

Extracurricular Participation and Academic Outcomes in the NICHD Study of Early Child Care and Youth Development¹

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Previous findings about extracurricular participation in early elementary school, published by the NICHD Study of Early Child Care and Youth Development (SECCYD), indicated that children who consistently participated in extracurricular activities during kindergarten and Grade 1, compared to children who participated only sometimes or never participated, obtained higher math achievement scores at the end of Grade 1, controlling for prior adjustment and a large number of family and child factors (NICHD Early Child Care Research Network, 2004). Using the NICHD data set, we follow up on these results by examining extracurricular participation through Grade 5. In the current study, we pose two research questions:

1. Is participation in extracurricular activities across time (defined as the proportion of epochs when the child participated) associated with academic outcomes in Grades 3 and 5, controlling for child, family, and school characteristics?
2. Is intensity of participation in these activities (defined as the proportions of epochs when the child participated for low, moderate, and high amounts of time) associated with the outcomes?

The NICHD SECCYD is a prospective longitudinal study that has followed children and families since the children's births in 1991. The study includes a large and diverse sample (see Table 1), and has collected extensive measures of the family and school contexts, and child

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functioning, at 10 data collection sites around the United States:

Wellesley, MA	Madison, WI
Philadelphia, PA	Little Rock, AR
Pittsburgh, PA	Lawrence, KS
Charlottesville, VA	Irvine, CA
Morganton, NC	Seattle, WA

Measures of Activity Participation

Mothers reported child participation in extracurricular or structured activities 2-3 times annually from kindergarten through Grade 5 (14 total reports or epochs). In *kindergarten and Grades 1-2*, we conducted two telephone interviews each year, in the fall and spring. We asked whether the child participated in structured activities or lessons (e.g., coached sports, music lessons) in the past week, on weekdays between 7:00 a.m. and 7:00 p.m. If yes, mother also reported the amount of time the child participated in these activities in the past week.

In *Grades 3-5*, mothers completed interviews throughout the school year (three interviews in Grades 3 & 4, two interviews in Grade 5) about their children's after-school arrangements on weekdays during a typical week. We asked where the child spent his or her time from school dismissal until 6:00 p.m., and the start and end times of each setting or arrangement. Structured activity was coded when the child was reported to participate in an interest group or club; team or individual sports; art, music, or performance lessons; academic enrichment or tutoring; or religious service or class.

As shown in Table 2, close to half of the children were reported to participate in structured activities during the kindergarten year. Half to nearly two thirds of the children participated during the elementary grades. In the full sample, the mean amount of time spent in these activities ranged from 40 minutes per week in kindergarten to 74 minutes per week in Grade 5. Among the children who participated in activities, the means ranged from 82 minutes

(kindergarten) to 127 minutes (Grade 5).

From the maternal reports of activity participation, we calculated the proportion of epochs in which children participated in structured activities from kindergarten through Grade 3 and kindergarten through Grade 5 (see Table 3). For kindergarten through Grade 3, 81% of the sample participated in structured activities during at least one epoch; for kindergarten through Grade 5, 88% had at least some participation in these activities.

We also determined *intensity* of participation via tertiary splits of the amount of time spent in the activities at each epoch. A participation intensity score (0 = none, 1 = low, 2 = moderate, 3 = high) were assigned for each epoch. At the beginning of kindergarten, *low* participation was 15-60 min/wk, $M = 53$ ($SD = 12$); *moderate* participation, 75-105 min/wk, $M = 89$ ($SD = 7$); and *high* participation, 120+ min/wk, $M = 174$ ($SD = 102$). At the end of Grade 5, *low* participation was 20-85 min/wk, $M = 55$ ($SD = 17$); *moderate* participation, 90-175 min/wk, $M = 123$ ($SD = 24$); and *high* participation, 180+ min/wk, $M = 297$ ($SD = 129$). We calculated the proportion of epochs in kindergarten through Grade 3, and kindergarten through Grade 5, in which the child's activity participation was of low intensity, moderate intensity, or high intensity (see Table 3).

Measures of Child Outcomes and Prior Functioning

Academic outcome data collected in Grades 3 and 5 included teacher reports of academic performance and work habits, and standardized tests of reading and math achievement. Prior child functioning data were obtained at 54 months and during the fall of the kindergarten year. Table 4 provides descriptive statistics for these measures.

Academic performance. Classroom teachers rated children's academic performance in Grades 3 and 5 using the *Mock Report Card* (Pierce, Hamm, & Vandell, 1999). Performance in each of six subject areas (reading, oral language, written language, math, social studies, and

science) is rated on a 5-point scale (1 = *below grade level*, 5 = *excellent*). A composite score is computed as the mean of the ratings (Cronbach's coefficient alpha = .95). The measure of prior academic performance is kindergarten teacher report on the Academic Competence scale of the *Social Skills Rating System (SSRS)*; Gresham & Elliott, 1990). Each of 9 items on this scale is rated on a 5-point scale (1 = *lowest 10%*, 5 = *highest 10%*); a total scale score is computed by summing the items (Cronbach's coefficient alpha = .95). Sample items include "Compared with other children in my classroom, the overall academic performance of this child is...", "In reading, how does this child compare to other students?", and "In terms of grade-level expectations, this child's skills in mathematics are..."

Work habits. Teachers also rated children's classroom work habits on the *Mock Report Card* in Grades 3 and 5. Six items are rated on a 5-point scale (1 = *very poor*, 5 = *very good*) and averaged to form a single score (Cronbach's coefficient alpha = .95). Sample items include "Follows classroom procedures," "Uses time wisely," and "Works well independently." The measure of prior functioning is the Cooperation scale on the *SSRS*, obtained from teachers at Kindergarten Fall. The 10 items, which are similar in content to the work habits items on the *Mock Report Card*, are rated on a 3-point scale (0 = *never*, 1 = *sometimes*, 2 = *very often*) and are summed to form a single score (Cronbach's coefficient alpha = .92).

Reading achievement. Trained research staff administered the *Woodcock-Johnson Psycho-educational Battery-Revised (WJ-R)*; Woodcock & Johnson, 1989) to study participants when they were in Grades 3 and 5. We selected the Letter-Word Identification subtest, a measure of reading identification skills, as our assessment of reading achievement. This measure also was administered when the children were 54 months old. Raw scores on this measure are converted to standard scores with a mean of 100 and a standard deviation of 15, standardized on a nationally representative sample.

Math achievement. The Applied Problems subtest of the *WJ-R* was selected as our math achievement outcome measure. This subtest assesses skills in analyzing and solving practical problems in mathematics and was administered at 54 months, Grade 3, and Grade 5. Raw scores on this measure are converted to standard scores with a mean of 100 and a standard deviation of 15, standardized on a nationally representative sample.

Measures of the Family and School Contexts

Measures of the family and school contexts were collected and used as covariates in our substantive analyses. Table 5 provides descriptive statistics for these measures.

Family context. We collected multiple measures of the family context, including demographic and family process variables. Mothers reported their education when the children were 1 month old (see Table 1). In Grades 1, 3, and 5, they reported household composition, family income, and maternal work hours. From these reports, we created variables to represent family structure (single-parent or two-parent household), income-to-needs ratio, and maternal weekly work hours at each time point. Cumulative measures of these demographic variables were created by averaging the individual scores for Grades 1-3 and Grades 1-5.

Mothers and children were videotaped while engaged in semi-structured discussions and problem-solving activities. The tapes were coded for a number of individual and dyadic behaviors that were rated on a 7-point scale (1 = *very low*, 7 = *very high*). *Maternal sensitivity* is the sum of the ratings of supportive presence, respect for child's autonomy, and reflected hostility (Cronbach's coefficient alpha = .80 to .85 across assessments). *Maternal stimulation* is the sum of the ratings of stimulation of the child's cognitive development and quality of assistance (Cronbach's coefficient alpha = .78 to .85 across assessments). We computed cumulative sensitivity and stimulation scores for Grades 1 and 3 and Grades 1, 3, and 5 as the mean of the composite ratings at those time points.

School context. When the children were in kindergarten, their mothers reported the number of hours the children were in school ($M = 24.7$, $SD = 9.4$, range = 1-50). From these reports, we determined whether the children attended full-day kindergarten, defined as more than 20 hours of school per week.

School context process features were obtained from observations of the children's classrooms in Grades 1, 3, and 5 with the *Classroom Observation System (COS)*. The classrooms were rated on a number of features using a 7-point scale (1 = *uncharacteristic*, 7 = *extremely characteristic*). Two composite scores, *instructional quality* and *emotional climate*, were calculated by summing the individual ratings of the classroom and teacher behavior. The particular ratings varied across the assessments so that they were developmentally appropriate for the children's ages. Cronbach's coefficient alpha for the instructional quality composite ranges from .70 to .76; for the classroom emotional climate composite, .77 to .89. We computed cumulative instructional quality and emotional climate scores for Grades 1-3 and Grades 1-5 as the mean of the composite ratings in Grades 1 and 3, and Grades 1, 3, and 5, respectively.

Results

Our first question was whether extracurricular participation (participated or not) was associated with academic outcomes in Grades 3 and 5. We conducted multiple regressions to examine cumulative activity participation in relation to the outcomes. In these analyses, we controlled for data collection site and child, family, and school characteristics (child sex, child ethnicity, maternal education, full- vs. half-day kindergarten, single-parent household, income-to-needs ratio, maternal weekly work hours, maternal sensitivity and stimulation, classroom instructional and emotional quality) as well as child prior functioning on each of the outcomes. As shown in Table 6, structured activity participation for more epochs from kindergarten through Grade 3 was associated with higher academic performance and work habits at the end of Grade

3. Participation in activities for more epochs from kindergarten through Grade 5 was associated with higher work habits and math achievement at the end of Grade 5.

Our next question was whether intensity of participation was related to the academic outcomes. We conducted a second set of multiple regressions in which the proportions of low-, moderate-, and high-participation epochs were considered as predictors (Table 7), using the same covariates as in the first set of analyses. More epochs of moderate extracurricular participation was associated with higher reading achievement in Grade 3 and higher work habits and math achievement in Grade 5. More epochs of high-intensity participation in structured activities was associated with higher academic grades and work habits in Grade 5. Low-intensity participation was not associated with the outcomes.

Conclusions

We found that sustained participation in extracurricular activities in elementary school during the after-school hours was linked to several academic measures, and that academic outcomes were not hindered by relatively large amounts of time in these activities. These findings demonstrate the importance of examining activity participation at young ages and suggest that substantial learning can occur in the context of nonacademic activities outside of school.

References

- Gresham, F. M., & Elliott, S. N. (1990). *The Social Skills Rating System*. Circle Pines, MN: American Guidance Service.
- NICHD Early Child Care Research Network (2004). Are child developmental outcomes related to before- and after-school care? Results from the NICHD Study of Early Child Care. *Child Development, 75*, 280-295.
- Pierce, K. M., Hamm, J. V., & Vandell, D. L. (1999). Experiences in after-school programs and children's adjustment in first-grade class classrooms. *Child Development, 70*, 756-767.
- Woodcock, R. W., & Johnson, M. B. (1989). *Woodcock-Johnson Psycho-Educational Battery-Revised*. Itasca, IL: Riverside.

Table 1
Demographic Characteristics of the Study Participants

	Recruitment Sample <i>N</i> = 1,364	Analysis Sample <i>N</i> = 1,157
Child male	52%	51%
Child ethnicity		
White, non-Hispanic	76%	77%
Black, non-Hispanic	13%	12%
Hispanic	6%	6%
Other	5%	5%
Single-parent household	14%	18%
Maternal education at 1 month		
No high school diploma	10%	9%
High school diploma or GED	21%	20%
Some college	33%	33%
College degree	21%	22%
Post-graduate education	15%	16%
Income-to-needs ratio		
0 – 1 (poor)	24%	9%
> 1 – 1.8 (near poor)	5%	14%
> 1.8 (not poor)	71%	77%

Table 2
Participation in Structured Activities during the After-School Hours

	Participated	Minutes/week, all children				Minutes/week, activity participants only			
		<i>N</i>	<i>M</i>	<i>SD</i>	Range	<i>N</i>	<i>M</i>	<i>SD</i>	Range
Kindergarten	48%	1,092	40	64	0 - 1080	528	82	70	8 - 1080
Grade 1	61%	1,082	56	74	0 - 1095	659	92	75	8 - 1095
Grade 2	66%	1,054	72	82	0 - 600	693	110	77	78 - 600
Grade 3	55%	1,054	53	79	0 - 875	577	96	85	5 - 875
Grade 4	59%	1,046	59	86	0 - 606	619	100	91	3 - 605
Grade 5	58%	1,047	74	102	0 - 638	610	127	106	8 - 638

Table 3
Cumulative Measures of Activity Participation

	<i>M</i>	<i>SD</i>	Range
Kindergarten – Grade 3 (<i>N</i> = 1,147)			
% epochs participated	43.9	33.5	0 - 100
% low-intensity epochs	16.0	17.3	0 - 100
% moderate-intensity epochs	12.4	15.4	0 - 75
% high-intensity epochs	15.5	21.8	0 - 100
Kindergarten – Grade 5 (<i>N</i> = 1,157)			
% epochs participated	43.3	31.3	0 - 100
% low-intensity epochs	15.2	15.1	0 - 79
% moderate-intensity epochs	12.9	13.7	0 - 77
% high-intensity epochs	15.2	20.4	0 - 100

Table 4
Descriptive Statistics for Child Prior Functioning and Developmental Outcome Variables

	<i>N</i>	<i>M</i>	<i>SD</i>	Range
Academic performance				
SSRS Academic Competence: Kindergarten	1,000	33.1	8.3	9 - 45
Mock Report Card: Grade 3	989	3.4	0.9	1 - 5
Mock Report Card: Grade 5	923	3.5	1.0	1 - 5
Work habits				
SSRS Cooperation: Kindergarten	992	15.9	4.0	0 - 20
Mock Report Card: Grade 3	992	3.6	1.1	1 - 5
Mock Report Card: Grade 5	941	3.7	1.0	1 - 5
Reading achievement				
WJ-R Letter-Word ID: 54 months	1,042	98.9	13.5	63 - 166
WJ-R Letter-Word ID: Grade 3	1,013	109.9	14.7	24 - 146
WJ-R Letter-Word ID: Grade 5	993	108.4	14.5	36 - 154
Math achievement				
WJ-R Applied Problems: 54 months	1,039	103.0	15.7	41 - 153
WJ-R Applied Problems: Grade 3	1,012	115.1	15.0	30 - 153
WJ-R Applied Problems: Grade 5	993	109.3	13.5	37 - 156

Table 5
Descriptive Statistics for Family and School Context Variables

	<i>N</i>	% or <i>M</i>	<i>SD</i>	Range
FAMILY CONTEXT				
Single-parent household				
Grade 1	1,048	18.0%		
Grade 3	1,053	18.5%		
Grade 5	1,001	18.5%		
Income-to-needs ratio				
Grade 1	982	4.0	3.0	0.1 - 21.3
Grade 3	982	4.4	3.8	0.1 - 26.6
Grade 5	996	4.5	4.1	0.1 - 28.7
Maternal weekly work hours				
Grade 1	1,021	26.5	19.0	0 - 90
Grade 3	1,075	26.8	19.1	0 - 91
Grade 5	1,029	27.7	19.0	0 - 81
Maternal sensitivity				
Grade 1	1,004	16.9	3.0	5 - 21
Grade 3	982	16.3	2.5	4 - 21
Grade 5	929	16.5	2.4	7 - 21
Maternal stimulation				
Grade 1	1,004	9.0	2.6	2 - 14
Grade 3	982	9.5	2.3	3 - 14
Grade 5	935	7.6	2.0	2 - 14
SCHOOL CONTEXT				
Full-day kindergarten	1,091	56.5%		
Classroom instructional quality				
Grade 1	965	15.7	4.2	4 - 28
Grade 3	971	7.0	1.4	2.6 - 12.4
Grade 5	955	11.8	2.5	5.3 - 18.5
Classroom/teacher emotional quality				
Grade 1	966	40.5	6.4	13.3 - 49
Grade 3	971	35.0	3.6	17.9 - 41.9
Grade 5	955	35.3	3.0	20.3 - 41.3

Table 6: Summary of Multiple Regression Analyses Predicting Academic Outcomes from Extracurricular Activity Participation

	Grade 3 outcomes				Grade 5 outcomes			
	Academic performance β	Work habits β	Reading achievement β	Math achievement β	Academic performance β	Work habits β	Reading achievement β	Math achievement β
Child sex—female	-.014	.132 ^{***}	-.024	-.104 ^{***}	.063 [*]	.218 ^{***}	-.040	-.125 ^{***}
Child ethnicity								
White	reference	reference	reference	reference	reference	reference	reference	reference
Black	-.101 ^{**}	-.041	-.110 ^{**}	-.103 ^{**}	-.124 ^{***}	-.083 [*]	-.103 ^{**}	-.106 ^{**}
Hispanic	.032	.016	.013	.030	.009	-.002	.037	.019
Other	-.055 ⁺	-.010	-.017	.026	.013	.011	.019	.066 [*]
Maternal education	.096 [*]	.112 ^{**}	.104 ^{**}	.084 [*]	.140 ^{***}	.064	.109 ^{**}	.076 [*]
Full-day kindergarten	-.005	-.001	.026	.029	-.012	.058 ⁺	.051	-.021
Single-parent household	-.057 ⁺	-.032	-.079 [*]	-.048	-.059 ⁺	-.021	-.040	-.041
Income-to-needs ratio	.073 [*]	.005	-.037	.007	.017	.041	-.009	.028
Maternal weekly work hours	.036	-.003	.022	.042	-.019	-.029	.036	.041
Maternal sensitivity	.032	-.015	-.024	.013	.076 ⁺	.044	.032	.051
Maternal stimulation	.060	.102 [*]	.131 ^{**}	.034	.074	.073	.139 ^{**}	.004
Classroom instructional quality	.029	.050	-.043	-.016	.026	.076 ⁺	-.024	-.052
Classroom emotional climate	-.016	.011	.020	.029	-.031	-.032	.011	.017
Prior functioning	.389 ^{***}	.370 ^{***}	.414 ^{***}	.494 ^{***}	.362 ^{***}	.290 ^{***}	.363 ^{***}	.455 ^{***}
% epochs K-Grade 3 activities	.079 [*]	.090 [*]	.028	.055 ⁺				
% epochs K-Grade 5 activities					.066 ⁺	.124 ^{***}	.037	.106 ^{**}

⁺ $p \leq .10$. ^{*} $p \leq .05$. ^{**} $p \leq .01$. ^{***} $p \leq .001$. Data collection site was controlled in these analyses.