003), with exceptions concerning sports (e.g., Crosnoe, 2002; Gore, Farrell, & Gordon, 2001; Miller, Sabo, Farrell, Barnes, & Melnick, 1999). As a result, gender was examined as a covariate in this study, together with family income, since youth from affluent families are also more likely to participate in organized activities (Huebner & Mancini, 2003; McNeal, 1998; Pedersen, 2005).

Study Objectives

The aim of this study was to test the relations between youth activity participation and adjustment over four years, i.e., from grades 7 to 10. Latent growth curve modeling was used to address the following research questions. First, is growth in participation associated with growth in adjustment over time? Second, does participation predict later adjustment or vice-versa? Participation was operationalized as the total number of hours spent in sports, performance and fine arts, and youth clubs over a school year. Three domains of youth adjustment were considered. Our intention was not to cover all the domains of youth functioning. Rather, we elected to focus on domains that: (a) have been considered in prior research on activity participation, (b) tap very different areas of youth functioning, and (c) are likely to change significantly over the age range covered in this study. As a result, school grades were examined as an indicator of academic orientation, alcohol use was examined as an indicator of risk behaviors, and depressive symptoms were examined as an indicator of psychological adjustment.

For the associations between growth curves of participation and adjustment, we expected that sports, performance and fine arts, and youth clubs would be positively associated with school grades and negatively linked to depressive symptoms over time. However, we expected that sports would be positively linked to alcohol use, as opposed to performance and fine arts and youth clubs. In testing for the bidirectional effects, links in both directions were anticipated between participation and adjustment.

METHOD

Participants

Three hundred ninety youth participated in this study. Youth were first surveyed in 2001 when they were in grade 6 (mean age = 12.38, $SD = 0.42$, 58% girls). They were originally recruited from eight elementary schools. Approximately 75% of the available student population

participated in the study. These schools were located in four distinct districts representing different socioeconomic backgrounds of a city of 350,000 residents in the province of Québec, Canada. Criminality and unemployment rates in this city are slightly lower than the provincial mean level. The data used in this study were collected annually between grades 7 and 10. By grade 10, participants were scattered across 30 high schools. Youth were from families where 65% had an income over \$50,000 (CAN) before taxes and 81% of mothers and 96% of fathers had at least a part-time job. Mothers and fathers had similar levels of education ($M=13.08$ years, $SD=2.68$ and $M=13.20$ years, $SD=3.20$, respectively). Ninety-six percent of youth were born in Canada and 69% were from two-parent families. The sample was ethnically homogenous. Most youth were White and French-speaking (around 3% of youth were Black, 1% Asian, 3% Latino, and 3% Arabic).

As in many longitudinal studies, there were missing data at different time points for different youth. Of the 390 youth in the study, 92% were still participating in grade 7 ($n=360$), 72% in grade 8 ($n=282$), 75% in grade 9 ($n=293$), and 76% in grade 10 ($n=296$). Overall, 15% of data were missing across all waves of data collection. To reduce the amount of missing data, only youth with data for at least one time point out of four on each variable of interest were included in the analyses. As a result, 362 youth were part of the final sample. These youth were not different from the 28 remaining youth with respect to gender, family income, and grade 7 participation and outcome variables. Simple imputation was conducted using the EM algorithm in NORM 2.03 (Shafer, 2000) before conducting the analyses.

Procedure and Study Design

A trained team of research assistants carried out data collection at the selected schools. Youth had to leave their classrooms to complete the questionnaires in small groups. Participation in organized activities was assessed annually during the spring of the first four years of high school (e.g., grades 7 to 10; in Québec, high school is comprised of Grades 7 to 11). In grade 7, participation was measured with a paper-and-pencil questionnaire at school. In grades 8–10, participation data were collected using structured phone interviews. The phone interview questions were identical to those that appeared in the grade 7 paper-and-pencil questionnaire. Outcomes were also measured annually during the first four years of high school. Alcohol use and depressive symptoms were assessed with paper-and-pencil-questionnaires, whereas school grades were collected from official school records.

Measures

Hours of Participation in Sports, Performance and Fine Arts, and Youth Clubs

Participation was operationalized as the total number of hours spent in three different types of activities, namely, sports, performance and fine arts, and youth clubs, over a full school year (10 months, from September to June). The participation variables were measured in two steps. In the first step, youth were asked to identify all the organized activities in which they were participating or had participated during the school year. This was done using a free recall procedure. To facilitate the recall, four separate questions were asked. First, youth had to identify all the school-based activities they were involved in from September to December (before winter break). Second, they had to identify all the community-based activities they were involved in from September to December (before winter break). The same two questions were asked for the time frame between January and June (after winter break). In the second step, for each activity previously identified, youth had to complete a brief questionnaire. The items targeted the following dimensions: frequency of participation, number of hours of participation, number of months of participation during the school year, presence of an adult activity leader, and presence of rules. To verify if the activities listed met the definition of an organized activity, the following criteria were applied: (a) regular frequency of participation (at least once a month; over 80% of the activities were practiced once a week), (b) presence of an adult activity leader, and (c) rule-guided engagement. Only the activities that met those criteria were considered. Youth centers were not included given that they are usually not considered as structured in other studies (e.g., Mahoney & Stattin, 2000).

Across waves of measurement, about 30 different activities were categorized as “sports” (e.g., karate, judo, swimming, diving, tennis, badminton, baseball, basketball, football, ice hockey, gymnastics, volleyball, etc.), 15 different activities were included as “performance and fine arts” (e.g., dance classes, band/orchestra, choir, drama, painting classes, etc.), and ten different activities were categorized as “youth clubs” (e.g., scouts/Girls’ and Boys’ club, science fair, chess club, service club, computer club, etc.). All youth’s activities in the sample were included in the three types of activities. The most common sports were ice hockey, soccer, karate, and gymnastics; the most common performance and fine arts were dance, band, and painting class; and the most common youth clubs were scouts and volunteering.

To compute the number of hours of participation in each type of activity, we multiplied the weekly number

of hours of participation by the number of weeks of participation within a school year (approximately 10 months). For example, for a youth who played basketball 3 hours per week from September to June, we multiplied 3 hours by 40 weeks of participation, which resulted in a total of 120 hours of participation over the school year. For a youth who participated in a dance class one hour per week from September to December, we multiplied one hour by 16 weeks of participation, which resulted in a total of 16 hours of participation. We then summed the number of hours of participation within each type of activity. For example, if a youth had participated in basketball 120 hours during the school year and in football 100 hours, he or she was attributed a score of 220 for sports. Thus, three scores, one for each type of activity, were computed for each youth from grades 7 to 10. Descriptive information for each type of activity at each wave of data collection is presented in Table 1.

Academic Achievement

Academic achievement was based on final grades in mathematics and French in student official school records, rated as percentages. Mean scores were used in the analyses (correlations ranged from .57 to .69 for grades 7 to 10).

Alcohol Drinking

Alcohol drinking was assessed with a single item: "How many alcoholic beverages have you drunk *during the last month?*" The item was rated from 0 to 10 and then 11 corresponded to 11–20 drinks; 12 corresponded to 21–40 drinks; and 13 corresponded to 41 drinks or more. The sample means from grades 7 to 10 were used in the analyses.

Depressive Symptoms

Scores on the Children's Depression Inventory (CDI; Kovacs, 1981) were used to assess the level of depressive symptoms among adolescents. This 27-item questionnaire covers a range of depressive symptoms, such as sadness, irritability, sleep, guilt, worry, self-confidence, loneliness, and preoccupation. Each item consists of three choices. The item choices are coded from 0 to 2 in the direction of increasing severity. The respondent chooses the options that best describe his or her feelings over *the past two weeks*. The CDI has been shown to be reliable and valid in large representative samples of youth (Kovacs, 1983). In this study, the item tapping suicidal ideation was removed from the questionnaire, resulting in 26 items and a range of 0 to 52. The sum of scores was used in the analyses. Cronbach's alpha ranged from .82 to .85 over the four years.

Family Income

The total family income before taxes was used as an indicator of the families' economic situation. Parents responded to a single item, "In which of the following categories is your total family income before taxes for the year 2000?" ranging from 1 (*less than \$5,000*) to 13 (*\$60,000 and more*). The mean response represented approximately \$50,000 CAN.

Analytical Strategy

Analyses were guided by Curran and Bollen's (2001) procedure for combining cross-lagged correlation and latent growth curve (LGC) models in a structural equation modeling framework. Combining LGC and cross-lagged models allows for the simultaneous consideration of associations between developmental growth curves and time-specific measures. The LGC part of the model tests whether changes in participation over the high school years are correlated with changes in youth adjustment during the same period. The cross-lagged part of the model tests whether there are bidirectional associations between participation and adjustment, after controlling for the stable components of growth over time.

Analyses were conducted in three steps. In the first step, the developmental growth curves of the variables of interest (i.e., hours spent in sports, hours spent in performance and fine arts, hours spent in youth clubs, school grades, alcohol use, and depressive symptoms) were identified in univariate models. Fitting the univariate LGC models determines the shape of the trajectory and provides information about the mean-level trajectory over time and the variability around this mean trajectory. In the second step, the univariate models were combined to examine the associations between the growth curves of participation and adjustment. In the third step, the cross-lagged paths were added to test the bidirectional links among the measures at specific time points. The estimated model is presented in Figure 1. Models were tested using Mplus 4.2 (Muthén & Muthén, 2006).

RESULTS

Descriptive Analyses

Means and standard deviations, and correlations between all study variables are presented in Table 1. With respect to the distribution characteristics of the variables, the hours spent in performance and fine arts and youth clubs were not normally distributed across times of measurement. As a result, these variables were transformed using the natural logarithm before testing the models. In addition, in order to facilitate model estimation, the number of hours spent in the three types

TABLE 1
Descriptive Data and Correlations for the Participation Variables, Outcomes, and Covariates from Grades 7 to 10 ($n=362$)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
1. Gender	–																									
2. Income	-.00	–																								
3. G7-sports	.17*	.14*	–																							
4. G8-sports	.19*	.14*	.69*	–																						
5. G9-sports	.15*	.16*	.56*	.65*	–																					
6. G10-sports	.13*	.09	.47*	.51*	.67*	–																				
7. G7-arts	-.25*	.00	-.17*	-.21*	-.17*	-.11*	–																			
8. G8-arts	-.25*	.04	-.15*	-.13*	-.12*	-.10	.66*	–																		
9. G9-arts	-.18*	-.01	-.08	-.06	-.16*	-.08	.37*	.55*	–																	
10. G10-arts	-.18*	.04	-.09	-.13*	-.17*	-.17*	.37*	.48*	.56*	–																
11. G7-clubs	.03	.08	-.13*	-.08	-.02	-.05	.03	.07	-.06	.07	–															
12. G8-clubs	-.02	.09	.01	.08	.09	.03	-.00	.03	-.04	.02	.58*	–														
13. G9-clubs	-.01	.08	-.05	.01	-.01	.03	.05	.00	-.06	.02	.41*	.48*	–													
14. G10-clubs	.04	.03	-.01	.10	-.03	.00	-.10	-.02	-.02	.06	.32*	.35*	.43*	–												
15. G7-grades	-.07	.36*	.04	.04	.05	.05	.02	.11*	.12*	.04	.09	.11*	.12*	.12*	.74*	–										
16. G8-grades	-.10	.17*	.01	.04	.01	.01	.06	.11*	.14*	.04	.12*	.17*	.11*	.18*	.74*	.71*	–									
17. G9-grades	-.10	.16*	.05	.07	.11*	.11*	.04	.05	.11*	.05	.10	.12*	.14*	.23*	.68*	.60*	.59*	–								
18. G10-grades	-.06	.14*	.03	.07	.07	.08	-.04	-.02	.10	.01	.07	.12*	.15*	.19*	.62*	.60*	.59*	-.18*	–							
19. G7-alc	.10	.06	.06	.01	.01	.04	-.02	-.06	-.04	-.04	-.05	-.10	-.06	-.09	-.16*	-.28*	-.24*	-.18*	-.49*	–						
20. G8-alc	.07	-.06	.14*	.02	.02	-.01	-.07	-.10	-.06	-.04	-.05	-.13*	-.01	-.08	-.29*	-.35*	-.28*	-.24*	.49*	.59*	–					
21. G9-alc	-.03	-.12*	.11*	.00	.02	-.00	-.05	-.10	-.08	-.04	-.07	-.11*	-.08	-.08	-.31*	-.34*	-.31*	-.34*	.37*	.59*	.54*	–				
22. G10-alc	.09	.06	.15*	.10	.14*	.09	-.04	-.05	-.12*	-.14*	-.01	-.09	-.06	-.09	-.26*	-.29*	-.28*	-.27*	.43	.52*	.54*	.17*	–			
23. G7-dpr	-.17*	-.08	-.12*	-.09	-.08	-.08	.02	.09	.07	.05	-.03	-.03	.05	.08	-.26*	-.21*	-.13*	-.17*	.15*	.25*	.24*	.17*	.63*	–		
24. G8-dpr	-.18*	-.05	-.03	-.03	.06	.02	-.06	-.03	-.05	-.11*	-.08	-.01	-.05	-.05	-.16*	-.24*	-.08	-.18*	.19*	.28*	.29*	.22*	.63*	.61*	–	
25. G9-dpr	-.11*	.03	-.03	-.02	-.01	.01	-.04	-.09	-.06	-.06	-.11*	-.12*	-.10	-.05	-.13*	-.26*	-.16*	-.27*	.15*	.23*	.21*	.10	.46*	.61*	.69*	–
26. G10-dpr	-.08	.04	.02	-.01	-.01	-.01	-.10	-.10	-.09	-.05	-.06	-.01	-.08	-.02	-.07	-.11*	-.09	-.21*	.13*	.24*	.18*	.10	.47*	.56*	.69*	–
<i>M</i>	.41	10.65	6.30	6.40	5.58	5.80	0.61	0.67	0.59	0.62	0.28	0.24	0.21	0.26	72.34	71.33	70.08	66.53	0.89	2.05	2.79	4.07	8.48	9.18	8.92	8.83
<i>SD</i>	.49	2.76	8.84	8.82	8.20	8.79	0.95	0.98	0.91	0.95	0.72	0.63	0.58	0.62	10.85	10.39	11.22	10.30	2.00	2.54	3.23	3.85	5.78	6.33	6.22	6.03

Note. Sex was coded “0” for girls and “1” for boys; alc=alcohol use; dpr=depressive symptoms.

* $p < .05$.

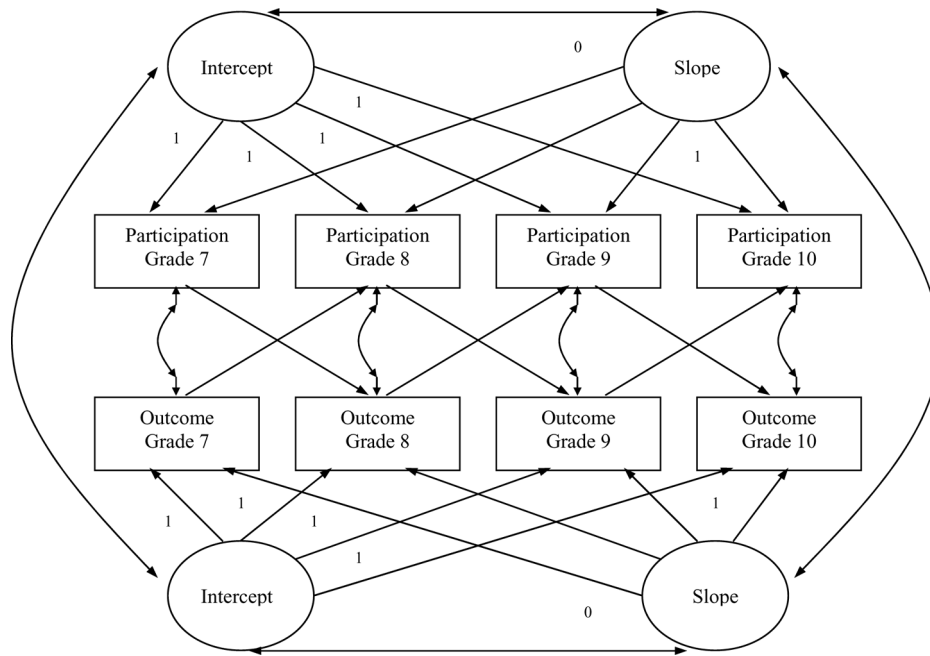


FIGURE 1 The bivariate latent growth-curve model with cross-lagged paths.

of activities was divided by 10 before conducting the analyses. We can see from Table 1 that the most notable associations include sports and alcohol use (positive), performance and fine arts and grades (positive), and youth clubs and grades (positive). We can also see that correlations across time ranged from .47 to .69 for sports, .37 to .66 for performance and fine arts, and .32 to .58 for youth clubs. For school grades, the correlations ranged from .59 to .74, for alcohol use, from .37 to .59, and for depressive symptoms, from .46 to .69.

Results for the Univariate Growth Curves

The same procedure was used for fitting all the univariate models. For each model, a random intercept factor was included to represent grade 7 levels for this variable, and a random slope factor was included to account for change over time. Because we had no a priori hypotheses about the shape of the curves, factors loadings for the second and third parameters of the slope were freely estimated (factor loadings for the first and fourth parameters were fixed at “0” and “1,” respectively). Fitting and using the unconstrained level and shape factor is a parsimonious approach when there is no statistical evidence to fit a linear or quadratic shape for the curves. In such models, the slope is the rate of change from the first to the fourth time points—here, from grade 7 to grade 10. Examination of the graphs for these analyses revealed that sports and youth clubs approximated a plateau-and-down trajectory, whereas performance and fine arts and depressive symptoms approximated an

up-and-plateau trajectory. Grades seemed to decrease linearly with a steeper decrease at the end of high school, and alcohol use approximated this same trajectory, but with increases over time. Indices of model fit for all models appear in Table 2. Models that provide a good fit to the data have nonsignificant chi-square values ($p > .05$), comparative fit indexes (CFIs) greater than .95, and root mean square errors of approximation (RMSEAs) less than .06 (Hu & Bentler, 1999).

As can be seen in Table 2, hours spent in sports and youth clubs tended to decrease from grade 7 to grade 10, whereas hours spent in performance and fine arts tended to increase, although the mean slope estimates for these curves were not statistically significant. Signification variation was observed around the intercept of sports and youth clubs and around the slope of sports (sports: estimate intercept = 54.01, $SE = 5.24$, $z = 10.30$, $p < .001$, estimate slope = 27.67, $SE = 9.44$, $z = 2.93$, $p < .01$; performance and fine arts: estimate intercept = 0.49, $SE = 0.59$, $z = 0.85$, n.s., estimate slope = 0.26, $SE = 0.57$, $z = 0.46$, n.s.; youth clubs: estimate intercept = 0.24, $SE = 0.07$, $z = 3.31$, $p < .001$, estimate slope = 0.11, $SE = 0.09$, $z = 1.16$, n.s.). It should be noted that even though the variability around some slopes was not significant, constraining it to be equal to zero resulted in a poorer model fit. As a result, the random slope was retained in the models.

For the outcome variables, grades decreased significantly over time, whereas alcohol use significantly increased. Depressive symptoms tended to increase over time, although nonsignificantly. Significant variation

TABLE 2
Univariate Model Fit Indexes

Model	df	χ^2	p	CFI	RMSEA	90% CI	Intercept estimates				Slope estimates			
							b	SE	beta	p	b	SE	beta	p
<i>Participation variables</i>														
Sports	3	8.27	.04	.992	.070	.013, .128	6.28	.43	.86	.001	-.70	.41	-.13	ns
Performance and fine arts	2	3.64	.16	.997	.048	.000, .125	.58	.05	.83	.001	.04	.04	.07	ns
Youth clubs	3	4.31	.23	.996	.035	.000, .101	.24	.03	.50	.001	-.01	.03	-.02	ns
<i>Outcome variables</i>														
School grades	2	1.49	.47	1.00	.000	.000, .095	72.35	.57	7.76	.001	-5.82	.49	-1.47	.001
Alcohol use	2	3.57	.17	.996	.047	.000, .124	.90	.10	.62	.001	3.19	.19	1.42	.001
Depressive symptoms	2	3.68	.16	.997	.048	.000, .125	8.46	.31	2.09	.001	.41	.26	.16	ns

Note. *df* = degrees of freedom; $p = \chi^2$ probability value; CFI = comparative fit index; RMSEA = root mean square error of approximation; CI = confidence intervals.

was observed around the intercept of all variables and around the slope of alcohol use (grades: estimate intercept = 87.00, $SE = 8.01$, $z = 10.86$, $p < .001$, estimate slope = 15.69, $SE = 13.29$, $z = 1.18$, n.s.; alcohol use: estimate intercept = 2.12, $SE = 0.36$, $z = 5.83$, $p < .001$, estimate slope = 5.02, $SE = 1.23$, $z = 4.10$, $p < .001$; depressive symptoms: estimate intercept = 16.33, $SE = 4.60$, $z = 3.55$, $p < .001$, estimate slope = 6.41, $SE = 3.99$, $z = 1.61$, n.s. for the slope). Here again, constraining the variance around the slopes to be equal to zero resulted in poorer model fits. As a result, the random slope was retained in the models.

With respect to the covariates, boys and youth from more affluent families participated more intensively in sports at the beginning of high school ($b = 3.19$, $SE = .84$, $z = 3.81$, $p < .001$, $\beta = .21$ for gender; $b = .47$, $SE = .15$, $z = 3.16$, $p < .01$, $\beta = .18$ for family income; covariates explained 8% of the variance). Girls also spent more hours in performance and fine arts in Grade 7 ($b = -.45$, $SE = .10$, $z = -4.33$, $p < .001$, $\beta = -.34$; covariates explained 12% of the variance). For school grades, family income was positively related to initial grades, but negatively associated with school achievement over time ($b = 1.23$, $SE = .20$, $z = 6.31$, $p < .001$, $\beta = .35$; covariates explained 13% of the variance for the intercept; $b = -.84$, $SE = .18$, $z = -4.61$, $p < .001$, $\beta = -.47$; covariates explained 23% of the variance for the slope). Finally, girls reported more depressive symptoms at the beginning of high school ($b = -1.88$, $SE = .62$, $z = -3.05$, $p < .01$, $\beta = -.22$; covariates explained 6% of the variance). No effect of gender and family income were found on the latent growth curves of youth clubs and alcohol use.

Correlations Between the Growth Curves of Participation and Adjustment

A series of growth curve analyses tested for links between the participation and developmental outcome

growth curves. For each combination of activity type and outcome, we tested for reciprocal relations among the slopes and intercepts of the participation and outcome curves. Nine models were tested separately to verify whether hours spent in sports, performance and fine arts, and youth clubs were linked to school grades, alcohol use, and depressive symptoms. Gender and family income was regressed on the intercepts and slopes of both participation and outcome variables in all models. Within-time correlations between the residuals of the participation and adjustment repeated measures were also estimated.

Of the nine models tested, seven associations between the growth curves of participation and adjustment were found to be significant. First, results indicated that higher levels of sports participation in grade 7 predicted a steeper increase in alcohol use over time ($b = .06$, $SE = .03$, $z = 2.30$, $p < .05$, $\beta = .21$). The fit of this model was adequate, $\chi^2(25) = 53.71$, $p = .00$; CFI = .98; RMSEA = .06; 90% CI = .04, .08. Second, we found that the slopes of performance and fine arts and depressive symptoms were negatively related ($b = -.67$, $SE = .31$, $z = -2.14$, $p < .05$, $\beta = -.54$). This model was a good fit of the data, $\chi^2(24) = 31.81$, $p = .13$; CFI = .99; RMSEA = .03; 90% CI = .00, .06. Third and fourth, the intercepts of youth clubs and school grades were positively and significantly related, as were their slopes (intercepts: $b = .60$, $SE = .27$, $z = 2.22$, $p < .05$, $\beta = .13$; slopes: $b = .50$, $SE = .24$, $z = 2.10$, $p < .05$, $\beta = .37$). This model fitted the data well, $\chi^2(25) = 42.53$, $p = .02$; CFI = .99; RMSEA = .04; 90% CI = .02, .07. Fifth, initial rates of participation in youth clubs and alcohol use were negatively correlated ($b = -.11$, $SE = .05$, $z = -2.01$, $p < .05$, $\beta = -.15$). The fit of this model was adequate, $\chi^2(25) = 38.73$, $p = .04$; CFI = .98; RMSEA = .04; 90% CI = .01, .06. Sixth, we found that higher levels of participation in youth clubs in grade 7 predicted a slower increase in depressive symptoms over time ($b = -1.35$, $SE = .52$, $z = -2.59$, $p < .01$,

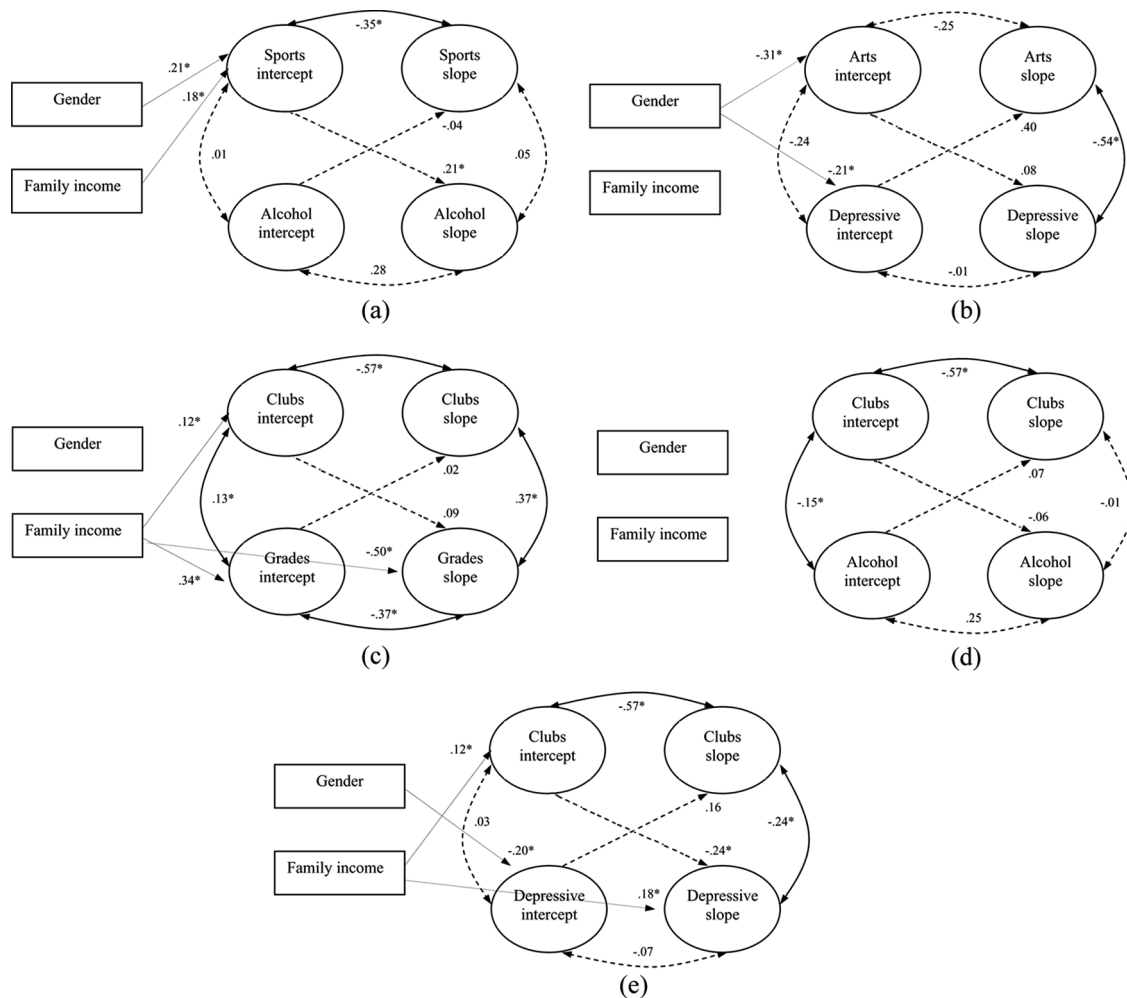


FIGURE 2 Latent growth-curve part of the tested model showing the significant associations between: (a) sports and alcohol use, (b) performance and fine arts and depressive symptoms, (c) youth clubs and school grades, (d) youth clubs and alcohol use, and (e) youth clubs and depressive symptoms. All parameters values are standardized. For the covariates, only the significant associations are presented. $*p < .05$.

beta = $-.24$). Finally, the slopes of these two variables were negatively correlated ($b = -.21$, $SE = .10$, $z = -2.07$, $p < .05$, beta = $-.24$). This model was a good fit of the data, $\chi^2(25) = 28.55$, $p = .28$; CFI = 1.00; RMSEA = .02; 90% CI = .00, .05. These results are presented in Figures 2a to 2e.

Testing for Bidirectional Effects

For these analyses, six cross-lagged paths were added to the models described above to test for time-specific associations (see Figure 1). After controlling for the stable components of both participation and adjustment, few links were found to be significant. One exception included hours spent in performance and fine arts. We first found that grade 9 arts predicted higher grades in grade 10 ($b = 2.53$, $SE = 1.11$, $z = 2.28$, $p < .05$, beta = .22). Moreover, all three paths linking grades to participation in performance and fine arts were significant

and positive (G7–G8: $b = .01$, $SE = .005$, $z = 2.63$, $p < .01$, beta = .13; G8–G9: $b = .01$, $SE = .005$, $z = 2.41$, $p < .05$, beta = .15; G9–G10: $b = .01$, $SE = .004$, $z = 2.46$, $p < .05$, beta = .13). Second, we found that hours spent in performance and fine arts in grade 8 predicted less alcohol use in grade 9, which was also the case from grade 9 to grade 10 (G8–G9: $b = -.44$, $SE = .18$, $z = -2.39$, $p < .05$, beta = $-.13$; G9–G10: $b = -.82$, $SE = .35$, $z = -2.34$, $p < .05$, beta = $-.19$). Finally, we found that depressive symptoms in grade 7 were positively related to participation in grade 8 arts ($b = .02$, $SE = .009$, $z = 2.47$, $p < .05$, beta = .13).

DISCUSSION

The goal of this study was to investigate the longitudinal associations between youth activity participation and adjustment. Is growth in participation related to growth

in adjustment over time? Are there bidirectional links between the two phenomena at specific time points over time? First, results indicated that there is significant variability in youth's trajectories of activity participation, mostly at the beginning of high school. Second, results revealed significant correlations between growth curves of: (a) sports in relation to alcohol use, (b) performance and fine arts in relation to depressive symptoms, and (c) youth clubs in relation to grades and depressive symptoms. Third, few time-specific associations were found to be significant, with the exception of performance and fine arts and grades.

Developmental Growth Curves of Youth Activity Participation and Adjustment

The developmental growth curves of participation, defined as the total number of hours spent in organized activities over one school year, were stable for the three types of activities from grade 7 to grade 10. Results revealed that youth were more likely to differ in their sports participation practices compared to performance and fine arts and youth clubs. With respect to indicators of adjustment, our growth curve results tended to be consistent with prior research. Previous studies have found both curvilinear and linear rates of change in academic achievement, as well as both increases and decreases over time (Crosnoe, 2002; Hong & Ho, 2005; Moller, Stearns, Blau, & Land, 2006; Wampler, Munsh, & Adams, 2002). In addition, alcohol use is likely to increase over time (Barnes, Reifman, Farrell, & Dintcheff, 2000; Brown, Catalano, Fleming, Haggerty, & Abbott, 2005; Schulenberg & Maggs, 2001). However, the nonsignificant slope of depressive symptoms was unexpected given prior findings (even though the shape suggested an up-and-plateau trajectory). Depressive symptoms usually increase between ages 13 and 16, and plateau or decline in late adolescence (Garber, Keiley, & Martin, 2002; Ge, Natsuaki, & Conger, 2006; Wichstrom, 1999). Among possible explanations for this discrepancy, not all of the previous studies have used the CDI (Kovacs, 1981, 1983) as we did. For instance, Ge, Natsuaki, and Conger (2006) and Wichstrom (1999) used the depression subscale of the SCL-90 (Derogatis, 1983; Derogatis, Lipman, Uhlenhuth, & Covi, 1974).

Gender differences were also found on these trajectories. As previously documented, boys participated more intensively in sports, and girls, more intensively in performance and fine arts (Eccles & Barber, 1999; McNeal, 1998; Pedersen, 2005). Girls also reported more depressive symptoms at the beginning of high school, which is consistent with previous studies (Hankin et al., 1998; Wichstrom, 1999). With respect to family income, youth from more affluent families

participated more intensively in sports at the beginning of high school (McNeal, 1998). These youth also had higher grades in grade 7, but showed a steeper decrease in academic achievement over time, which may reflect a regression to the mean effect.

Associations Between Growth Curves of Participation and Adjustment

Our first research question was to verify whether growth in participation would be associated with growth in youth adjustment. This implies that the initial level or rate of change in participation is related to the corresponding adjustment outcome trajectory parameters. With respect to sports, we found that initial levels of participation in these activities were linked to a steeper increase in alcohol use over time. In other words, the more intensively youth were participating in sports at the beginning of high school, the faster their increase in drinking over the years. The association between participation in sports and alcohol use and misuse during the high school years has been documented previously (Darling, Caldwell, & Smith, 2005; Eccles & Barber, 1999). To explain this association, researchers have suggested the possibility of a sports subculture likely to value academic success, but also alcohol use or "partying" (Crosnoe, 2002; Eccles & Barber, 1999; Barber, Eccles, & Stone, 2001; Eccles, Barber, Stone, & Hunt, 2003; Barber, Stone, Hunt, & Eccles, 2005; Miller, Hoffman, Barnes, Sabo, & Melnick, 2003). These findings draw attention to the relative importance that coaches could have in preventing a culture of alcohol use from forming among members of their teams.

With respect to performance and fine arts, we found a negative correlation between rates of change of participation in these activities and depressive symptoms. In other words, youth who increased their participation in performance and fine arts were also likely to experience a decrease in depressive symptoms, although whether or not there is any causal relation between these two slopes cannot be determined by these findings. Observed relations between arts and depressive symptoms have been mixed in the literature. In their longitudinal study of adolescents' psychopathology, Bohnert and Garber (2007) found no significant association between performance and fine arts and internalizing symptoms. Barber, Eccles, and Stone (2001) also found no association between arts participation and depressed mood, but reported that youth involved in these activities showed higher rates of suicide attempts and visits to a psychologist by age 24. On the other hand, in adolescence, these types of activities have been associated with positive outcomes such as identity exploration and initiative (Hansen, Larson, & Dworkin, 2003; Larson, Hansen, & Moneta, 2006). Arts activities may

also allow youth to express their creativity and emotions in a structured context, which could protect them from depressed mood over time. Yet more longitudinal studies are needed to document the positive, and potentially negative, association between arts activities and youth's psychological adjustment.

With respect to youth clubs, a positive relation was found between both the initial rates and rates of change of participation in these activities and school grades. In other words, youth who spent more time in these activities were also more likely to have higher grades across the high school years. Here again, however, a causal relation cannot be determined by these findings. Youth clubs, which mainly included prosocial activities and community and school clubs in this study, have been linked to adolescents' academic success, such as higher GPA, higher educational aspirations, and more years of education in other studies as well (Barber, Eccles, & Stone, 2001; Eccles & Barber, 1999; Fredricks & Eccles, 2006; Youniss, McLellan, Su, & Yates, 1999). According to Youniss, McLellan, Su, & Yates (1999), meaningful activities, such as volunteering or participating in civic organizations, serve as basic orientations toward normative society. This could, in turn, promote academic achievement, which is part of the constellation of behaviors valued by normative society. This could also explain why youth with higher rates of participation in these activities showed lower levels of alcohol use at the beginning of high school.

Finally, we found a negative correlation between rates of change of participation in youth clubs and depressive symptoms. In other words, youth who increased their participation in these activities were also likely to experience a decrease in depressive symptoms, or vice versa, since no causal relation can be determined by this correlation. Participation in prosocial activities, such as youth clubs, has been associated with higher self-esteem (Barber, Eccles, & Stone, 2001). In addition, these activities give youth the opportunity to develop linkages with adults in the community (Hansen, Larson, & Dworkin, 2003; Larson, Hansen, & Moneta, 2006). The potential additional support received from these adults may explain why youth experience a decrease in their depressive symptoms over the years (Mahoney, Schweder, & Stattin, 2002).

Bidirectional Effects Between Participation and Adjustment

By looking at bidirectional effects, our second research question was to examine more closely the direction of the associations between participation and adjustment. These effects imply, for instance, that elevated levels of participation at a particular time point influence a subsequent elevation of adjustment at a later point in time, or vice versa. After controlling for the stable

components of participation and adjustment, few cross-lagged paths were found to be significant in the different models, except for performance and fine arts. As expected, effects were found in both directions. For instance, our results revealed that even though participation in performance and fine arts in grade 9 predicted higher grades the year after, grades predicted higher participation in these activities across the high school years. Participation in performance and fine arts has been associated with positive educational outcomes in previous studies (Barber, Eccles, & Stone, 2001; Eccles & Barber, 1999), and our results suggest that this can go in both directions. The positive link from grade 7 depressive symptoms to grade 8 performance and fine arts also suggested some selection effects, whereas the two negative links from arts to alcohol use suggested some impact effects. Yet few clear bidirectional effects emerged from our findings.

In sum, our findings suggest that the outcomes of youth activity participation might be seen over a longer period of time, and not necessarily from year to year. They also inform about the direction of effects. After controlling for gender, family income, and previous levels of participation and adjustment, we found evidence consistent with both participation-to-adjustment and adjustment-to-participation effects. This adds to previous research that assessed participation at a single time point. On the one hand, our findings suggest that self-selection can indeed be at play in the association between youth activity participation and adjustment. But on the other hand, our results reveal that selection effects are not enough to account for the benefits of youth activity participation over the high school years.

Some of our null findings conflict with other studies, however. Most notably, no positive link was found between sports participation and academic achievement, which is usually well-established in the literature (Barber, Eccles, & Stone, 2001; Darling, Caldwell, & Smith, 2005; Eccles & Barber, 1999; Fredricks & Eccles, 2006). Among possible explanations, our sample may be culture-specific. Both in the United States and in Canada, organized activities are voluntary, have regular schedules and adult leaders, and promote the development of various skills. However, in the province where our data were collected, youth mostly participate in community-based activities, whereas in the United States, organized activities are often held within the school system. Yet Gerber (1996) found that participation in school activities was more strongly related to academic achievement than was participation in out-of-school activities.

Limitations of the Study

In this study, we tried to shed new light on the longitudinal associations between youth activity participation

and adjustment. However, only one specific model was tested for all indicators of participation and adjustment. It will be important in future studies to test other longitudinal models. For example, natural groups of participants might exist in the population, such as stable groups of highly-involved and non-involved youth. These youth might show unique patterns of adjustment, which could be verified using latent class trajectories. We also did not take into account the nesting of individuals within schools since our participants were scattered across multiple high schools with a very different number of youth per school (e.g., around twenty high schools included less than 5 participants). Nonetheless, differences between schools, such as in the availability of activities, remain a source of variance that could have biased the obtained estimates. Moreover, a large number of analyses were conducted and, as a result, our results should be interpreted with caution.

In addition, we only considered youths' intensity of participation in three separate types of activities, and other dimensions of participation, especially breadth (i.e., when youth are involved in more than one type of activity), merit further research attention. According to Busseri, Rose-Krasnor, Willoughby, and Chalmers (2006), the intensity and breadth of participation may not have the same developmental implications for youth. Involvement in a diverse set of activities may facilitate one's identity exploration, whereas intensive involvement in one type of activity may reflect one's talent. Moreover, the use of time as the indicator of participation is not without limitations. Although most studies have shown positive relations between intensity of participation and adjustment in the adolescent years, thresholds or tipping points with some diminishing benefits have also been documented (Mahoney, Harris, & Eccles, 2006). This was not tested in our study. The quality of the activities, such as opportunities for youth to truly engage in the activities, should also be considered when looking at participation outcomes.

We also focused on one positive outcome (grades) and two negative outcomes (alcohol use and depressive symptoms). In doing so, we did not explore the many ways that activity participation might enhance psychological adjustment or competence (Call & Mortimer, 2002; Lerner et al., 2006; Pedersen, 2005). Moreover, we did not examine the activity-adjustment curves among different subgroups of adolescents. Even though there is no reliable empirical support so far in the literature for looking at participation outcomes among boys and girls, we believe this deserves more research attention. Likewise, some researchers have suggested that although all youth are expected to benefit from organized activities, those who experience risk in one or more social contexts might benefit even more (Darling, 2005; Pedersen & Seidman, 2005). For instance, with

respect to academic outcomes, Marsh and Kleitman (2002) found that benefits of participation tended to be larger for low-income youth. Given that our sample was predominantly composed of White, middle-class youth, effects of activity participation clearly need to be further examined among youth from different ethnic backgrounds or living in disadvantaged neighborhoods.

CONCLUSION AND IMPLICATIONS FOR FUTURE RESEARCH

The current study's longitudinal assessment of both participation and adjustment allowed us to take a developmental perspective in the study of the links between activity participation and adolescent adjustment. Using four time points assessed annually during the first four years of high school, we identified a number of associations between initial levels of participation and increasing or decreasing trajectories of adjustment, as well as between changes in participation and changes in adjustment. Our findings also confirm the importance of examining activity type when conducting research in this area. Still, the examination of the processes that could explain these positive, and sometimes negative, participation effects remains crucial. What youth experience during each activity session with their peers, leaders, and parents clearly deserves more research attention.

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Received December 6, 2006

Final revision received July 8, 2008

Accepted July 8, 2008