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The role of neighborhood ecological assets and activity involvement in youth developmental outcomes: Differential impacts of asset poor and asset rich neighborhoods ☆

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ABSTRACT

Developmental system theories recognize that variables from multiple levels of organization within the bioecology of human development contribute to adolescent development, including individual factors, family factors and the neighborhood which includes extracurricular activities. Extracurricular activities provide a context for youth development, and participation has been linked with positive developmental outcomes. This study uses data from a subsample of early adolescents in the 4-H Study of Positive Youth Development to determine whether neighborhood assets moderate the effect of adolescent activity involvement on positive and negative developmental outcomes. The relationship between activity involvement and neighborhood assets was different for girls as compared to boys when assessing outcomes of positive youth development, risk behavior, and depression. Consistent with a developmental systems perspective, the findings affirm the need for researchers and practitioners to consider multiple contextual influences when seeking to understand or promote, respectively, positive youth development.
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Many factors contribute to adolescent development, including individual characteristics, resources, and preferences, family factors, school factors, and neighborhood/community factors. The recognition of the multiple contexts that influence youth development and the bidirectional, individual-context relational process that link the person to his or her ecology, can be attributed to developmental system theories such as bioecological systems theory (Bronfenbrenner, 1979), developmental contextualism (Lerner, 2002), dynamic systems theory (Thelen & Smith, 1998), and holistic person-context interaction theory (Magnusson, 1995). The positive youth development perspective emerged in the 1990s (Hamilton, Hamilton, & Pittman, 2004) and is rooted in developmental system theories that stress the relationship between the developing individual and the environment as well as the plasticity, or capacity for change, inherent in human development (Lerner et al., 2005). Positive development is optimal when there is a good fit between the individual and the ecological assets found in the context in which he or she is embedded (Benson, Scales, Hamilton, & Sesma, 2006). Extracurricular activities have been suggested to be one type of asset that can potentially enhance development (Eccles & Gootman, 2002).

Extracurricular activities as a context for development

Regardless of the specific location (i.e., at school, in the community, etc.), programs that promote positive youth development provide youth with (a) physical and psychological safety, (b) appropriate structure, (c) supportive relationships, (d) opportunities to belong, (e) positive social norms, (f) support for efficacy and mattering, (g) opportunity for skill building, and (h) integration of

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family, school, and community efforts (Eccles & Gootman, 2002). Alternatively, time spent in unsupervised activities has been linked with antisocial behavior (Persson, Kerr, & Stattin, 2007). Positive youth development activities range in scope from single-focus programs like sports teams to national organizations like 4-H. Participation in positive activities has been linked with positive outcomes such as college attendance, volunteering, voting (Zaff, Moore, Papillo, & Williams, 2003), higher academic performance, decreased risk taking (Eccles & Barber, 1999), psychological resilience, self-worth, and school belonging (Fredricks & Eccles, 2006). Although sports involvement has features that promote positive development, studies have also found a relationship between sports involvement and negative outcomes including high levels of stress (Larson, Hansen, & Moneta, 2006), substance use (in the case of school team sports) (Eccles & Barber, 1999) and delinquency and substance use (Fauth, Roth, & Brooks-Gunn, 2007).

In addition, media attention, and more recently research, has focused on the possible negative effects of over-scheduling youth (Elkind, 2001; Mahoney, Harris, & Eccles, 2006). The over-scheduling hypothesis warns against the potential negative effects of over-involvement in activities. This hypothesis is based on the idea that participation in activities is extrinsically motivated; the extensive time commitment required to participate in activities erodes time spent in traditional family activities (such as shared meals); and due to the combination of adult (parents, teachers, coaches) pressures to achieve (for example, academically) and heavy time commitments that erode family functioning, youth are at greater risk of developing adjustment problems and poor relationships with parents (Mahoney et al., 2006). In essence, then, the relationship between adolescent extracurricular activity involvement and developmental outcomes does not appear to be as simple and straightforward as initially believed (Mahoney, Vandell, Simpkins, & Zarrett, 2009).

Neighborhoods as an ecological asset

Neighborhood effects typically operate through processes that occur at the individual, family, and community levels (Leventhal & Brooks-Gunn, 2000; Leventhal, Dupere, & Brooks-Gunn, 2009). Particularly for younger adolescents, access to neighborhood resources and extracurricular activities may be brokered by parents (Leventhal & Brooks-Gunn, 2000) or by adolescents' own ability to self-regulate (Gestsdottir & Lerner, 2007; Zimmerman, Phelps, & Lerner, 2007). One of the principles of youth development proposed by Benson, Scales, Hamilton, and Sesma (2006) is that, although all youth stand to benefit from supportive relationships, contexts, and ecologies, the strategies for promoting these assets may differ as a function of the individual's social location. Accordingly, in addition to whatever individual characteristics an adolescent may bring to a social setting, the quality, diversity, and quantity of neighborhood resources such as recreational and social programs (parks, sports programs, and community centers), social services, and schools may mediate neighborhood effects on youth well-being (Leventhal & Brooks-Gunn, 2000; Leventhal et al., 2009).

Generally, utilization of these institutional resources is expected to be beneficial particularly for youth living in disadvantaged neighborhoods. However, involvement in extracurricular activities could potentially have negative effects on youth living in disadvantaged neighborhoods marked by high levels of violence, as participation could increase their exposure to neighborhood violence (Fauth et al., 2007; Sampson, Raudenbush, & Earls, 1997).

Defining and explaining neighborhood ecological assets

Measuring and observing neighborhood effects are a challenging, and yet important, endeavor. The most common approaches are subjective measures based on residents' perceptions of their neighborhoods and objective measures of neighborhood resources. Subjective measures have the problem that individual perceptions may not reflect the actual available resources. In turn, objective measures may fail to capture the degree to which any given resource is actually valued or utilized. Despite these limitations, the use of a taxonomy of objective neighborhood asset measures is desirable particularly when comparing youth outcomes across youth from multiple neighborhoods.

Theokas and Lerner (2006) specified four categories of ecological assets that organize the resources and opportunities available to youth in the context of the family, school, and neighborhood. Within each context, they documented four dimensions of assets including: human resources, physical or institutional resources, collective activity, and accessibility. With neighborhoods defined by census tracts, data for the observed neighborhood ecological assets was derived from census data, online resources, the National Center for Educational Statistics, and student questionnaires (see Theokas & Lerner, 2006 for a complete description of measures). The strength of this taxonomy is that they have specified major categories of ecological assets that are applicable to multiple settings, across multiple contexts.

Human resources refer to the strengths, skills, talents, and abilities of people and in the neighborhood context is operationalized by the percent of college educated residents, the percent of employed adult males, and the presence of at least one non-parental adult mentor (as reported by the student). Physical and institutional resources refer to opportunities for recreation, learning, and engaging with the physical and social world. In the neighborhood context, this asset is documented by the presence of a local library, youth facilities (i.e., local youth center, Boys and Girls Club, YMCA), and recreation opportunities (i.e., city/town parks, state/national parks, recreation programs). Collective activity refers to the relationships and connections among institutions, youth, and community members and is operationalized in the neighborhood context by the presence of community organizations (i.e., community center, community development corporation), neighborhood groups, and youth coalitions. Accessibility refers to opportunities for people to utilize human resources (i.e., the potential of youth to interact with adults) and is

operationalized in the neighborhood context by neighborhood stability (the percent of residents in the neighborhood for more than five years) and the ratio of adults to children.

To measure the relationship between these ecological assets and early adolescent developmental outcomes, Theokas and Lerner (2006) formed composite scores for each of these ecological assets by creating sums for each setting (family, school, and neighborhood) and examining assets in relation to positive (positive youth development and contribution) and negative (depression and risk taking) developmental outcomes. For their sample of 646 fifth graders from six school districts representing different regions of the United States, each of the ecological asset dimensions was associated with developmental outcomes in at least one context. Collective activity in the family, accessibility in school (i.e., the potential of youth to interact with adults), and human resources in the neighborhood provided the most powerful covariate of developmental outcomes (Theokas & Lerner, 2006). The youth were still early adolescents and neighborhood ecological assets may become increasingly important as youth mature and spend less time with their families and more time in their neighborhood (Bronfenbrenner & Morris, 1998, 2006; Leventhal et al., 2009). As such, the changing developmental ecology of youth development must be considered in any analysis of the role of assets in adolescence.

The bioecological theory of development

Developmental systems theories, and particularly bioecological theory, help to explain the complex interactions between person, process, context, and time (Bronfenbrenner & Morris, 2006), and may be particularly salient as a frame for understanding links between neighborhood assets and youth development. At the core of bioecological theory are proximal processes which are defined as "progressively more complex reciprocal interaction between an active, evolving biopsychological human organism and the persons, objects, and symbols in its immediate external environment" (Bronfenbrenner & Morris, 2006, pp. 797). Proximal processes can occur by chance or by design; for example, via participation in extracurricular activities. The effects of these processes are posited to vary as a function of context and type of outcome: "the greater developmental impact of proximal processes on children growing up in disadvantaged or disorganized environments is expected to occur mainly for outcomes reflecting developmental *dysfunction*.

By contrast, for outcomes indicating developmental *competence*, proximal processes are posited as likely to have greater impact in more advantaged and stable environments" (Bronfenbrenner & Morris, 2006, pp. 803). These processes are expected to have their greatest impact on youth in the most disadvantaged settings: "If persons are exposed over extended periods of time to settings that provide developmental resources and encourage engagement in proximal processes to a degree not experienced in the other settings in their lives, then the power of proximal processes to actualize genetic potentials for developmental competence will be greater for those living in more disadvantaged and disorganized environments" (Bronfenbrenner & Morris, 2006, pp. 819). Accordingly, the potential importance of neighborhood resources in youth development is brought to the fore within the bioecological model and, as such, helps to frame the present research.

The current study

The data for this research are derived from the first wave (school year 2002–2003) and the third wave (school year 2004–2005) of the 4-H Study of Positive Youth Development (Lerner et al., 2005), when the participants were in fifth and seventh grade, respectively. This study utilizes data from a subsample of the larger national sample that was selected due to the availability of neighborhood ecological asset measures collected by Theokas and Lerner (2006). This subsample was selected to include a diverse set of individual demographic characteristics, a variety of neighborhood types (e.g., urban, suburban, rural), and different regions of the United States (Northeast, North Central, Southeast, and Southwest).

This research begins to explore how participation in extracurricular activities affects the course of positive youth development in neighborhoods with varying levels of ecological assets. Specifically, this study aims to assess whether participation in extracurricular activities has a more positive and powerful effect for youth living in asset poor neighborhoods as compared to youth living in asset rich neighborhoods and whether this varies for outcomes of competence versus dysfunction. The hypotheses tested were (a) the positive impact of participating in extracurricular activities varies inversely with the asset level of the neighborhood, such that youth in the lowest asset neighborhoods who participate in higher levels of extracurricular activities will have the most positive developmental outcomes (and reduced negative developmental outcomes); (b) youth in the highest asset neighborhoods who participate in higher levels of extracurricular activities will experience diminished returns in the form of positive developmental outcomes. This hypothesis is intended to test the over-scheduling hypothesis (e.g. Mahoney et al., 2006). A quadratic term for activity involvement was used to test for potential negative effects of high levels of activity involvement.

Since previous studies using the data from the 4-H Study of Positive Youth Development have found gender differences in patterns of activity involvement (Zarrett et al., 2007) and outcomes (Jelicic, Bobek, Phelps, Lerner, & Lerner, 2007; Theokas & Lerner, 2006), the data for this study were analyzed separately for boys and girls. In order to control for individual selection effects, self-regulation was included as a control variable. Self-regulation (defined according to the processes of selection, optimization, and compensation (SOC)), refers to what an individual uses to regulate his or her relationship with the environment and emphasizes those aspects of the individual that would lead him or her to select and capitalize on the supports available within the ecological context (Baltes, Lindenberger, & Staudinger, 2006; Lerner, 2005, 2008).

Method

A subsample of youth ($N = 626$), including 322 girls and 304 boys, from six school districts ($N = 17$ schools), across four communities (Mesa, Arizona; Worcester, Massachusetts; Dade County, Florida; and Missoula, Montana), were selected from the larger sample of youth in the national 4-H Study of Positive Youth Development. As previously noted, this subsample was selected based on the work of Theokas and Lerner (2006). The youth participants were a diverse group of fifth-grade students at the first wave of data collection (mean age = 11.06, $SD = 0.51$, 51% female, average mother's education = 13.3 years, mean per capita family income = \$11,530.63, SD = \$8,596.10). Because of the particular communities that were sampled, a large percentage of youth were Latino (35.2%). Other youth were European American (34.7%; African American, 6.9%; Asian American, 4.7%; Multiethnic, 3.9%; and other, 11.8%). Across the four communities we sampled, participants were living in various types of settings (38.2% urban, 30.2% suburban, and 31.6% rural).

Missing data

Of the 626 adolescents included in the analyses, 194 had complete data on all outcome variables and 199 had complete data on all explanatory variables. Overall, 66 had complete data on all outcome and explanatory variables for both measurement occasions of this study. Since multiple imputation is preferred compared with other methods for handling missingness such as listwise deletion and mean replacement (Jelicic, Phelps, & Lerner, 2009), when missing data occurred for the included 626 adolescents, missing values were replaced using multiple imputation based on chained regression equations. Multiple imputation was implemented using Stata's user-written program ice (imputation by chained equations) and run on Stata version 10 SE (Royston, 2004, 2005a,b).

The idea of multiple imputation is to create multiple imputed data sets for a data set with missing values. The analysis of a statistical model is then done on each of the multiple data sets. The multiple analyses are then combined to yield a single set of results applying "Rubin's rules" for combining the results of an analysis of multiply imputed data sets (Rubin, 1987). In the current study, 10 data sets combining observed and imputed values were created as suggested by Graham, Olchowski and Gilreath (2007). Missing values for each variable were imputed by regressing the variable with missing data on a set of predictor variables.

Data collection

Youth were given a two-hour block of time at school to complete the student questionnaire which included measures related to the Five Cs (competence, confidence, connection, character, and caring) of positive youth development (PYD), individual and ecological assets, problem behaviors, developmental regulation, extracurricular activity involvement, and demographics (Lerner et al., 2005). Parents/guardians were also asked to complete a consent form and questionnaire that included items about the family and the neighborhood.

Outcome measures

Three outcomes were used including a composite measure of positive youth development and two measures of negative development: depression and risk behavior. All three measures were obtained from the student questionnaire at the third wave of data collection, when the youth were in the 7th grade.

As described by Lerner et al. (2005), several measures derived from the overall measurement model of the 4-H Study of PYD were used to index PYD, operationalized through the assessment of the Five Cs (Eccles & Gootman, 2002; Roth & Brooks-Gunn, 2003). Each of the Cs of PYD–competence, confidence, character, connection, and caring–comprises a number of well-validated scales designed to assess the essential elements of the definition of the construct. Full details about the substance and psychometric characteristics of these measures are found in several publications (e.g., Gestsdottir & Lerner, 2007; Jelicic et al., 2007; Lerner et al., 2005; Phelps et al., 2007; Zimmerman, Phelps, & Lerner, 2008). A PYD score for each participant was computed as the mean of Five Cs, with higher scores representing higher levels of the Cs and PYD (mean = 74.38, SD = 10.67). PYD scores could range from zero (0) to 100. Cronbach's alpha for the PYD composite score was .95.[1] Of the 626 participants, 207 (33.1%) had complete data on this variable prior to missing data imputation.

Negative developmental characteristics were measured with two scales representing internalizing (depression) and externalizing (delinquency and substance use) problems. The Center for Epidemiological Studies Depression (CES-D) scale is a 20-item self-report measure of depressive symptomatology (Radloff, 1977). Depression was conceptualized as feelings of frustration, sadness, demoralization, loneliness, and pessimism about the future (Radloff, 1977). Example items include "During the past week I was bothered by things that usually don't bother me" and "During the past week I felt sad." The response format ranges from 0 = *rarely or none of the time* to 3 = *most or all of the time* to indicate how frequently the respondent experienced symptoms during the previous two weeks. However, our participants reported how often they experienced symptoms during the past week. An adjusted sum of the items was computed to arrive at a total score (mean = 14.39, $SD = 10.16$; $\alpha = .87$), with a

[1] Cronbach's alphas reported in this study were computed based on the entire 4-H Study sample of Grade 5 and/or Grade 7 participants.

maximum possible score of 60, and higher scores are indicative of higher depressive symptomatology. Of the 626 participants, 264 (42.2%) had complete data on this variable prior to missing data imputation.

We measured indicators of risk behavior and delinquency with a set of questions derived from items included in the Search Institute's Profiles of Student Life-Attitudes and Behavior (PSL-AB) scale (Leffert et al., 1998) and the Monitoring the Future (2000) questionnaire. Five items assess the frequency of substance use (e.g., smoked cigarettes, drank alcohol, used marijuana or hashish) in the past year. The response format ranges from 1 = *never* to 4 = *regularly* ($\alpha = .86$). Four items assess the frequency of delinquent behaviors. The response format for these items ranges from 1 = *never* to 5 = *five or more times*. A sample delinquency item is "During the last 12 months, how many times have you hit or beat up someone?" ($\alpha = .73$). A mean score of potential risk behaviors was calculated for each youth (mean = 2.51, $SD = 3.18$). Of the 626 participants, 237 (37.9%) had complete data on this variable prior to missing data imputation.

Predictor variables

The hypotheses were assessed using several predictor variables including standardized per capita family income, self-regulation (SOC), activity involvement, and neighborhood asset scores (physical resources, human resources, collective activity, and accessibility), all measured at Grade 5. Parents or guardians were sent a questionnaire and completed questions about the family. Per capita family income was calculated based on information reported by parents or guardians and was positively skewed. Scores were transformed by taking the log of per capita family income and dividing by 10. Mother's education did not account for any additional variability when census tract was included as a level and was therefore not included in the model.

Self-regulation

Self-regulation was measured using the nine-item version of the SOC scale (Gestsdottir & Lerner, 2007). Each participant had a SOC score which is the sum of the items ($\alpha = .55$). Items are scored dichotomously (mean = 7.2, $SD = 2.0$). An example of a SOC item is "When I do not succeed right away at what I want to do, I don't try other possibilities for very long [Person A] OR I keep trying as many different possibilities as are necessary to succeed at my goal [Person B]." Of the 626 participants, 514 (82.1%) had complete data on this variable prior to missing data imputation.

Activity involvement

Intensity of extracurricular activity involvement ($\alpha = .67$) at Grade 5 was obtained from the student questionnaires (range = 0–5.76; mean = 0.84, $SD = 0.65$). Youth ranked their involvement in several activities where 0 = no involvement, 1 = a few times a year, 2 = once a month, 3 = several times a month, 4 = once a week, and 5 = several times a week. Youth were asked to indicate their level of involvement in the following activities: Girl Scouts/Boy Scouts, 4-H Clubs, Boys Clubs/Girls Clubs, martial arts, tutoring (giving and/or receiving), paid work, mentoring/peer advising, dance, music, religious youth group, academic clubs, school government, religious education, sports, school band, acting/drama, volunteer work, YMCA/YWCA, Big Brothers/Big Sisters, and attending an after school child care program. Although all of the activities listed are not inherently "positive" they do indicate constructive use of time in diverse settings. Of the 626 participants, 502 (80.2%) had complete data on this variable prior to missing data imputation.

Neighborhood ecological assets

Theokas and Lerner (2006) have documented the presence of ecological assets within the neighborhoods of the selected subsample. This information was collected from the 2000 Census reports, the National Center for Educational Statistics (NCES), the student questionnaires, city websites, county websites, and online directories (Table 1). In this sample, physical resource scores ranged from − 1.14–2.60 (mean = 0.0, $SD = 0.65$); collective activity scores ranged from − 0.66–1.76 (mean = 0.0, $SD = 0.55$); accessibility scores ranged from − 1.74–3.04 (mean = 0.0, $SD = 0.72$); and human resource scores ranged from − 1.91–1.55 (mean = 0.0, $SD = 0.65$). All participants had complete data on this variable prior to missing data imputation.

Results

Analyses of the data from Waves 1 and 3–that is, Grades 5 and 7 of the 4-H Study data set–were done to determine whether extracurricular activity involvement differentially affects youth depending upon the resources available to them in the neighborhood in which they are embedded.

Descriptive and correlational analyses

Descriptive analyses were conducted to determine the mean levels of activity involvement, SOC, income, and neighborhood assets when the youth were in fifth grade and PYD, risk behavior, and depression when the youth were in seventh grade. The results showed that in general, the youth in the sample exhibited low levels of depression and risk behaviors and high levels of PYD.

Initially, a correlation matrix was analyzed separately by gender to explore the relationships between neighborhood asset scores, dependent variables, and covariates and the results are presented in Table 2. As would be expected, several neighborhood assets were significantly correlated. For both boys and girls, neighborhood accessibility was positively correlated with neighborhood human resources and physical resources. Neighborhood human resources and physical resources were also

Table 1
Observed neighborhood ecological assets.

Indicator	Source of items	Range	Items	Mean (*SD*)
Human resources				
Education level	Census 2000	1–68	Percent of college educated residents	23.14 (17.2)
Employment level	Census 2000	23–81	Percent of employed adult males	68.31 (16.3)
Adult mentors	SQ	0–2	Do you have at least one adult, other than your parent, you can talk to if you had a problem?	1.14 (.57)
Physical resources				
Library	NCES	0–1	A local library	.12 (.32)
Youth facilities	Online	0–3	a) Local youth center b) Boys and Girls Club c) YMCA	.39 (.54)
Recreation opportunities	Online	0–3	a) City/town parks b) State/national parks c) Recreation program	1.29 (.65)
Collective activity				
Community organization	Online	0–1	a) Community center b) Community development corporation	.09 (.28)
Neighborhood group	Online	0–1	An organization that represents the needs of the neighborhood	.28 (.45)
Youth coalition	Online	0–1	A local organization devoted to youth development and needs	.61 (.49)
Accessibility				
Neighborhood stability	Census 2000	22–79	Percent of residents in neighborhood more than five years	49.51 (9.8)
Ratio adults to children	Census 2000	1.45–12.69		2.91 (1.5)

Note. SQ = Student Questionnaire.

positively correlated for girls. For both boys and girls, collective activity was negatively correlated with physical resources, accessibility, and human resources. Activity involvement was not significantly correlated with any of the outcome variables for boys and was only significantly (and positively) correlated with PYD for girls. For boys, PYD was positively correlated with physical resources, accessibility, and human resources, but negatively correlated with collective activity. However, for girls, PYD was positively correlated with collective activity and human resources and negatively correlated with physical resources. For both boys and girls, risk behavior was positively correlated with physical resources and negatively correlated with human resources. Risk

Table 2
Correlations among neighborhood asset scores, dependent variables, and covariates.

Variable	1	2	3	4	5	6	7	8	9	10
1 Physical res	1									
2 Collective act	− .29	1								
3 Accessibility	.14	− .22	1							
4 Human res	.04	− .08	.23	1						
5 PYD	ns	ns	.07	.30	1					
6 Risk behavior	.14	− .05	− .03	− .09	− .38	1				
7 Depression	.05	ns	− .12	− .15	− .34	.20	1			
8 Income	.12	− .16	.34	.53	.22	− .05	− .16	1		
9 SOC	.05	− .04	.08	.18	.36	− .22	− .12	.14	1	
10 Activity inv	− .12	.04	.04	.10	.04	ns	ns	ns	ns	1

Correlations among neighborhood asset scores, dependent variables, and covariates by sex.

Variable	1	2	3	4	5	6	7	8	9	10
1 Physical res	1	− .34	.14	.07	− .04	.09	.06	.11	ns	− .14
2 Collective act	− .24	1	− .22	− .06	.08	− .11	− .05	− .08	ns	.08
3 Accessibility	.13	− .23	1	.21	ns	ns	− .10	.32	.04	.05
4 Human res	ns	− .10	.26	1	.34	− .10	− .18	.52	.22	.09
5 PYD	.09	− .04	.15	.26	1	− .38	− .37	.22	.38	.04
6 Risk behavior	.17	ns	− .09	− .06	− .34	1	.22	− .05	− .23	ns
7 Depression	.05	.04	− .13	− .12	− .36	.20	1	− .16	− .12	ns
8 Income	.14	− .23	.38	.54	.22	− .05	− .16	1	.13	− .04
9 SOC	.08	− .08	.12	.14	.35	− .21	− .13	.15	1	ns
10 Activity inv	− .07	ns	.05	.11	ns	ns	ns	.05	ns	1

Note. All correlations are significant unless otherwise specified.
Correlations for male participants (n =304) are in the lower triangle portion of the matrix, and correlations for female participants (n = 322) are in the upper triangle portion of the matrix.

behavior was also negatively correlated with accessibility for boys and collective activity for girls. For both boys and girls, depression was negatively correlated with accessibility and human resources and positively correlated with physical resources. However, depression was negatively correlated with collective activity for girls and positively correlated with collective activity for boys.

Multivariate analyses

Hierarchical multiple regression was used to test the hypothesis that the effect of increased levels of participation in extracurricular activities would vary inversely with the asset level of the neighborhood such that youth in the lowest asset neighborhoods who participated in the highest levels of extracurricular activity would have the most positive developmental outcomes. For each of the three outcome variables (PYD, depression, and risk behavior), eight models were tested; male and female for each neighborhood asset type: physical resources, human resources, collective activity, and accessibility. The first step was an unconditional model without any predictors. Next, the youth/family level control variables were added (SOC and income). Linear and quadratic terms for activity involvement were added at step three to examine how activity involvement affects PYD, depression, and risk behaviors. The quadratic term was included to test for potential negative effects of high levels of activity involvement. In the last step, the neighborhood asset variable was entered as well as a neighborhood asset by activity involvement interaction term and a neighborhood asset by activity involvement squared interaction term. The interaction terms were included to test whether neighborhood assets moderated the effects of activity involvement. The inclusion of the linear interaction term tested the first part of the hypothesis that youth in low asset neighborhoods who participate in high levels of extracurricular activities would have the most positive outcomes. The inclusion of the squared interaction term addressed the second part of the hypothesis that youth in high asset neighborhoods who participate in high levels of extracurricular activities would exhibit diminished levels of positive outcomes (over-scheduling hypothesis).

Neighborhood assets

The results of the full model including all predictor variables and covariates are presented for PYD in Table 3, risk behavior in Table 4, and depression in Table 5. The relationship between neighborhood assets and outcome variables was relatively straightforward for girls. Increased levels of collective activity and human resources predicted increased levels of positive youth development and decreased levels of depression and risk behaviors. For boys, the pattern was not as straightforward. Increased levels of accessibility predicted decreased levels of depression in boys and increased levels of human resources predicted increased levels of positive youth development in boys. However, increased levels of human resources and physical resources predicted increased levels of risk behaviors in boys. Neighborhood collective activity and accessibility were associated with reduced levels of risk behaviors in boys. In general, neighborhood accessibility served as a protective factor for boys against depression and risk behaviors. The role of neighborhood human resources was less clear since this asset was associated with higher levels of both PYD and risk behaviors in boys.

Neighborhood assets moderate the effects of activity involvement: positive youth development

There were significant linear interactions between activity involvement and neighborhood assets for both boys and girls across all three outcome variables, with the exception of depression for boys. For girls, neighborhood accessibility interacted with activity involvement to predict positive youth development (Fig. 1). For girls living in low accessibility neighborhoods, low to moderate

Table 3
Parameter estimates, *p* values, and associated goodness-of-fit statistics for regression models that describe the relationship for boys and girls by neighborhood asset between PYD and activity involvement controlling for self-regulation (SOC) and income.

	Physical resources		Collective activity		Accessibility		Human resources	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
Intercept	52.38***	56.64***	52.39***	57.15***	52.34***	56.51***	54.89***	59.63***
SOC	17.88***	15.93***	17.88***	16.04***	17.66***	16.11***	17.40***	15.03***
Income	8.54***	8.99***	8.55***	8.63***	8.48***	9.18***	6.36**	6.52***
Activity involvement	− 0.40	1.50**	− 0.33	1.43**	0.29	1.21*	− 1.15	2.30***
Activity involvement^2	− 0.11	− 0.39**	− 0.15	− 0.45**	− 0.52	− 0.31*	0.21	− 0.79***
Neighborhood asset	0.73	− 0.56	1.21	3.06***	1.21	0.24	3.85***	4.12***
Activity × asset	1.15	− 0.80	2.43	− 0.23	− 0.65	− 2.22**	− 3.72*	− 0.22
Activity^2 × asset	− 0.28	− 0.28	− 1.22	0.78*	0.86	0.43	2.51**	− 0.51
δ^2_μ	28.27	15.95	29.17	19.43	26.63	18.21	24.47	13.19
δ^2_r	88.47	75.58	88.38	74.96	88.48	75.49	87.14	74.28
ll (*df*)	− 11,192.48(7)	− 11,573.97(7)	− 11,191.00(7)	− 11,565.23(7)	− 11,191.07(7)	− 11,575.46(7)	− 11,167.26(7)	− 11,543.32(7)
Change in − 2 LL	5.08	14.2**	8.04*	31.68***	7.9*	11.22**	55.52***	75.50***

*$p<.05$. **$p<.01$. ***$p<.001$.

Table 4
Parameter estimates, *p* values, and associated goodness-of-fit statistics for regression models that describe the relationship for boys and girls by neighborhood asset between risk behavior and activity involvement controlling for self-regulation (SOC) and income.

	Physical resources		Collective activity		Accessibility		Human resources	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
Intercept	6.56***	5.97***	6.59***	5.98***	6.59***	5.89***	6.87***	5.63***
SOC	− 4.06***	− 2.82***	− 4.11***	− 2.84***	− 3.98***	− 2.85***	− 4.18***	− 2.76***
Income	− 1.11	− 2.17***	− 1.19	− 2.19***	− 1.09	− 2.06***	− 1.39*	− 1.85***
Activity involvement	− 0.27	− 0.21	0.35*	− 0.14	− 0.16	− 0.01	0.11	− 0.28
Activity involvement^2	0.35***	0.20***	0.02	0.15***	0.33**	0.12**	0.13*	0.22***
Neighborhood asset	0.95***	0.35	− 0.86**	− 0.77***	− 0.91**	− 0.16	0.50**	− 0.56***
Activity × asset	1.09**	− 1.09***	− 0.98	0.03	1.36**	0.59*	− 0.68	0.46
Activity^2 × asset	− 0.69***	0.59***	0.26	− 0.03	− 0.86**	− 0.03	0.62*	0.03
δ^2_μ	1.84	1.38	3.01	1.43	2.21	1.48	2.61	1.53
δ^2_r	9.07	7.30	9.07	7.35	9.09	7.33	9.07	7.30
ll (*df*)	− 7727.78(7)	− 7821.72(7)	− 7735.72(7)	− 7833.79(7)	− 7733.47(7)	− 7830.61(7)	− 7734.22(7)	− 7825.50(7)
Change in − 2 LL	24.6***	29.06***	8.72*	4.92	13.22**	11.28**	11.72**	21.5***

*$p<.05$. **$p<.01$. ***$p<.001$.

levels of activity involvement at Grade 5 predicted increases in PYD at Grade 7. At higher levels of activity involvement, PYD scores leveled off and began to decline slightly. For girls living in high accessibility neighborhoods, PYD scores remained stable across all levels of activity involvement.

For boys, neighborhood human resources interacted with activity involvement to predict positive youth development (Fig. 2). For boys living in low human resource neighborhoods, increased levels of activity involvement at Grade 5 predicted decreases in PYD at Grade 7. The reverse was true for boys living in high human resource neighborhoods; higher levels of activity involvement predicted increased PYD.

Neighborhood assets moderate the effects of activity involvement: risk behavior

For both boys and girls, neighborhood physical resources and neighborhood accessibility interacted with activity involvement to predict risk behaviors; however, the nature of the interaction differed by gender. For girls who participated in low levels of activity involvement, there was no difference in risk behavior scores. However, medium to high levels of activity involvement at grade 5 predicted decreased levels of risk behaviors at Grade 7 for girls living in low physical resource neighborhoods. Conversely, medium to high levels of activity involvement at Grade 5 predicted increased levels of risk behaviors at Grade 7 for girls living in high physical resource neighborhoods (Fig. 3). For all girls, regardless of neighborhood accessibility levels, low levels of activity involvement predicted lower levels of risk behaviors; as activity involvement increased to moderate and high levels, risk behaviors also increased (Fig. 4). However, for girls living in low accessibility neighborhoods, increased levels of activity involvement predicted lower levels of risk behaviors when compared to girls living in high accessibility neighborhoods.

For boys living in low physical resource neighborhoods, low levels of activity involvement predicted low levels of risk behaviors (Fig. 5). However, moderate to high levels of activity involvement predicted increasingly higher levels of risk behaviors. For boys living in high physical resource neighborhoods, there was relatively little difference in risk behaviors as a function of activity

Table 5
Parameter estimates, *p* values, and associated goodness-of-fit statistics for regression models that describe the relationship for boys and girls by neighborhood asset between depression and activity involvement controlling for self-regulation (SOC) and income.

	Physical resources		Collective activity		Accessibility		Human resources	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
Intercept	21.98***	18.28***	22.13***	18.43***	21.61***	18.52***	21.67***	17.40***
SOC	− 5.26***	− 3.90***	− 5.05***	− 4.14***	− 4.99***	− 4.19***	− 5.11***	− 3.52***
Income	− 5.24**	− 0.36	− 5.48**	− 0.66	− 4.74*	− 0.59	− 5.05*	0.18
Activity involvement	1.31	0.00	1.18*	− 0.06	1.56*	0.26	1.34*	− 0.68
Activity involvement^2	− 0.35	0.14	− 0.29	0.21	− 0.47	0.08	− 0.35	0.43*
Neighborhood asset	1.28	2.02	0.48	− 2.13*	− 1.77**	− 1.07	− 0.53	− 1.60**
Activity × asset	− 2.26	2.76*	0.15	1.04	− 1.25	1.65	1.03	− 2.06*
Activity^2 × asset	0.44	− 0.45	− 0.82	− 0.64	0.55	− 0.12	− 0.36	0.63*
δ^2_μ	9.39	17.15	10.09	31.32	8.40	29.55	9.96	27.38
δ^2_r	87.25	92.09	87.32	92.12	87.45	92.13	87.49	92.14
ll (*df*)	− 11,151.00(7)	− 11,898.54(7)	− 11,152.63(7)	− 11,902.32(7)	− 11,151.91(7)	− 11,901.50(7)	− 11,156.07(7)	− 11,900.51(7)
Change in − 2 LL	14.38**	18.00***	11.12**	10.44*	12.56**	18.52***	4.24	14.06

*$p<.05$. **$p<.01$. ***$p<.001$.

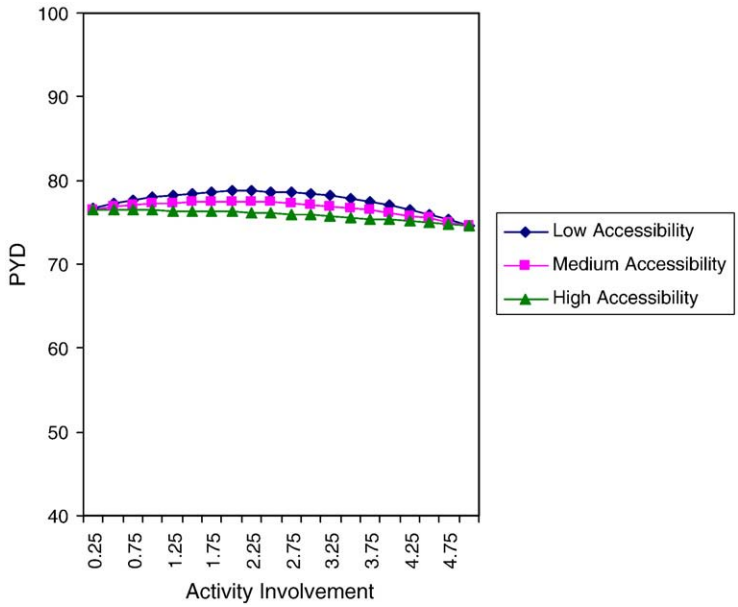

Fig. 1. Grade 7 PYD predicted by Grade 5 activity involvement and neighborhood accessibility for girls.

involvement. For boys living in low accessibility neighborhoods, low levels of activity involvement predicted the lowest levels of risk behaviors (Fig. 6). Moderate and high levels of activity involvement predicted increasing levels of risk behaviors. The reverse was true for boys living in high accessibility neighborhoods. There was a general decline in risk behaviors as levels of activity involvement increased.

Neighborhood assets moderate the effects of activity involvement: depression

For girls living in low physical resource neighborhoods, low to moderate levels of activity involvement predicted decreased levels of depression (Fig. 7). High levels of activity involvement were associated with slightly higher levels of depression. For girls living in high physical resource neighborhoods, increased levels of activity involvement were associated with increased levels of depression. A different pattern emerged for the interaction of activity involvement and neighborhood human resources. For girls living in low human resource neighborhoods, increased levels of activity involvement predicted increased levels of depression

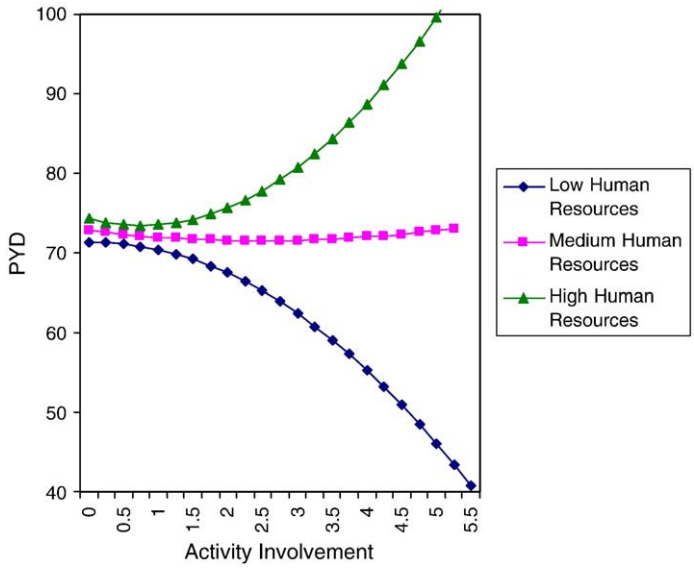

Fig. 2. Grade 7 PYD predicted by Grade 5 activity involvement and neighborhood human resources for boys.

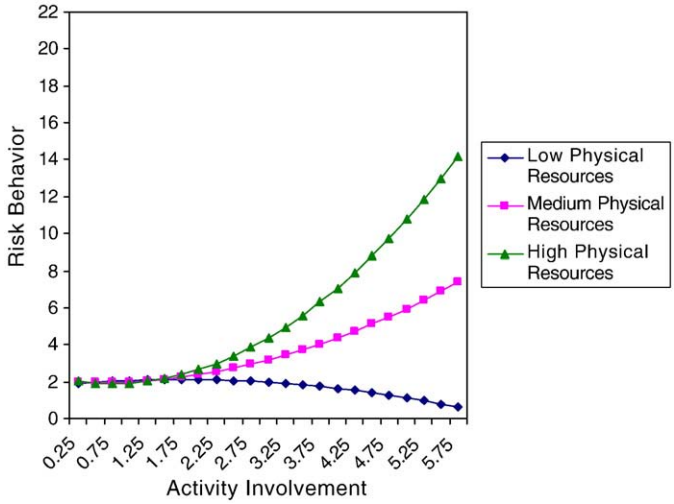

Fig. 3. Grade 7 risk behavior predicted by Grade 5 activity involvement and neighborhood physical resources for girls.

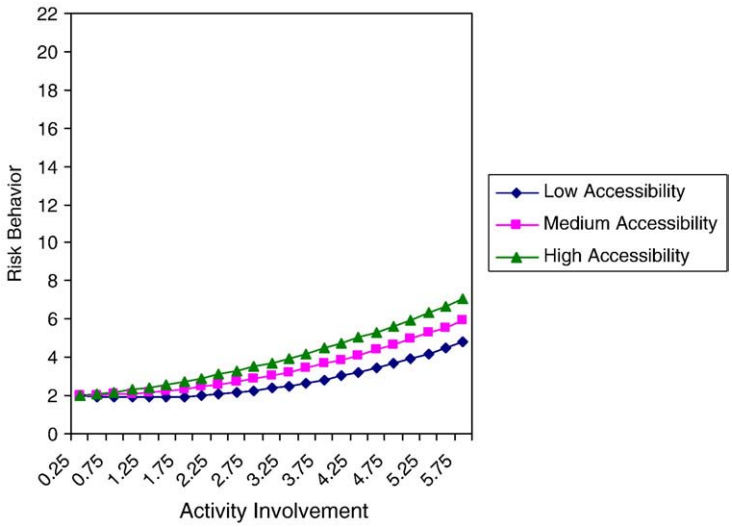

Fig. 4. Grade 7 risk behavior predicted by Grade 5 activity involvement and neighborhood accessibility for girls.

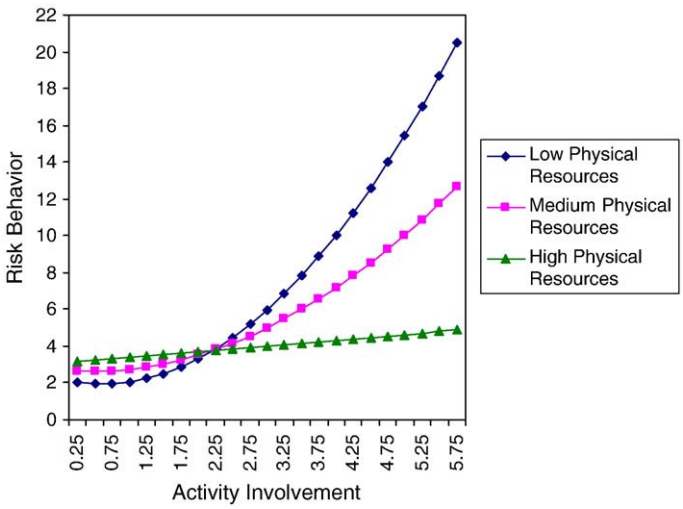

Fig. 5. Grade 7 risk behavior predicted by Grade 5 activity involvement and neighborhood physical resources for boys.

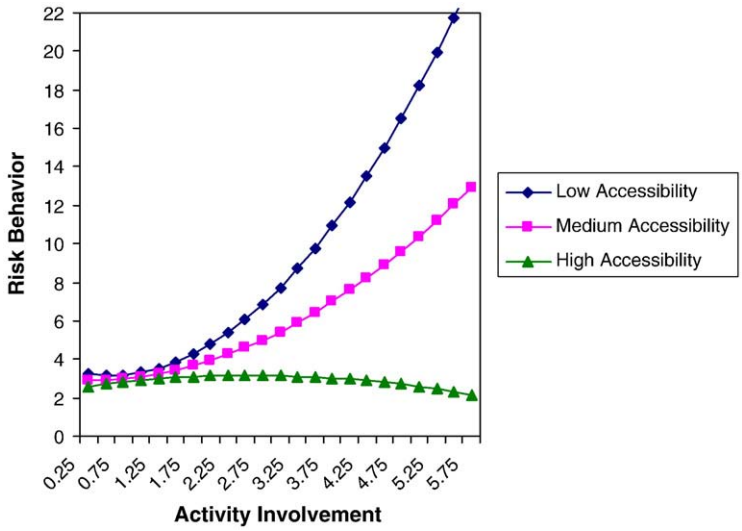

Fig. 6. Grade 7 risk behavior predicted by Grade 5 activity involvement and neighborhood accessibility for boys.

(Fig. 8). For girls living in high human resource neighborhoods, low to moderate levels of activity involvement predicted the lowest levels of depression, while high levels of activity involvement predicted the highest levels of depression.

Summary

The relationship between activity involvement and neighborhood assets was quite different for girls compared to boys. Girls who live in low asset neighborhoods scored more favorably on measures of PYD, depression, and risk behaviors when they engaged in extracurricular activities. Activity involvement did not provide the same benefits for girls living in high asset neighborhoods. Rather, girls living in high asset neighborhoods exhibited lower levels of PYD and higher levels of risk behaviors and depression at moderate to high levels of activity involvement. The opposite effect was seen for boys. For boys living in low asset neighborhoods, moderate to high levels of activity involvement predicted lower levels of PYD and higher levels of risk behaviors. However, for boys living in high asset neighborhoods, moderate to high levels of activity involvement were predictive of higher levels of PYD and lower levels of risk behaviors.

Discussion

Consistent with a developmental systems perspective, the findings from this study affirmed the need to consider multiple contextual influences on development, including the impact that distal factors, such as the neighborhood, can have on the individual. A key hypothesis of the positive youth development perspective (Lerner, 2009) is that activities are developmental assets and, as such, provide an important source of youth development. Activities act as resources for positive development by providing structured and

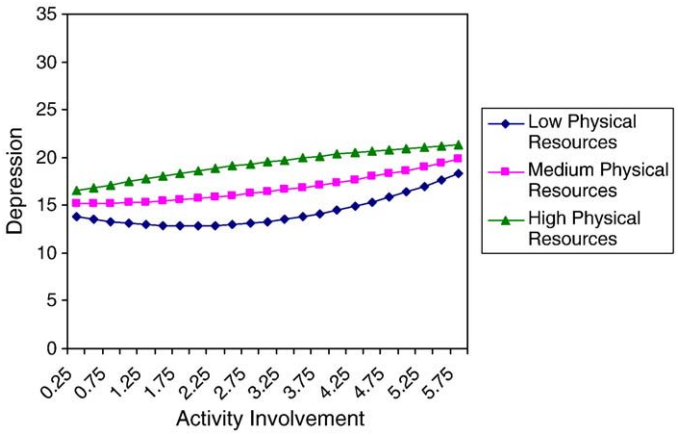

Fig. 7. Grade 7 depression predicted by Grade 5 activity involvement and neighborhood physical resources for girls.

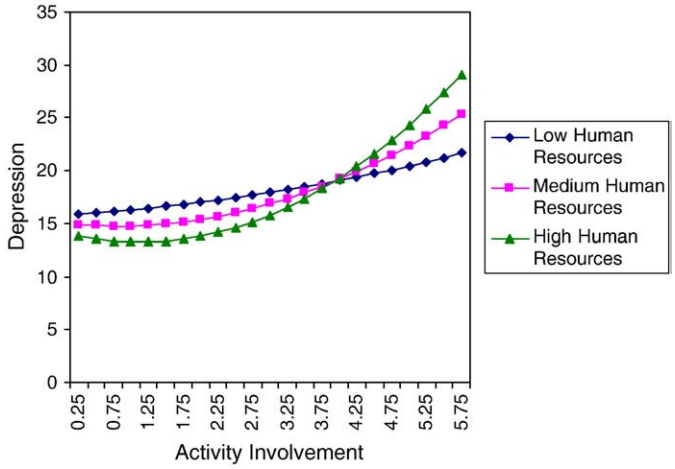

Fig. 8. Grade 7 depression predicted by Grade 5 activity involvement and neighborhood human resources for girls.

challenging activities in safe environments and therefore, increased levels of activity involvement should generally result in better developmental outcomes. Alternatively, the over-scheduling hypothesis (Elkind, 2001; Mahoney et al., 2006) warns against the potential negative effects of over-involvement in activities. The current study provided support for both perspectives as a function of gender and neighborhood assets and bioecological theory helps us interpret these unexpected findings.

For girls living in low asset neighborhoods, activity involvement was generally beneficial. Increased activity involvement was associated with increased levels of PYD and decreased levels of risk behaviors and depression. This finding is consistent with results summarized in a recent review of the literature, which concluded that, in general, more participation in organized activities is almost always better than little or no participation (Mahoney et al., 2006). For girls living in high asset neighborhoods, there was some support for the over-scheduling hypothesis. At high levels of activity involvement, girls in high asset neighborhoods exhibited increased levels of risk behaviors, particularly if they lived in neighborhoods with abundant physical resources. This finding is consistent with previous studies with European American, affluent girls, which found that girls who were both highly engaged in activities and perceived their parents as highly critical exhibited poorer adjustment (Luthar, Shoum, & Brown, 2006). Bioecological theory would predict that for the outcomes of risk behaviors and depression, increased levels of activity involvement should have the greatest impact on youth living in low asset neighborhoods (Bronfenbrenner & Morris, 2006). The results of this study indicate that this is true for girls but not for boys.

The findings for boys were unexpected and the opposite of what was found for girls. For boys living in high asset neighborhoods, activity involvement was generally beneficial. Increased activity involvement was associated with increased levels of PYD and decreased levels of risk behaviors. For boys living in low asset neighborhoods, there was some support for the over-scheduling hypothesis. At high levels of activity involvement, boys living in low asset neighborhoods exhibited decreased levels of PYD and increased levels of risk behaviors. Bioecological theory would predict that for the outcome of PYD, increased levels of activity involvement should have the greatest impact on youth living in high asset neighborhoods (Bronfenbrenner & Morris, 2006). The results of this study indicate that this is true for boys but not for girls.

Although youth may participate in extracurricular activities outside of their primary neighborhood, they are most likely to utilize those resources that are in closest proximity. However, the youth who are best able to self-regulate may seek additional resources that are not available in their immediate context and thus enhance the person–environment fit resulting in more optimal outcomes. Additional research is needed to examine the interaction between individual characteristics (such as self-regulation) and extracurricular activity involvement particularly amongst youth living in low asset neighborhoods.

Previous research suggests some promising future directions. Differential parenting practices provide one possible explanation for the gender differences found in this study. There is some evidence that parents monitor girls more than boys (Kroneman, Loeber, & Hipwell, 2004). Additional evidence suggests that higher environmental risk is associated with more authoritarian parenting strategies (Eamon, 2001). Parents of girls living in low asset neighborhoods may be more likely to use an authoritarian parenting style and encourage increased involvement in extracurricular activities. The increased time spent in activities may work to counteract the antisocial influences of the neighborhood. In addition, participation in extracurricular activities provides opportunities for girls to interact with prosocial peers who may positively affect girls who were otherwise at-risk for engaging in antisocial behavior (Bradshaw, Brown, & Hamilton, 2006, 2008).

Alternatively, boys living in low asset neighborhoods appear to be susceptible to iatrogenic effects of activity involvement. Findings from the intervention literature suggest that high-risk youth, and particularly boys, are susceptible to peer contagion effects (Dishion & Dodge, 2005; Dishion, McCord, & Poulin, 1999). Boys living in low asset neighborhoods who engage in high levels of activity involvement may be disproportionately exposed to and affected by “deviancy training.” Extracurricular activity involvement may escalate risk behaviors by facilitating informal interactions among peers at a time when youth are particularly vulnerable to peer effects on risk behaviors. Finally, we may note that the interesting gender differences identified in this research

constitute an important topic for future research. Such work should investigate whether the conceptualization and measurement of ecological assets is equally valid for boys and girls.

The current study utilized an objective approach to measuring neighborhood assets and is therefore subject to the criticisms that accompany the use of such measures including that they fail to capture the degree to which any given resource is actually valued by those for whom it is intended to serve (Leventhal & Brooks-Gunn, 2000). However, despite this limitation, the current study's use of census data and internet resources to catalogue neighborhood assets has two advantages: (1) it provides consistent information on available resources for individuals living in the same neighborhood; and, (2) it avoids confounding the availability of neighborhood resources with the average SES of the neighborhood.

Few studies to date distinguish between the resources available in a neighborhood and the average neighborhood SES. This conflation leads to the assumption that neighborhoods with a predominance of wealthy inhabitants must also have an abundance of neighborhood resources and, conversely, that neighborhoods with a predominance of poor residents must lack neighborhood resources. However, Allard, Tolman, and Rosen (2003) found that neighborhood SES and the availability of resources are independent. Similarly, Sampson, Morenoff, and Earls (1999) concluded that neighborhood disadvantage or advantage must be conceptualized based on more than simply poverty rates. In the current study, although family income was positively correlated with physical resources, accessibility, and human resources, it was negatively correlated with collective activity indicating that neighborhood assets and family income are not equivalent. One possible explanation is that neighborhoods that are characterized by high rates of poverty may be more likely to build collective efficacy by forming neighborhood groups and community organizations to advocate on behalf of the community. Additional research is needed to better understand this relationship.

The role and importance of neighborhood characteristics have been demonstrated by several studies that have explored their influence on individual outcomes (e.g., Leventhal & Brooks-Gunn, 2000; Paus, 2009). However, despite promising findings, neighborhood effects are consistently difficult to detect and account for the smallest amount of variance in the outcomes of interest. Most of the variance in outcomes can be explained at the individual level leaving little between-neighborhood variance to be explained (Fauth et al., 2007). Despite this challenge, the findings from the current study suggest that neighborhood-level variation does contribute to the explanation of the association between activity involvement and youth outcomes. The addition of self-regulation (SOC) as a control variable measures the individual's ability to select from a range of developmental supports and opportunities available to them within their neighborhood that will help him or her achieve individual goals. These findings add to the growing body of evidence that suggests the impact of adolescent activity involvement on developmental outcomes needs to be considered in terms of the multiple contexts (including the neighborhood) in which youth are embedded (see Leventhal et al., 2009).

In addition to the challenges associated with measuring and detecting neighborhood effects, there are additional challenges associated with measuring and cataloguing adolescent activity involvement. Youth are typically involved in a cacophony of activities (Theokas, Lerner, Phelps, & Lerner, 2006), making it difficult to capture the types of activities and the amount of time spent in these activities. The current study used a self-report approach to cataloguing activity involvement and, as such, failed to capture variation in the quality of the activities. In addition to these challenges, there is not yet clear consensus regarding the optimal amount of time youth should spend engaged in extracurricular activities (Mahoney et al., 2006, 2009). Findings from the current study begin to elucidate the more nuanced differences in developmental outcomes that have previously been observed by unpacking the relationship between neighborhood assets, activity involvement, and gender.

In sum, the results of this study revealed a complex interplay between activity involvement, neighborhood assets, and gender. Neighborhood assets moderate the effect of activity involvement on early adolescent outcomes and this relationship differs for boys and girls. Additional research is needed to understand the underlying mechanisms that drive these differences. Continued longitudinal analyses should examine whether these patterns persist through adolescence and adulthood. Future research that captures both the details of adolescent activity involvement in terms of type, quality, and time as well as variation in neighborhood assets would strengthen the literature in this field. The greatest impact on positive developmental outcomes will occur when individual factors are considered together with environmental contexts. The most successful programs are likely to be those that consider the goodness-of-fit between the individual youth and the context in which that youth is embedded.

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