

The Contribution of Middle Childhood Contexts to Adolescent Achievement and Behavior

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I. Introduction

As in other childhood stages, children spend their elementary school years in extremely diverse conditions. For some children, high family incomes provide large houses, safe neighborhoods and ample opportunities for developing both academic and social skills. For others, middle childhood is a time of economic deprivation. Some attend safe schools with highly qualified and caring teachers, while others do not. Some children live with both biological parents during middle childhood, other do not. For some, parent relationships are warm and secure, while for others they are not. For surprisingly many children, these conditions change over the course of middle childhood, and change itself may reduce the odds of entering adolescence on positive academic and behavior trajectories.

Our chapter seeks to assess the extent to which the diverse contexts experienced during middle childhood matter for children's subsequent well-being. Given the established importance of genetic factors and pre-school family background conditions, the extent to which contexts during the middle childhood years play a role in shaping – the achievement and behavior trajectories established during the preschool years is far from clear.

We address three specific questions. First, how much variation in adolescents' academic achievement and problem behaviors are uniquely explained by the contexts they experience in middle childhood? Second, to the extent that middle childhood contexts matter, which contexts matter the most? And third, are the effects of contexts in middle childhood on early adolescents' outcomes different for boys and girls and for poor and middle class children?

Our answers to these questions are based on an analysis of data from a national sample of over 2,000 children followed from birth until adolescence. Family poverty, structure and home environments are measured throughout this time, enabling us to both describe the stability of contexts between early and middle childhood and assess the extent to which middle childhood contexts add to the explanation of adolescent achievement and behavior over and above early environments.

First, we review the previous research that guides our analyses. Next, we describe our sample of children and measures of their environments and outcomes. Our presentation of results is followed by a discussion of their implications.

II. Background

Middle childhood involves important changes in intellectual, emotional, and physical realms (Eccles, 1999). During this time, children both master fundamental academic skills such as reading and arithmetic and become more self-aware, reflective, and planful. Erikson (1959) characterized this phase of life as a time of “industry”, with attention directed at gaining competencies in a variety of tasks and learning how to cooperate with their peers and adults. In contrast to children’s very early years, when the influence of proximal family contexts is paramount, the middle childhood years represent a time of increasing influences of out-of-home environments. Although the family remains an important influence on children’s well-being, children at this age increasingly participate in organized programs and interact with peers in their community or neighborhood; they may be influenced by teachers, school environments, and peer groups.

Eccles (1999) pointed out that while children typically enter middle-childhood highly optimistic about their abilities, their self-concepts become much more differentiated and less positive (albeit, for many, more realistic) by age 10. A continued decline in self-confidence and motivation into the adolescent years could portend a future of avoiding or withdrawing from certain activities. If these activities were to include academic achievement pursuits, one would be quite concerned about these children’s long-term prospects. Indeed, Collins (1984) suggested that children’s personalities, behaviors, and competencies during middle childhood may consolidate into forms persisting into adolescence and adulthood. Thus is it clearly important to study the middle-childhood years and to identify the factors that promote successful development during this time. Yet, despite the theoretical importance of this stage of life, middle childhood development -- and the factors that influence it -- has been less studied than early childhood or adolescent development.

Influences on development during middle childhood

Numerous studies have examined the influence of family and home characteristics, as well as contexts experienced outside the home, on children’s cognitive and emotional development. In the psychological literature, there has been a recent burgeoning of studies focused on the effects of poverty and economic hardship on children. In general, the non-experimental literature has suggested negative effects of low family income on children’s cognitive and emotional adjustment, with stronger negative effects during the preschool years than in later developmental periods (Duncan & Brooks-Gunn, 1997). However, one recent experiment showed that offering a package of employment and economic supports to low-income families improved boys’, but not girls’, school performance and social development during middle childhood (Huston et al., 2001).

Children’s living arrangements are also associated with an array of outcomes; here, research has focused primarily on the living arrangements during early or mid-adolescence and their influence on teenagers’ well-being. In general, children living with two married biological parents fare best developmentally. For example, DeLeire & Kalil (2002) examined 8th graders’ household family structures and found that, with the exception of living in a multigenerational household, youth who lived in all other types of non-intact (two married biological parent families) subsequently had poorer academic outcomes and engaged in more problem behaviors during the high school years. Hill, Yeung, & Duncan (2001) also provided evidence that time spent in a step-family during middle childhood predicts lower educational attainment for girls.

Research has found consistent associations between the stimulation offered by the home learning environment and children's development; again, with stronger relations established for younger than older children (Bradley et al., 2001).

As children grow, the scope of contextual influences expands to include an array of out-of-home contexts. Chief among these is the school environment. Children's sense of "school connectedness," which includes the dimensions of social belonging and relationships with teachers, has been identified as a particularly important influence on middle-schoolers' emotional & academic adjustment (Blum et al. 2002; McNeely, 2003; Roeser, Eccles, & Strobel, 1998). Positive interpersonal relationships in school can fulfill students' needs for belonging and competence and are in turn hypothesized to promote academic motivation and achievement (Connell & Wellborn, 1991; Eccles & Midgley, 1989; Goodenow, 1992; Roeser, Eccles, & Strobel, 1998).

The quality of relationships students have with teachers has been found to be an especially important determinant of students' achievement motivation and adjustment during middle childhood (Goodenow, 1992; Wentzel, 1996, 1997, 2002). Resnick and colleagues (1997), for example, found that young adolescents who reported strong emotional attachments to teachers were less likely to use substances or engage in problem behavior. Moreover, positive relationships with teachers were more influential on these behaviors than structural characteristics of the school (e.g., school type, classroom size, attendance and dropout rates).

As children grow older, they also increasingly participate in structured extracurricular programs. Indeed, supervised after-school programs are reported to be the fastest-growing segment of child-care services (Pierce, Hamm, & Vandell, 1999). Not only are these arrangements necessary for the supervision and monitoring of school-age children, but activities in after-school programs can also provide valuable opportunities for the development of skills and social relationships. Structured, non-school programs can be designed to meet many of the developmental needs of children in the middle-childhood period of development (Eccles, 1999). Participation in structured activities has been associated with positive changes in adjustment in early adolescence for middle class youth (McHale, Crouter, & Tucker, 2001), but a decline in GPA for low-income youth (Posner & Vandell, 1999). Mahoney and Stattin's (2000) analysis of 14-year olds' leisure time activities suggested that participation in highly structured leisure activities (e.g., school and community-sponsored athletics, music organizations, and church groups) is correlated with low levels of antisocial behavior. Conversely, unsupervised peer contact in the after-school hours is associated with increases in problem behavior among school age children, especially for those in relatively low-income environments (Jarett, 1999; Pettit, Bates, Dodge, & Meece, 1999; Posner & Vandell, 1994; Vandell & Shumow, 1999).

Finally, the neighborhood environments experienced during middle childhood may be an important influence on children's development. Although the research on neighborhood influences has tended to focus on adolescents, it is possible that neighborhood influences begin before then (Chase-Lansdale, Gordon, Brooks-Gunn, & Klebanov, 19xx). Physically dangerous neighborhoods may force children of all ages to be isolated in their homes and thus restrict opportunities for interactions with peers and adults (Jarrett, 1997). Parks, libraries and children's programs provide more enriching opportunities in higher-quality neighborhoods than in less-advantaged ones; as discussed above, participation in these extracurricular activities is associated with better outcomes for children.

Parents in dangerous neighborhoods may also face greater constraints in working together to enforce collective norms of positive behavior among children's peer groups (Sampson, 19xx). One recent set of experimental studies showed that increasing neighborhood safety (by randomly assigning families to safer neighborhoods) induced decreases in problem behavior for 8-14 year olds and improved reading & math scores for 5-11 year olds (Del Conte & Kling, 2001; Ludwig, Ladd, & Duncan, 2001).

Are middle-childhood contexts uniquely important?

Many of the studies reviewed above assess correlations between contexts in middle childhood and concurrent indicators of child well-being. It is therefore not clear whether these observed child outcomes are indeed the product of the contexts children experience at this time. This is a difficult issue to untangle, because contexts as well as behavior may be stable, and correlated, over time. Developmental theory predicts substantial stability in developmental trajectories. This is not because behaviors are fixed at an early age and persist, but rather because patterns of interactions between the child and his or her contexts become fixed at early ages and persist at later ages. Typically studies do not adequately address whether experiences during middle childhood affect later adjustment over and above developmental trajectories that were established during early childhood. We use a large, nationally-representative longitudinal data set to do so.

III. Method

Sample

Our data are drawn from the National Longitudinal Survey of Youth, a multi-stage stratified random sample of 12,686 individuals aged fourteen to twenty-one in 1979. Black, Hispanic, and low-income youth were over-represented in the sample. Annual (through 1994) and biennial (between 1994 and 2000) interviews with sample members, and very low cumulative attrition in the study contribute to the quality of the study's data.

Beginning in 1986, the children born to NLSY female participants were tracked through biennial interview supplements with the mother and direct child assessments. Given the nature of the sample, it is important to note that early cohorts of the child sample were born disproportionately to young mothers. With each additional cohort the children become more representative of all children, and NLSY children younger than age 14 in 2000 share many demographic characteristics of their broader set of age mates.

Given our desire to track contexts and child achievement from the preschool period through adolescence, our sample consists of all children whose contexts were tracked from birth to age 13/14 and whose achievement and behavior was tracked from ages 5/6 to 13/14. Consequently, our sample is comprised of children who were age 5 or 6 in 1986, 1988, 1990 or 1992. The age 13/14 achievement and behavior of these children were assessed in the respective 1994, 1996, 1998 and 2000 interviews. The middle childhood contexts of these children were assessed during the intervening biennial interviews. The early childhood contexts were measured annually between birth and their age 5/6 assessments.

Outcome measures

As summarized in Table 1, our dependent variables include tests of academic

achievement (reading and math) and maternal reports of problem behavior during adolescence (ages 13/14). Adolescents' academic achievement was assessed by the Peabody Individual Achievement Tests (PIAT, reading recognition and math). In our analyses we use the raw PIAT scores, and control for children's age at the time of the final assessment. Children were eligible for the PIAT tests if they were older than 5 years of age, so we are also able to control for children's scores on these same tests at the beginning of the middle childhood period.

Interviewers verbally administered the PIATs. Children were first given an age appropriate item, and a basal score was established when a child answered five consecutive questions correctly. Once a basal was established, interviewers continued to ask the child questions until the child answered 5 out of 7 consecutive items incorrectly. Subtracting the number of incorrect scores between the basal and the ceiling score from the ceiling score produced a raw test score.

The reading recognition test consists of 84 items that measure word recognition and pronunciation ability. It tests children's skills at matching letters, naming names, and reading single words out loud. Dunn and Markwardt (1970) reported the one-month temporal reliability of a national sample by grade, and the test-retest correlations ranged from a low of .81 for kindergarteners to a high of .94 for third grade students. Overall the test had an average temporal reliability of .89. Studies of the tests concurrent validity find that the test was moderately correlated with other tests of intelligence (e.g., Wechsler Intelligence Scale for Children-Revised) and reading vocabulary (e.g., Metropolitan Achievement Test) (Davenport, 1976; Wikoff, 1978).

The math subscale consists of 84 multiple-choice items designed to measure mathematic concepts taught in mainstream classrooms. The problems were designed so that children are required to apply math concepts to questions rather than conduct increasing complicated computations. The test starts with basic skills such as number recognition and counting. The test increases in difficulty to problems involving division, multiplication, and fractions. The most difficult questions involve advanced concepts from algebra and geometry. Dunn & Markwardt (1970) reported one-month test-retest reliabilities from a national sample by grade level. The reliabilities ranged from a low of .52 for kindergarteners to a high of .84 for high school seniors. On average the test-retest reliability was .74. Studies of the PIAT math test's concurrent validity found that the test correlated moderately with other tests of intelligence and math achievement (Davenport, 1976; Wikoff, 1978).

Behavior problems were assessed by mothers' responses to 30 items that asked how true statements were about a child's behavior during the past three months. We examine externalizing and internalizing behavior problems separately. The single item questions were recoded so that a response of "not true" corresponded to a score of 0, and "sometimes true" and "often" corresponded to scores of 1 and 2, respectively. The internalizing scale is comprised of 10 items that asked about behavior such as crying a lot, being fearful and anxious, being withdrawn. The externalizing scale is comprised of 20 items that ask about behavior such as cheating or lying, arguing, being disobedient, acting impulsively, and losing their temper. These subscales share three items: being unhappy, sad or depressed; too fearful or anxious; and being easily confused or in a fog.

Middle childhood context measures

Our key independent variables of interest consist of indicators of household income, family structure, urban residence, and the home environment spanning the period from ages 7 to 12, as

well as perceived neighborhood safety, perceived school safety, and perceptions of teachers at age 10 or 11 (Table 2). The measures of family income consist of the percent of middle childhood years in poverty, near poverty (1-2 times the poverty line), middle income (2-4 times the poverty line) and high income (more than 4 times the poverty line). The family structure variables assess the percent of middle childhood years children resided in married, divorced, never-married, step-family, cohabiting, and multigenerational households.

The quality of children's home environment was measured by a shortened form of the Home Observation and Measurement of the Environment (HOME) scale. We use two subscales of the HOME in our analyses as measures of children's family contexts—cognitive stimulation and emotional climate. The HOME scales combine interviewers' ratings of the child's home environment and mothers' responses to questions about the child's home experiences. Items are dichotomized and then summed to create scores. We have divided the scores by 100, and so the means range from 0 to 1.4 or 1.3.

The cognitive stimulation scale consists of 14 items that measure the quality of the child's cognitive stimulation and learning opportunities in the home environment. Included in the scale are mothers' responses to 10 questions such as whether the family receives a newspaper, whether the child attended a museum, and whether the family encourages the child's hobbies. Four interviewer items rate the physical appearance of the child's home environment. For example, interviewers appraise the cleanliness of the house and whether the rooms are minimally cluttered.

The emotional subscale of HOME consists of 13 items that measure the emotional climate of the home environment. Five of the items are interviewer ratings of the mother's interactions with her child during the child assessments and the remaining items are maternal reports of the family activities and discipline strategies. Questions asked of the mother include, how often the family gets together with relatives and friends and how often the child was spanked in the week prior to the interview. Interviewer observation items included how often the mother spoke with the child, and whether the mother introduced the child to the interviewer.

Questions in both HOME scales vary by the child's age to account for the differing dimensions of the home environment are appropriate as children age, although there is continuity across the ages in the types of questions asked. Different sets of questions are asked for children 3-5 years old, children 6-9 years old, and children 10 years and older. For example in the cognitive stimulation subscale, mothers of children below age 6 are asked how frequently the mother reads to the child, mothers of children ages 6-9 ask how frequently they read to the child as well as how many books the child has, but mothers of children over age 10 are asked how frequently the child reads for enjoyment and how many books the child has. In terms of the emotional home scale, mothers of children ages 3-5 are asked how much say their child has in choosing what they eat, whereas mothers of children 6 years and older are asked how often the child is expected to pick up after themselves.

The reliability of the HOME scales, as measured by a Cronbach's Alpha, varies with children's age (Baker, 1993). The cognitive stimulation scale's reliability declines as children age. The reliability for the scale when children age are 3-5 years old is .72, but drops to .67 and .62 when children are 6-9 years old, and over 10 years old, respectively. The emotional subscale is most reliable when children are between the ages of 6-9, with a Cronbach's Alpha of .61. The scales for young and older children are somewhat less reliable, with Cronbach's Alphas lower than .58 for both age groups.

When children reached age 10, the NLSY interviewers asked them a series of questions about their home, neighborhood, and school experiences. We use children's responses to several of these single item questions to measure children's out-of-home environments. Due to the biennial structure of the interviews, these measures were collected when children were either 10 or 11 years of age. Means for these measures are given in Table 2.

Neighborhood safety was measured by children's responses to how safe they felt walking and playing in their neighborhood. Responses ranged from 1 (very unsafe) to 4 (very safe). An additional question asked children how safe they felt in their school. Again, responses ranged from 1 (very unsafe) to 4 (very safe).

Two items measured children's perceptions of their teachers. Children were asked whether the following statements were true: "teachers are willing to help with personal problems" and "teachers don't know their subjects well." Responses to both questions ranged from 1 (very true) to 4 (not true at all). Consequently, a higher score suggests that teachers do not help with personal problem (we refer to this as teachers do not care), and teachers know their subjects. Finally, a single item measured whether children participated in any clubs, teams or school activities in or out of school. Children responded with either an answer of yes (1) or no (0).

Preschool control measures

The NLSY provides many measures of early-childhood characteristics and family background contexts, including age 5-6 measurements on the achievement and behavior dependent variables (Table 3). We use these data to examine the unique contribution of middle childhood contexts over and above the early childhood and family background characteristics. The family context measures available for children at ages 5 or 6 include family income, family structure, home environment, and urban residence (coded as described above for the middle childhood measures). Separate measures of family income, structure, and urban residence are available for children across the years 1-5. Achievement scores and behavior problems are also available for children ages 5/6.

Maternal and interviewer reports of children's temperament, assessed with separate measures of sociability and compliance, are available for children at ages 4 or 5. The compliance measure was created by summing mothers' ratings about children's behavioral tendencies on a five-point scale from almost never (1) to almost always (5). The measure of compliance consists of seven items that ask mothers' about how well the child follows their parents' directions. Questions ask about how often "the child obeys when told to go to bed" and "turns off the TV when asked." This measure has adequate reliability, with NLSY reporting the Alpha Cronbach of .59 for children of all ages (Baker et al., 1993).

Summing three interview ratings of the child's cooperation during the child assessment created the sociability scale. Interviewers rated children on a scale of poor (1) to excellent (5). Items include the observers rating of how cooperative the child was in completing the child's attitude toward being tested. This measure has a high reliability; the NSLY reports an Alpha Cronbach of .93 (Baker et al., 1993).

An array of child and mother background characteristics is also available, including measures of the child's race (Black, Hispanic, or non-Hispanic white) and sex, whether the mother drank alcohol during her pregnancy, her percentile score on the Armed Forces Qualifying Test

(AFQT), the age at which she gave birth to the child, whether she ever smoked, her use of marijuana and other drugs during her own early adult or adolescent years, indicators of whether she got in fights during her own adolescence. Finally, we include missing data dummies for all variables with substantial missing information. Appendix Table 1 presents descriptive sample statistics for all measures.

The AFQT was administered to mothers in 1980 and measures a mother's academic aptitude. The resulting percentile scores were based on a mother's performance on four subtests in the following areas: arithmetic reasoning, numerical operations, word knowledge, and paragraph comprehension.

The questions about mothers' fighting and drug use were asked in 1980, prior or close to the birth of the children in our sample. Mothers were asked how frequently they had smoked marijuana or hashish in the past year, used other drugs or chemicals to get high, and gotten into fights at school or at work in six years. Responses to these questions ranged from never (0) to more than 50 times (6). We coded the variables so that having used drugs once or twice in the past year was considered occasional use, whereas having used drugs 3-5 times or more in the past year was moderate or high use.

IV. Results

Do middle childhood contexts matter?

We first consider the extent to which our collection of middle-childhood context measures, taken as a whole, accounts for the variation in each of our four early adolescent outcomes measures. A useful point of reference comes from regressions of each of the age 13/14 outcomes on the collection of middle-childhood context measures, with no attempt to adjust for preschool contexts, background factors and achievement and behaviors. The details of these regressions are provided in the first columns of Appendix Tables 2-5 and show that the variance explained by middle childhood contexts ranges from 6% and 10% for teen internalizing and externalizing behavior problems to about 20% for math and reading achievement.

These estimates of the variance explained by our set of middle childhood contexts surely overstates the unique role of these contexts, because they include the contribution of any early childhood conditions or contexts that is correlated with them. Given what we know about the continuity of contexts and outcomes across childhood, the bias from not controlling for earlier conditions is likely to be substantial.

A more stringent test is of the unique contribution of the middle childhood contexts. To accomplish this we first regress the outcomes on our set of mothers' and children' background characteristics, all of which are measured prior to middle childhood. We then add the entire set of middle-childhood context measures to the regression to see how much additional variation in the outcomes can be explained by the collection of middle childhood contexts.

The results of this analysis are summarized in Figure 1 and detailed in Appendix Table 6. In short, middle childhood contexts add significantly but modestly to explained variance. In every case the additional explained variance amounts to 1%-3%. Middle childhood contexts were the strongest predictors of children's externalizing behavior, with an R-square increasing from .24 to .27. In the case of internalizing behavior problems, the increase was just slightly more modest from .15 to .17. The collection of background factors accounted for much more of the variance in math (32%) and reading (34%) achievement, and again the contributions in explained variance

from contexts during middle childhood was small, just one percent in the case of children's reading achievement.

With 1-3% incremental explained variance, our collection of middle childhood contexts appears not to be uniquely powerful determinants of early teen outcomes. However, there is plenty of room for some of the middle-childhood home and out-of-home contexts to be significant predictors of subsequent attainments and behavior.

Which middle childhood contexts matter the most?

We next examined which of our set of contextual measures were most closely associated with the behavior and achievement outcomes. Again, we took both a simple and more stringent or conservative approach. The simple look comes from the same regressions used above – regressions that predict adolescents' outcomes and adjust for other middle childhood contexts but not for contexts, behavior, and achievement earlier in childhood (first columns of Appendix Tables 2-5). These regressions show that economic conditions in middle childhood have strong correlations with the math and reading achievement measures, the levels of cognitive stimulation and emotional support in the home are strongly predictive of both achievement and behavior outcomes, and most of the out-of-home contextual measures are significant predictors of the outcomes as well.

A stricter test of the unique influence of these contextual measures is whether they still matter once we control for the child's preschool experiences, attainments and behaviors. Given our ability to control for age 5-6 levels of the dependent variables plus a host of preschool conditions, the regressions provide a rigorous test of whether middle childhood context matter. The detailed results from these regressions are provided in the second and third columns of Appendix Tables 2-5, with a summary of results from the most comprehensive regressions provided in Table 4.

As shown in Table 4, among the family environmental measures, only the level of cognitive stimulations in children's home learning environments was consistently predictive of all four teen outcomes, positively in the case of math and reading achievement and negatively in the case of internalizing and externalizing behavior problems. In all four regressions, a standard deviation increase in the home learning environment was associated with about a tenth of a standard deviation increase in the given outcome. Furthermore, the home emotional climate was predictive of children's behavior problems, and again, the magnitude of these effects was near a tenth of a standard deviation.

Consistent with the research of Duncan et al. (1998), economic conditions during middle childhood were not significantly predictive of any of the four outcomes net of preschool conditions. Likewise, our measures of family structure were not associated with our set of early adolescent outcomes.

Out-of-home settings in middle childhood were more consistently, but modestly, predictive of adolescent outcomes. Children's perceptions of school safety were associated with lower behavior problems and higher reading achievement. Their perceptions of whether their teachers knew their subjects were also predictive of three of the four outcomes -- both of the achievement outcomes as well as externalizing behaviors. Participating in clubs and activities was associated with higher math scores but not other outcomes. Perceptions of neighborhood safety and whether the teachers were helpful with students' personal problems appear unrelated to early adolescents' behavior and academic achievement.

Which conditions and contexts in early childhood matter?

Although not a central focus of this chapter, our regressions also provide an assessment of which of characteristics and contexts in early childhood matter, net of controls for middle childhood contexts. Standardized regression coefficients that were .10 or higher (all of which are statistically significant) are shown in the bottom of Table 4; complete regression results are in Appendix Tables 2-5.

Not surprisingly, the age 5-6 measures of the dependent variables were the most powerful predictors, with standardized regression coefficients ranging from .24 for internalizing behavior problems and math achievement, to .34 for reading achievement and .40 for externalizing behavior problems. Reading achievement was also predictive of later math achievement, and likewise math achievement was predictive of later reading achievement. Similarly, early externalizing behavior predicted internalizing behavior, and early internalizing behavior predicted later externalizing behavior although this association was not especially strong (see Table 4, and Appendix Table 3). Also noteworthy, children's early reading and math skills were not significant predictors of adolescents' problem behavior. However, early measures of children's behavior problems were modestly predictive of adolescents' academic achievement (Appendix Tables 2-5).

Parent ratings of the child's compliance and sociability at ages 4 or 5 were also important predictors of children's outcomes. Higher levels of reported child compliance was associated with lower levels of behavior problems and higher reading achievement. In addition, child sociability was predictive of subsequent math and reading achievement.

A few other early childhood conditions mattered net of the host of other early and middle childhood predictors. More positive home emotional climates were associated with lower levels of adolescent externalizing behavior problems, and mothers' AFQT test scores were positively associated with children's academic achievement. Finally, being Black was associated with lower math achievement in early adolescence.

Do the patterns differ by gender or SES?

We next consider whether the effects of contexts in middle childhood differ according to child gender and early childhood poverty status. To conduct these analyses we ran our most complete regression models (estimation model 3) to provide coefficient estimates, and, in separate regressions, interacted each variable in the estimation model with child gender and then family poverty (defined as being poor at least half of the time between birth and age 5).

The results, detailed in Appendix Tables 7-10, show few such interactions. In the case of gender interactions, five of the 68 tested interactions attained statistical significance at conventional levels. Participating in clubs and activities appeared to have a more positive effect on girls as compared with boys. In particular, it appears to be associated with better math achievement for girls, but not boys. The other significant interactions did not involve the same contextual measures.

In the case of early poverty interactions, seven of the 68 tested interactions were statistically significant at conventional levels, but few sensible patterns emerged. Four of the eight interactions involved the age 13/14 internalizing behavior problem measure. But some of these interactions rested on what appeared to be odd results. For example, for the poor sample, a higher percent of years living in a divorced family reduced internalizing problems, and participating in after-school activities increased them. For none of the other outcomes were more than one of the 17 middle childhood context interactions significant. Our general conclusion is that the middle childhood

contexts identified as significant for the overall sample (e.g., cognitive stimulation in the home, safe schools) appear to have similar influences on boys and girls and for poor and middle class children.

Continuity of contexts across childhood

Continuity in children's contexts from early to middle childhood presents both conceptual and empirical challenges for our analysis. If a child's contexts are highly similar in early and middle childhood, it may be impossible to assess the unique contribution of middle childhood contexts to early adolescent well-being. In this section, we assemble various pieces of evidence to show that contexts are far from permanent, and certainly variable enough to enable us to assess the unique role of middle-childhood contexts in our statistical analysis.

In Table 5 we present simple correlations of our middle childhood context measures with measures of the same contexts at ages 5-6 and ages 1-5. In the cases of time spent in urban areas and family size, these correlations are high indeed, ranging between .63 and .83. In the case of economic conditions, the well-documented fluctuations in families' economic fortunes (Duncan, 1988) produce correlations that average only .40 and range from .30 to .66. Temporal correlations for the two key components of the home environment (cognitive stimulation and the emotional climate) residence are around .50.

Correlations in the .40 to .60 range are certainly significant in a statistical sense and may be viewed by some as high in an absolute sense. But suppose we translate the family poverty (.66) and home cognitive stimulation (.56) correlations into corresponding two-way distribution tables (Table 6). The top panel shows that a little more than one-third of children who are poor at least 75% of their early childhood years are poor that much during middle childhood. To be sure, most who escape 75+% poverty still fall into the "often poor" category (i.e., poor 50-75% of the time), but close one third of those in seeming permanent poverty in early childhood are either never poor or poor less than half of time in middle childhood.

In a similar way, the .56 temporal correlation for home cognitive stimulation translates into considerable change in average conditions between early and middle childhood (bottom panel of Table 6). Only half of children in the lowest quartile of this measure in early childhood were also in the lowest quartile during middle childhood. Likewise, close to one half of the children with early childhood in the top quartile were also in the top quartile in middle childhood.

A complementary look at the correlation issue comes from an examination of the precision (standard errors) of the estimates of middle-childhood contextual effects with and without controls for early childhood contexts and other conditions. Contexts so highly correlated as to cause troublesome multicollinearity would be reflected in large increases in standard errors between Models 1 and 3 in Appendix Tables 2-5.¹ In fact, the standard errors hardly increase at all. For example, the standard error of estimates of the impacts of middle childhood home cognitive stimulation stay at .037 for teen externalizing behavior problems, increase from .039 to .042 for internalizing behavior problems, increase from .035 to .036 for math achievement, and decrease slightly from .037 to .036 for reading achievement. Thus, it appears that while contexts are indeed correlated between early and middle childhood, they are not so correlated as to interfere at all with our attempts to estimate the unique contributions of middle-childhood contexts.

IV. Summary and Implications

Our look at links between middle childhood contexts and teen outcomes leads us to the following conclusions. First, taken as a whole, our measures of middle childhood contexts explain a small but significant proportion (1-3%) of the variance in early adolescents' academic and problem behaviors. Despite considerable continuity in contexts between the preschool years and middle childhood, none that we were able to measure displayed the kind of lockstep relationship that would have made it difficult for us to estimate their separate impacts.

Second, elements of both the home and out-of-home environments appear to produce more positive changes in behavior and achievement. A stimulating home learning environment during middle childhood has the most consistent associations with teen outcomes, being predictive of lower levels of problem behavior and higher levels of academic achievement. Higher quality home emotional environments are predictive of fewer teen behavior problems.

Looking outside the home, students' perceptions that their "teachers know their subjects" are associated with higher levels of academic achievement and lower levels of subsequent externalizing behavior problems. Similarly, students who report higher levels of perceived school safety had fewer problem behaviors and higher levels of reading achievement several years later.

Third, in the main, the estimated effects of our measures of middle childhood contexts appear to be similar for boys and girls, as well as for children who did and did not experience poverty in early childhood.

Thus, it appears that some middle childhood contexts, but not others, influence early adolescents' well-being. Notably absent from our list of important contexts are the economic conditions and family structures of the child's household, both of which were well measured in our survey data. To be sure, children in families with higher incomes and two biological parents during

¹ In order to provide direct information on explanatory power and statistical significance, Appendix Table 2-5 show t-ratios rather than standard errors. Division of coefficients by t-ratios produces the needed standard errors.

middle childhood achieved more and behaved better in adolescence than children in poorer or single-parent families, but these differences disappeared once differences in preschool family conditions and achievement and behavior at the beginning of middle childhood were taken into account.

If we had to select a single context category as most important, it appears that a stimulating learning environment – both in the home (through a direct and repeated measurement) and school (through the child’s report of whether his or her teachers knew their subjects) – matters the most. These measures were predictive of both math and reading achievement and of reduced behavior problems. School safety, which also facilitates positive learning environments, was also predictive of three of the four adolescent outcomes.

Learning opportunities and cognitive stimulation in the preschool years have been identified repeatedly as a powerful predictor of school readiness, which has led to public awareness campaigns that encourage parents to read to and in other ways enrich their children’s home learning environments. Little effort has been devoted to estimating its unique contribution during the middle childhood years. If confirmed in other studies, the predictive power of cognitive stimulation in home environments during middle childhood emerging from our analysis suggests the possible utility of interventions that promote stimulation in children’s home environments.

Despite having repeated measurements of a number of contexts across middle childhood, our data fell short of supplying a comprehensive set of environmental conditions. Topping our list of lamented omissions are measures of the peer groups to which our children are exposed. Given the element of self-selection in peer groups, it would have been difficult for us to establish likely casual impacts of peers using our methods. Nevertheless, we suspect that peer influences account for a significant share of unexplained variance in our analyses.

Finally, we note that the most powerful associations with teen outcomes were found for the experiences, abilities, and behaviors that children bring to middle childhood. So while middle childhood contexts may constitute independent sources of risk and resilience for children, and be amenable to cost-effective policy interventions, the key to understanding their eventual achievements and behaviors involves the nature and nurture taking place prior to middle childhood.

Table 1: Outcomes Measured in Early Adolescence

- PIAT Reading Recognition and Math Skills at age 13/14
 - Raw scores, range from 0-84
 - Reading mean = 59.3, Math mean = 53.8

- Maternal Reports of Internalizing and Externalizing Behavior at age 13/14
 - Sum of trichotomized responses to questions
 - Internalizing behavior 10 items, mean = .32
E.g., child is unhappy, sad or depressed
 - Externalizing behavior 20 items, mean = .51
E.g., child argues too much

Table 2: Middle Childhood Contexts

- Family Income (ages 7-12)
 - % Years Poverty, mean = .33
 - % Years Near Poverty, mean = .20
 - % Years Middle Income, mean = .16
 - % Years High Income (omitted group in regressions)

- Family Structure (ages 7-12)
 - % Years Divorced, mean = .23
 - % Years Never Married, mean = .13
 - % Years Blended, mean = .09
 - % Years Cohabitation, mean = .02
 - % Years w/ Grandmother, mean = .07
 - % Years with Two Biological Parents (omitted group in regressions)
 - Average Number of Children, mean = 2.67

- Urban Residence (ages 7-12)
 - % Years Urban Residence, mean = .76

- Home Environment (ages 7-12)
 - Emotional Climate, mean = .90
 - Cognitive Stimulation, mean = .97

- School & Neighborhood (ages 10/11)
 - Neighborhood Safety, mean = 2.99
 - School Safety, mean = 3.07
 - Teachers Not Care, mean = 1.56
 - Teachers Know Subjects, mean = 3.13
 - Participation in Clubs or Activities, mean = .50

Table 3: Family Background and Child Outcomes in Early Childhood

- Family contexts during at the beginning of middle childhood (ages 5/6) and early childhood (birth through age 5), coded identically with corresponding age 7-12 measures
 - Family Income (ages 1-6)
 - Family Structure (ages 1-6)
 - Urban Residence (ages 1-6)
 - Home Emotional and Cognitive Stimulation Environment (ages 5-6)
- Family and child demographic characteristics
 - Race/ethnicity
 - Child Gender
- Indicators of mothers' academic aptitude and anti-social behavior
 - Years of Completed School
 - AFQT test score
 - Mother Used Alcohol During Pregnancy
 - Age of Mother at Birth of Child
 - Mother Fought, Smoked Cigarettes, Used Marijuana as a Young Adult
- Children's temperament (ages 4/5)
 - Maternal Reports of Compliance and Sociability
- Children's Achievement and Behavior at the Beginning of Middle Childhood (ages 5/6)

Figure 1: Explained Variance (R-square) With and Without Middle Childhood Contexts

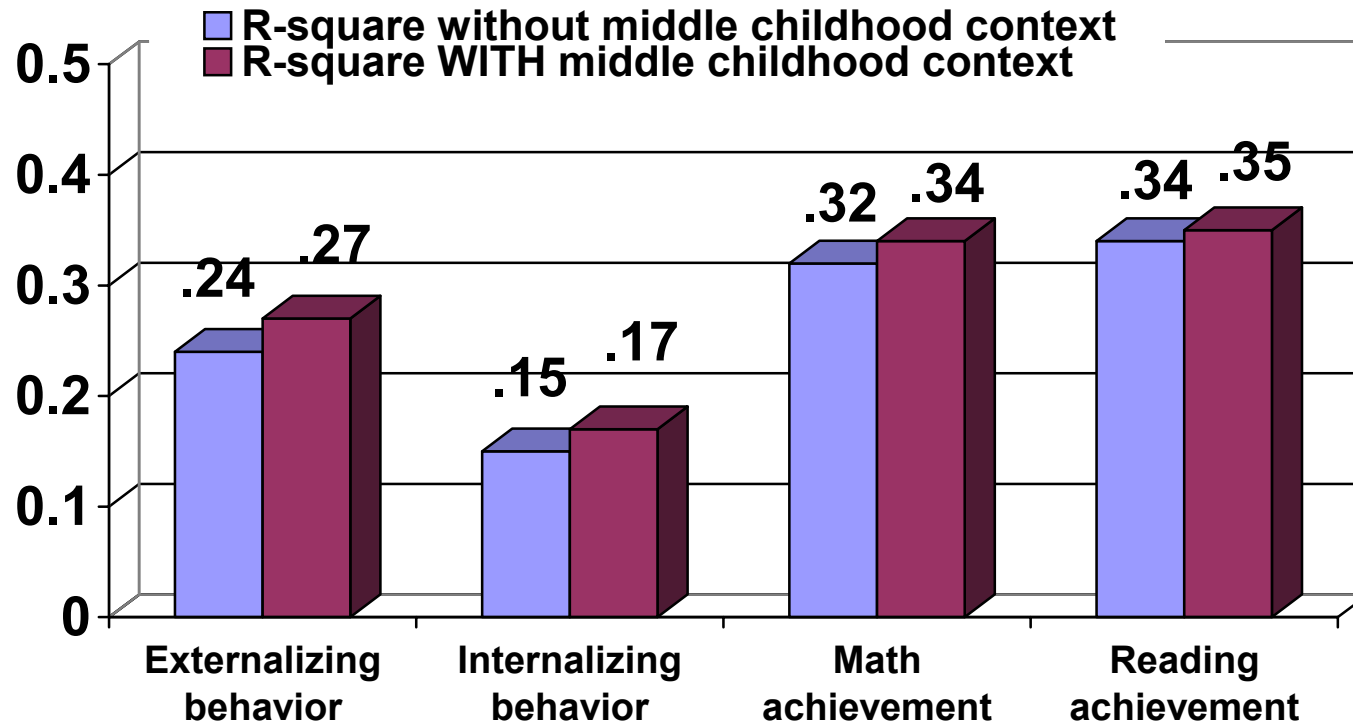


Table 4: Summary of Standardized Regression Coefficients for Middle Childhood Contexts Predicting Early Adolescent Behavior and Achievement

	Early Adolescent Outcomes			
	Externalizing	Internalizing	Math	Reading
MIDDLE CHILDHOOD FAMILY ENVIRONMENTS				
Poverty/income	-	-	-	-
Family size and structure	-	-	-	-
Home cognitive	-.08**	-.09**	.11***	.10***
Home emotional	-.11**	-.09*	-	-
MIDDLE CHILDHOOD OUT-OF-HOME ENVIRONMENTS				
Clubs/Activities	-	-	.04*	-
Neighborhood safety	-	-	-	-
School safety	-.07*	-.06*	-	.09***
Teachers not care	-	-	-	-
Teachers know subjects	-.07*	-	.10***	.07**
PRESCHOOL FAMILY AND INDIVIDUAL CHARACTERISTICS (standardized coefficients of .10 or higher)				
Age 5/6 Externalizing behavior	.40***	.20***	-	-
Age 5/6 Internalizing behavior	-	.24***	-	-
Age 5/6 Math achievement	-	-	.24***	.14***
Age 5/6 Reading achievement	-	-	.19***	.34***
Child compliance (4/5)	-.16 ***	-.16 ***	-	.15 ***
Child sociability (4/5)	-	-	.10 **	.10 **
Home emotional (age 5/6)	-.13***	-	-	-
Mom AFQT	-	-	.18 ***	.12 ***
Black	-	-	-.10***	-

Note: Note: ***p<.01, **p<.05, *p<.10; “-“ indicates that standardized coefficients was not statistically significant at p<.10; See Appendix Tables 2-5 for other preschool and individual characteristics included in these regressions.

Table 5: Correlations of Key Contexts over Time

	Contexts Age 5/6	Contexts Ages 1-5
<u>Contexts 7-12</u>		
Poverty	.43	.66
Near Poverty	.30	.36
Medium High Income	.31	.35
HOME Emotional	.48	-
HOME Cognitive Stimulation	.56	-
Urban Residence	.83	.74
Grandmother in Household	.50	.44
Number of Children	.77	.63
Never Married	.77	.73
Divorced	.67	.52

Note: Correlations are calculated only for observations with non-missing data. All correlations are significant at the $p < .01$ level.

Table 6: (Dis)continuities in Family Economic and Home Cognitive Environments Before and During Middle Childhood

Family Poverty, ages 0-5	Family Poverty, ages 7-12				Total
	Never or rarely	Sometimes	Often	Always or almost always	
Never or rarely poor (<25% of time)	68	23	7	2	100%
Sometimes poor (25-50% of time)	60	23	1	7	100%
Often poor (50-75% of time)	36	28	20	17	100%
Always or almost always poor (>75% of time)	11	21	32	36	100%
Home Cognitive Environment, ages 5-6	Home Cognitive Environment, ages 7-12				Total
	Lowest	Second	Third	Highest	
Lowest quartile	50	31	13	6	100%
Second quartile	28	28	29	16	100%
Third Quartile	13	28	33	27	100%
Highest quartile	5	14	28	53	100%

Note: Calculations based on observations with non-missing data.

Appendix Table 1: Means, Standard Deviations, Minimum, and Maximum of Dependent and Independent Variables

	<u>Mean</u>	<u>Std. Dev.</u>	<u>Min</u>	<u>Max</u>
<i>Ages 13/14 Outcomes</i>				
Age	13.69	.49	12.58	14.83
Externalizing BPI	.51	.51	0	4.65
Internalizing BPI	.32	.38	0	6.8
Math	53.80	11.05	0	84
Reading Recognition	59.38	14.26	0	84
<i>Ages 7-12 Contexts</i>				
% Years Poverty	.33	.31	0	1
% Years Near Poverty	.20	.26	0	1
% Years Middle Income	.16	.24	0	1
Missing Family Income	.09	.29	0	1
% Years Divorced	.23	.37	0	1
% Years Never Married	.13	.31	0	1
% Years Blended	.09	.22	0	1
% Years Cohabitation	.02	.12	0	1
% Years w/ Grandmother	.07	.19	0	1
HOME Cognitive Stimulation Scale	.90	.27	0	1.35
HOME Emotional Scale	.97	.31	0	1.4
Ave # Children	2.67	1.08	1	8.67
Missing HOME Cognitive Stimulation	.04	.19	0	1
Missing HOME Emotional Scale	.07	.25	0	1
% Years Urban Residence	.76	.39	0	1
<i>Ages 10-11 Contexts</i>				
Neighborhood Safety	2.99	1.28	0	6
School Safety	3.07	1.35	0	4
Teachers Not Care	1.56	.95	0	4
Teachers Know Subjects	3.13	1.32	0	4
Participation in Clubs or Activities	.50	.50	0	1
Missing Clubs or Activities	.17	.37	0	1
Missing Neigh. Safety	.09	.29	0	1
Missing School Safety	.10	.30	0	1
Missing Teachers Not Care	.09	.29	0	1
Missing Teachers Know	.09	.29	0	1

Appendix Table 1: Continued

	<u>Mean</u>	<u>Std. Dev.</u>	<u>Min</u>	<u>Max</u>
<i>Age 5/6: Contexts, Achievement, BPI</i>				
Poverty	.35	.48	0	1
Near Poverty	.15	.36	0	1
Middle Income	.14	.34	0	1
Missing Family Income	.19	.39	0	1
Missing HOME Total	.06	.24	0	1
Never Marry	.15	.36	0	1
Divorced	.20	.40	0	1
Cohabitation	.04	.19	0	1
Blend	.06	.24	0	1
Live with Grandmother	.09	.29	0	1
Number of Children	2.54	1.18	0	11
HOME Cognitive Stimulation Scale	.90	.41	0	1.4
HOME Emotional Scale	.77	.36	0	1.3
Mother's Education	12.10	2.14	0	20
Urban Residence	.76	.43	0	1
Internalizing BPI	.38	.34	0	1.7
Externalizing BPI	.84	1.24	0	8.09
Reading Recognition (missing data=0)	14.21	6.52	0	53
Missing Reading Recognition	.07	.25	0	1
Math (missing data=0)	13.28	5.81	0	42
Missing Math	.04	.19	0	1
Missing Urban	.03	.16	0	1
Missing HOME Cognitive Subscale	.10	.31	0	1
Missing HOME Emotional Scale	.12	.33	0	1
<i>Maternal Report Temperament</i>				
Sociability	7.19	5.82	0	15
Compliance	17.14	1.11	0	30
Missing Sociability	.34	.47	0	1
Missing Compliance	.23	.42	0	1
<i>Age 1-5: Contexts</i>				
% Years Poverty	.31	.36	0	1
% Years Near Poverty	.22	.28	0	1
% Years Middle Income	.17	.25	0	1
Missing Family Income	.11	.31	0	1
% Years Urban Residence	.75	.41	0	1
% Years Never Married	.25	.41	0	1
% Years Divorced	.11	.25	0	1
% Years Live w/ Grandmother	.17	.29	0	1
Ave # Children	2.21	1.05	0	8.5
Missing Urban Residence	.03	.16	0	1

Appendix Table 1: Continued

	<u>Mean</u>	<u>Std. Dev.</u>	<u>Min</u>	<u>Max</u>
<i>Child & Mother Background Characteristics</i>				
Black	.33	.47	0	1
Hispanic	.21	.40	0	1
Boy	.50	.50	0	1
Mom use Alcohol During Pregnancy	.41	.49	0	1
Missing Alcohol During Pregnancy	.04	.20	0	1
Mother AFQT test score	.32	.26	0	.99
Missing AFQT	.03	.18	0	1
Mother Ever Use Alcohol	.86	.35	0	1
Mother Fight	.29	.74	0	6
Mother Never Smoke	.23	.42	0	1
Mother Marijuana Use: Occasional	.13	.34	0	1
Mother Marijuana Use: Moderate or High	.11	.31	0	1
Mother Drug Use: Occasional	.05	.22	0	1
Mother Drug Use: Moderate or High	.05	.21	0	1
Age of Mom at Birth	22.54	2.95	15	30
Missing Mother fight	.05	.21	0	1
Missing Marijuana Use	.05	.21	0	1
Missing Drug Use	.05	.22	0	1

Appendix Table 2: Standardized Coefficients and T-ratios from Regression of **Externalizing Problem Behavior** at age 13/14 on Middle Childhood Contexts with Varying Levels of Controls for Early Childhood Experiences and Background Characteristics

	<u>Model 1</u>	<u>Model 2</u>	<u>Model 3</u>
Age 7-12 Contexts			
% Years Poverty	.05 (1.33)	.02 (.52)	.03 (.69)
% Years Near Poverty	.05 (1.66)*	.02 (.75)	.03 (1.17)
% Years Middle Income	-.02 (.83)	-.03 (1.21)	-.02 (.64)
% Years Divorced	-.01 (.38)	-.01 (.33)	-.02 (.46)
% Years Never Married	-.02 (.77)	.04 (.80)	.03 (.72)
% Years Blended	.01 (.36)	-.01 (.24)	-.01 (.39)
% Years Cohabitation	.01 (.21)	-.01 (.26)	-.01 (.31)
% Years w/ Grandmother	.02 (.96)	-.01 (.34)	.01 (.36)
HOME Emotional	-.18 (3.39)***	-.09 (1.80)*	-.11 (2.17)**
HOME Cognitive Stimulation	-.18 (4.83)***	-.08 (2.11)**	-.08 (2.15)**
Ave # Children	-.01 (.45)	-.05 (1.44)	-.05 (1.52)
% Years Urban Residence	.05 (.24)	.02 (.38)	.03 (.32)
Age 10/11 Contexts			
Participation in Activities/Clubs	.00 (.04)	.00 (.04)	.00 (.03)
Neighborhood Safety	-.08 (2.37)**	-.08 (2.56)**	-.07 (2.34)**
School Safety	-.09 (2.50)**	-.05 (1.68)*	-.06 (1.90)*
Teachers Not Care	.02 (.80)	.02 (.78)	.01 (.49)
Teachers Know Subjects	-.09 (2.53)**	-.07 (2.30)**	-.07 (2.32)**
Age 5/6: Contexts, Achievement, BPI			
Poverty		-.01 (.37)	-.01 (.36)
Near Poverty		.02 (.75)	.02 (.74)
Middle Income		.04 (1.59)	.04 (1.68)*
Never Marry		-.06 (1.20)	-.08 (1.36)
Divorced		.01 (.19)	-.04 (1.06)
Cohabitation		.01 (.32)	-.02 (.38)
Blend		.02 (.74)	.00 (.09)
Live with Grandmother		.01 (.34)	.02 (.67)
Number of Children		.06 (1.68)*	.07 (1.64)
Urban Residence		.00 (.12)	-.02 (.47)
HOME Cognitive Stimulation		.07 (1.49)	.04 (1.02)
HOME Emotional		-.14 (3.33)***	-.13 (3.11)***
Internalizing BPI		-.10 (3.09)***	-.07 (2.38)**
Externalizing BPI		.43 (13.54)***	.40 (12.58)***
Reading Recognition PIAT		-.04 (1.46)	-.03 (1.05)
Math PIAT		-.02 (.83)	-.04 (1.44)
Mother's Education		-.02 (.72)	-.01 (.31)

Appendix Table 2: Continued

	<u>Model 1</u>	<u>Model 2</u>	<u>Model 3</u>
<i>Age 4/5: Temperament</i>			
Sociability			.04 (.95)
Compliance			-.16 (3.03)***
<i>Age 1-5: Contexts</i>			
% Years Poverty			.03 (.66)
% Years Near Poverty			.01 (.40)
% Years Middle Income			-.02 (.71)
% Years Never Married			.06 (1.03)
% Years Divorced			.05 (1.82)*
% Years Live w/ Grandmother			-.05 (1.67)*
Ave # Children			.00 (.02)
% Years Urban Residence			.04 (.74)
<i>Background Characteristics</i>			
Black			-.06 (1.85)*
Hispanic			-.02 (.82)
Boy			.02 (.80)
Mother use Alcohol During Pregnancy			-.02 .01
Mother AFQT			.04 (1.37)
Mother Fight			.01 (.25)
Mother Never Smoke			-.04 (1.70)*
Mother Marijuana Use: Occasional			-.01 (.57)
Mother Marijuana Use: Moderate or High			.04 (2.57)**
Mother Drug Use: Occasional			.02 (1.20)
Mother Drug Use: Moderate or High			.01 (.76)
Age of Mom at Birth			-.04 (1.55)
Observations	2042	2042	2042
R-squared	.10	.25	.27

***p<.01, **p<.05, *p<.10; Dummy variables included for the missing values for the following variables: Age 7-12 Family income; Age 6 reading; Age 6 math scores; Age 6 urban residence; Age six HOME total; Age 4/5 compliance; Age 4/5 sociability; Mother's Alcohol use during child's pregnancy; Mother's Smoking; Mother's AFQT; Mother's Fighting; and Mother's drug use. A continuous measure of the child's age at the final assessment was also included in all models.

Appendix Table 3: Regression of Internalizing Problem Behavior at age 13/14 on Middle Childhood Contexts with Varying Levels of Controls for Early Childhood Experiences and Background Characteristics

	Model 1	Model 2	Model 3
Age 7-12 Contexts			
% Years Poverty	.06 (1.30)	.04 (.93)	.06 (1.34)
% Years Near Poverty	.02 (.62)	.00 (.14)	.03 (.88)
% Years Middle Income	-.02 (.54)	-.02 (.79)	-.01 (.21)
% Years Divorced	-.03 (1.21)	-.01 (.27)	-.01 (.22)
% Years Never Married	-.04 (1.26)	.03 (.53)	.03 (.64)
% Years Blended	-.01 (.49)	-.01 (.19)	.00 (.11)
% Years Cohabitation	.00 (.14)	-.01 (.22)	-.01 (.15)
% Years w/ Grandmother	.00 (.23)	-.04 (1.66)*	-.02 (.99)
HOME Emotional	-.15 (2.75)***	-.08 (1.56)	-.09 (1.78)*
HOME Cognitive Stimulation	-.15 (3.89)***	-.08 (1.87)*	-.09 (2.16)**
Ave # Children	-.03 (1.31)	-.04 (1.01)	-.05 (1.40)
% Years Urban Residence	.01 (.48)	-.02 (.42)	-.03 (.52)
Age 10/11 Contexts			
Participation in Activities/Clubs	-.01 (.34)	-.01 (.40)	-.01 (.34)
Neighborhood Safety	-.07 (2.12)**	-.06 (2.01)**	-.05 (1.57)
School Safety	-.08 (2.48)**	-.05 (1.47)	-.06 (1.80)*
Teachers Not Care	.00 (.14)	.00 (.19)	.00 (.03)
Teachers Know Subjects	-.03 (.97)	-.03 (.87)	-.03 (.99)
Age 5/6: Contexts, Achievement, BPI			
Poverty		-.01 (.50)	-.01 (.34)
Near Poverty		.00 (.04)	.01 (.37)
Middle Income		.04 (1.49)	.05 (1.91)*
Never Marry		-.06 (1.31)	-.05 (.99)
Divorced		-.03 (.81)	-.07 (1.43)
Cohabitation		.01 (.31)	.01 (.02)
Blend		.00 (.05)	-.01 (.46)
Live with Grandmother		.03 (1.04)	.04 (1.22)
Number of Children		.01 (.37)	.03 (.52)
Urban Residence		.05 (1.10)	.01 (.30)
HOME Cognitive Stimulation		.10 (1.93)*	.09 (1.93)*
HOME Emotional		-.06 (1.38)	-.09 (1.51)
Internalizing BPI		.10 (2.98)***	.24 (3.08)***
Externalizing BPI		.21 (6.62)***	.20 (6.19)***
Reading Recognition PIAT		-.06 (1.87)*	-.06 (1.57)
Math PIAT		-.05 (1.58)	-.06 (2.06)**
Mother's Education		-.01 (.25)	-.00 (.18)

Appendix Table 3: Continued

	<u>Model 1</u>	<u>Model 2</u>	<u>Model 3</u>
<i>Age 4/5: Temperament</i>			
Sociability			-.01 (.19)
Compliance			-.16 (2.50)**
<i>Age 1-5: Contexts</i>			
% Years Poverty			.02 (.48)
% Years Near Poverty			-.02 (.53)
% Years Middle Income			-.04 (1.23)
% Years Never Married			.00 (.06)
% Years Divorced			.01 (.22)
% Years Live w/ Grandmother			-.03 (1.01)
Ave # Children			.00 (.04)
% Years Urban Residence			.05 (1.02)
<i>Background Characteristics</i>			
Black			-.05 (1.49)
Hispanic			.02 (.60)
Boy			-.05 (2.29)**
Mother use Alcohol During Pregnancy			.02 (.55)
Mother AFQT			.06 (1.96)**
Mother Fight			.01 (.27)
Mother Never Smoke			-.04 (1.65)
Mother Marijuana Use: Occasional			-.00 (.34)
Mother Marijuana Use: Moderate or High			.02 (.69)
Mother Drug Use: Occasional			.02 (.91)
Mother Drug Use: Moderate or High			.02 (.75)
Age of Mom at Birth			-.05 (1.44)
Observations	2042	2042	2042
R-squared	.06	.15	.17

***p<.01, **p<.05, *p<.10; Dummy variables included for the missing values for the following variables: Age 7-12 Family income; Age 6 reading; Age 6 math scores; Age 6 urban residence; Age six HOME total; Age 4/5 compliance; Age 4/5 sociability; Mother's Alcohol use during child's pregnancy; Mother's Smoking; Mother's AFQT; Mother's Fighting; and Mother's drug use. A continuous measure of the child's age at the final assessment was also included in all models.

Appendix Table 4: Regression of Math Achievement at age 13/14 on Middle Childhood Contexts with Varying Levels of Controls for Early Childhood Experiences and Background Characteristics

	Model 1	Model 2	Model 3
Age 7-12 Contexts			
% Years Poverty	-.20 (5.56)***	-.13 (3.76)***	-.05 (1.45)
% Years Near Poverty	-.11 (4.21)***	-.06 (2.54)**	-.02 (.75)
% Years Middle Income	-.07 (2.77)***	-.05 (2.09)**	-.02 (.65)
% Years Divorced	.06 (2.33)**	.00 (.02)	.01 (.25)
% Years Never Married	-.02 (.88)	.00 (.01)	.02 (.47)
% Years Blended	-.01 (.29)	-.03 (.83)	-.01 (.26)
% Years Cohabitation	.01 (.46)	.02 (.84)	.02 (.70)
% Years w/ Grandmother	-.02 (.78)	.01 (.54)	.00 (.09)
HOME Emotional	.11 (2.16)**	.08 (1.61)	.05 (1.01)
HOME Cognitive Stimulation	.28 (8.03)***	.12 (3.35)***	.11 (3.02)***
Ave # Children	.02 (.85)	.05 (1.53)	.04 (1.48)
% Years Urban Residence	-.02 (.94)	-.05 (1.38)	-.04 (1.00)
Age 10/11 Contexts			
Participation in Activities/Clubs	.07 (3.01)***	.05 (2.10)**	.04 (1.96)*
Neighborhood Safety	.02 (.76)	.01 (.50)	-.01 (.26)
School Safety	.08 (2.58)***	.04 (1.41)	.02 (.76)
Teachers Not Care	.05 (2.16)**	.03 (1.42)	.02 (1.00)
Teachers Know Subjects	.12 (3.71)***	.09 (2.94)***	.10 (3.05)***
Age 5/6: Contexts, Achievement, BPI			
Poverty		-.01 (.22)	.01 (.38)
Near Poverty		.00 (.04)	.02 (.64)
Middle Income		-.02 (.67)	-.01 (.27)
Never Marry		-.04 (.80)	.03 (.57)
Divorced		.06 (1.77)*	.06 (1.61)
Cohabitation		-.03 (.99)	.01 (.38)
Blend		.03 (1.04)	.04 (1.43)
Live with Grandmother		-.01 (.29)	.00 (.12)
Number of Children		-.01 (.25)	-.03 (.75)
Urban Residence		.03 (.87)	-.02 (.44)
HOME Cognitive Stimulation		.07 (1.64)	.01 (.31)
HOME Emotional		.01 (.24)	-.01 (.24)
Internalizing BPI		-.04 (1.30)	.00 (.03)
Externalizing BPI		-.03 (.85)	-.06 (2.04)**
Reading Recognition PIAT		.17 (5.85)***	.19 (6.24)***
Math PIAT		.27 (9.98)***	.24 (8.87)***
Mother's Education		.05 (1.96)*	.01 (.25)

Appendix Table 4: Continued

	<u>Model 1</u>	<u>Model 2</u>	<u>Model 3</u>
<i>Age 4/5: Temperament</i>			
Sociability			.10 (2.15)**
Compliance			-.01 (.24)
<i>Age 1-5: Contexts</i>			
% Years Poverty			-.02 (.48)
% Years Near Poverty			-.01 (.41)
% Years Middle Income			-.03 (1.01)
% Years Never Married			-.05 (1.11)
% Years Divorced			.00 (.18)
% Years Live w/ Grandmother			.02 (.68)
Ave # Children			.01 (.27)
% Years Urban Residence			.06 (1.19)
<i>Background Characteristics</i>			
Black			-.10 (3.59)***
Hispanic			.00 (.11)
Boy			.06 (3.35)***
Mother use Alcohol During Pregnancy			-.01 -.01
Mother AFQT			.18 (5.68)***
Mother Fight			-.02 (1.17)
Mother Never Smoke			-.01 (.41)
Mother Marijuana Use: Occasional			.01 (.47)
Mother Marijuana Use: Moderate or High			-.03 (.1.27)
Mother Drug Use: Occasional			.00 (.02)
Mother Drug Use: Moderate or High			.03 (1.09)
Age of Mom at Birth			.02 (.90)
Observations	2042	2042	2042
R-squared	.19	.29	.34

***p<.01, **p<.05, *p<.10; Dummy variables included for the missing values for the following variables: Age 7-12 Family income; Age 6 reading; Age 6 math scores; Age 6 urban residence; Age six HOME total; Age 4/5 compliance; Age 4/5 sociability; Mother's Alcohol use during child's pregnancy; Mother's Smoking; Mother's AFQT; Mother's Fighting; and Mother's drug use. A continuous measure of the child's age at the final assessment was also included in all models.

Appendix Table 5: Regression of Reading Recognition Achievement at age 13/14 on Middle Childhood Contexts with Varying Levels of Controls for Early Childhood Experiences and Background Characteristics

	Model 1	Model 2	Model 3
Age 7-12 Contexts			
% Years Poverty	-.15 (4.44)***	-.08 (2.55)**	-.01 (.26)
% Years Near Poverty	-.11 (4.13)***	-.06 (2.44)**	-.02 (.76)
% Years Middle Income	-.04 (1.50)	-.02 (.81)	.01 (.31)
% Years Divorced	.02 (.77)	-.02 (.60)	-.04 (1.09)
% Years Never Married	-.04 (1.54)	-.01 (.16)	.00 (.07)
% Years Blended	.00 (.03)	-.01 (.19)	-.01 (.36)
% Years Cohabitation	-.01 (.37)	.00 (.13)	.00 (.18)
% Years w/ Grandmother	.01 (.69)	.04 (1.53)	.02 (.83)
HOME Emotional	.08 (1.57)	.05 (.97)	.01 (.16)
HOME Cognitive Stimulation	.30 (8.13)***	.11 (2.98)***	.10 (2.78)***
Ave # Children	-.07 (2.52)**	.01 (.16)	-.01 (.19)
% Years Urban Residence	-.03 (1.27)	-.01 (.27)	-.02 (.43)
Age 10/11 Contexts			
Participation in Activities/Clubs	.01 (.50)	-.01 (.26)	-.01 (.62)
Neighborhood Safety	.05 (1.68)*	.05 (1.76)*	.05 (1.58)
School Safety	.14 (4.19)***	.10 (3.37)***	.09 (2.79)***
Teachers Not Care	.06 (2.46)**	.04 (1.80)*	.03 (1.56)
Teachers Know Subjects	.12 (3.48)***	.09 (2.75)***	.07 (2.25)**
Age 5/6: Contexts, Achievement, BPI			
Poverty		-.02 (.69)	-.01 (.17)
Near Poverty		-.01 (.43)	.00 (.14)
Middle Income		-.01 (.28)	-.01 (.23)
Never Marry		-.05 (1.03)	-.03 (.55)
Divorced		.03 (.91)	.02 (.54)
Cohabitation		-.03 (.87)	-.03 (.75)
Blend		.02 (.65)	.01 (.31)
Live with Grandmother		-.01 (.21)	-.01 (.58)
Number of Children		-.05 (1.56)	-.02 (.69)
Urban Residence		-.03 (.87)	-.09 (2.07)**
HOME Cognitive Stimulation		.09 2.15**	.04 (1.09)
HOME Emotional		.04 (1.07)	.02 (.47)
Internalizing BPI		.02 (.67)	.03 (1.02)
Externalizing BPI		-.06 (1.80)*	-.06 (1.78)*
Reading Recognition PIAT		.33 (11.08)***	.34 (11.18)***
Math PIAT		.17 (6.85)***	.14 (5.99)***
Mother's Education		.03 (.99)	.01 (.46)

Appendix Table 5: Continued

	<u>Model 1</u>	<u>Model 2</u>	<u>Model 3</u>
<i>Age 4/5: Temperament</i>			
Sociability			.10 (2.13)**
Compliance			.15 3.00***
<i>Age 1-5: Contexts</i>			
% Years Poverty			-.08 (1.81)*
% Years Near Poverty			-.04 (1.59)
% Years Middle Income			-.01 (.56)
% Years Never Married			.03 (.63)
% Years Divorced			.05 (1.98)**
% Years Live w/ Grandmother			.03 (1.34)
Ave # Children			-.03 (.81)
% Years Urban Residence			.07 (1.56)
<i>Background Characteristics</i>			
Black			-.07 (2.18)**
Hispanic			.08 (3.34)***
Boy			-.04 (2.06)**
Mother use Alcohol During Pregnancy			-.01 (.56)
Mother AFQT			.12 (3.86)***
Mother Fight			-.04 (1.83)*
Mother Never Smoke			-.01 (.42)
Mother Marijuana Use: Occasional			.03 (1.45)
Mother Marijuana Use: Moderate or High			-.01 (.45)
Mother Drug Use: Occasional			.00 (.14)
Mother Drug Use: Moderate or High			.06 (2.67)
Age of Mom at Birth			.00 (.05)
Observations	2042	2042	2042
R-squared	.20	.32	.36

***p<.01, **p<.05, *p<.10; Dummy variables included for the missing values for the following variables: Age 7-12 Family income; Age 6 reading; Age 6 math scores; Age 6 urban residence; Age six HOME total; Age 4/5 compliance; Age 4/5 sociability; Mother's Alcohol use during child's pregnancy; Mother's Smoking; Mother's AFQT; Mother's Fighting; and Mother's drug use. A continuous measure of the child's age at the final assessment was also included in all models.

Appendix Table 6: Summary of R-squares and Significance of Increase in R-Squares

	(1)	(2)	(3)	(4)
Age 13/14 Outcomes				
Externalizing Problem Behavior	.05	.07	.24	.27
Internalizing Problem Behavior	.02	.03	.15	.17
Math Achievement	.20	.21	.32	.34
Reading Achievement	.17	.21	.34	.35
Blocks of Variables Included in Regression X=yes				
Background Child	X	X	X	X
Background Mother	X	X	X	X
Ages 0-5: Contexts		X	X	X
Ages 4/5: Temperament		X	X	X
Age 6: Achievement, Behavior, & Contexts			X	X
Ages 7-12: Contexts				X

***p<.01, **p<.05, *p<.01

Table reads: The R-squared of a regression of Age 13/14 Externalizing Problem Behavior on background characteristics of the child and mother is .04. Adding Ages 0-5 contexts and age 4/5 temperament increases the R-squared to .07 - a highly significant increase. All of the R-squares are highly significant, and increases in R-squares associated with moving from one estimation model to the next are also highly significant.

Appendix Table 7: Regression of Externalizing Behavior at age 13/14 on Middle Childhood Contexts with Controls for Early Childhood Experiences and Background Characteristics, By Gender and Poverty Subgroups

	<u>BOYS</u>	<u>GIRLS</u>	<u>B v. G</u>	<u>NOT POOR</u>	<u>POOR</u>	<u>NP v. P</u>
<i>Ages 7-12 Contexts</i>						
% Years Poverty	.03 (.65)	.02 (.37)		.02 (.66)	-.06 (.62)	
% Years Middle Income	.03 (.87)	.03 (.86)		.02 (.67)	-.03 (.46)	
% Years Middle High Income	-.01 (.26)	-.02 (.51)		-.01 (.46)	-.08 (1.41)	
% Divorced	.02 (.32)	-.07 (1.36)	**	.01 (.15)	-.06 (.77)	
% Years Never Married	.02 (.34)	.06 (.89)		.08 (1.65)	-.01 (.08)	
% Years Blended	.01 (.29)	-.04 (.90)		-.02 (.59)	-.01 (.20)	
% Years Cohabitation	.00 (.10)	-.02 (.34)		.02 (.68)	-.05 (.71)	
% Years Live with Grandmother	-.04 (1.37)	.08 (2.00)**		-.03 (.95)	.06 (1.28)	
HOME Emotional Environment	-.06 (.94)	-.17 (2.17)**		-.07 (1.14)	-.20 (2.20)**	*
HOME Cognitive Stimulation	-.07 (1.49)	-.11 (1.95)**		-.10 (2.28)**	-.05 (.80)	
Ave # Children	-.07 (1.40)	-.07 (1.27)		-.06 (1.35)	-.03 (.54)	
% Urban Residence	.02 (.32)	.03 (.60)		-.02 (.38)	.01 (.14)	
<i>Ages 10/11 Contexts</i>						
Participate in Clubs or Activities	.05 (1.33)	-.04 (1.29)	*	-.01 (.31)	.04 (1.05)	
Neighborhood Safety	-.02 (.35)	-.10 (2.30)**		-.08 (2.33)**	-.02 (.42)	
School Safety	-.10 (2.41)**	-.03 (.59)		-.05 (1.17)	-.08 (1.48)	
Teachers Not Care	.00 (.05)	.04 (1.10)		-.01 (.21)	.06 (1.36)	
Teachers Know Subjects	-.07 (1.51)	-.10 (1.95)**		-.10 (2.38)**	-.02 (.34)	
Observations	1015	1027		603	1439	
R-squares	.32	.28		.27	.31	

Notes all models include covariates from Model 3 Tables 3-6. ***p<.01, **p<.05, *p<.01. The POOR subgroup is defined by having lived 50% or more of years between ages 0-5 in poverty. The NOT POOR subgroup is defined as having lived less than 50% of years between 0-5 in poverty. The B v. G column represents the significance of whether the effects differ between boys and girls. Likewise the NP v. P column represents the significance of whether the effects differ between not poor and poor children.

Appendix Table 8: Regression of **Internalizing Behavior** at age 13/14 on Middle Childhood Contexts with Controls for Early Childhood Experiences and Background Characteristics, By Gender and Poverty Subgroups

	<u>BOYS</u>	<u>GIRLS</u>	<u>B v. G</u>	<u>NOT POOR</u>	<u>POOR</u>	<u>NP v. P</u>
<i>Age 7-12 Contexts</i>						
% Years Poverty	.05 (.94)	.06 (.93)		.03 (.95)	.04 (.36)	
% Years Middle Income	.01 (.29)	.03 (.82)		.03 (.79)	-.02 (.22)	
% Years Middle High Income	-.02 (.62)	.01 (.38)		-.01 (.34)	-.03 (.54)	
% Divorced	-.04 (.68)	.02 (.32)		.03 (.67)	-.15 (1.66)*	**
% Years Never Married	-.03 (.47)	.09 (1.26)		.10 (2.46)*	-.09 (.82)	**
% Years Blended	-.01 (.22)	.02 (.44)		.00 (.03)	-.02 (.45)	
% Years Cohabitation	.01 (.28)	-.02 (.35)		.00 (.01)	-.05 (.64)	
% Years Live with Grandmother	-.02 (.50)	-.02 (.61)		-.07 (2.24)	.02 (.48)	
HOME Emotional Environment	-.10 (1.52)	-.09 (1.06)		-.07 (1.11)	-.19 (2.00)**	
HOME Cognitive Stimulation	-.06 (.96)	-.17 (2.56)**	*	-.11 (2.25)**	-.04 (.59)	
Ave # Children	-.04 (.95)	-.08 (1.39)		-.05 (1.29)	-.06 (.97)	
% Urban Residence	-.02 (.23)	-.03 (.49)		-.05 (.72)	-.04 (.46)	
<i>Age 10/11 Contexts</i>						
Participate in Clubs or Activities	.01 (.31)	-.02 (.63)		-.03 (.91)	.07 (1.63)	**
Neighborhood Safety	-.01 (.26)	-.06 (1.52)		-.05 (1.45)	-.04 (.70)	
School Safety	-.06 (1.38)	-.06 (1.20)		-.04 (1.01)	-.09 (1.53)	
Teachers Not Care	-.01 (.38)	.02 (.59)		-.05 (1.57)	.11 (2.31)**	***
Teachers Know Subjects	-.03 (.69)	-.03 (.62)		-.07 (1.60)	.02 (.35)	
Observations	1015	1027		1439	603	
R-squared	.20	.19		.17	.25	

Notes all models include covariates from Model 3 Tables 3-6. ***p<.01, **p<.05, *p<.01. The POOR subgroup is defined by having lived 50% or more of years between ages 0-5 in poverty. The NOT POOR subgroup is defined as having lived less than 50% of years between 0-5 in poverty. The B v. G column represents the significance of whether the effects differ between boys and girls. Likewise the NP v. P column represents the significance of whether the effects differ between not poor and poor children.

Appendix Table 9: Regression of **Math Achievement** at age 13/14 on Middle Childhood Contexts with Controls for Early Childhood Experiences and Background Characteristics, By Gender and Poverty Subgroups

	<u>BOYS</u>	<u>GIRLS</u>	<u>B v. G</u>	<u>NOT POOR</u>	<u>POOR</u>	<u>NP v. P</u>
<i>Age 7-12 Contexts</i>						
% Years Poverty	-.03 (.51)	-.08 (1.47)		-.05 (1.58)	-.07 (.67)	
% Years Middle Income	.01 (.22)	-.07 (1.81)*		-.01 (.21)	-.08 (1.05)	
% Years Middle High Income	-.01 (.28)	-.03 (.87)		-.01 (.47)	-.01 (.17)	
% Divorced	.05 (.94)	-.03 (.53)		.05 (1.28)	-.12 (1.48)	*
% Years Never Married	.03 (.41)	.01 (.25)		.03 (.56)	-.06 (.76)	
% Years Blended	.00 (.01)	-.03 (.63)		-.01 (.25)	-.05 (.75)	
% Years Cohabitation	.03 (.70)	.02 (.57)		.03 (.91)	-.02 (.37)	
% Years Live with Grandmother	.00 (.07)	.00 (.15)		.02 (.64)	-.03 (.71)	
HOME Emotional Environment	.07 (1.03)	.02 (.31)		.05 (.83)	.09 (.94)	
HOME Cognitive Stimulation	.13 (2.83)**	.10 (1.60)*		.13 (3.01)***	.07 (.97)	
Ave # Children	.06 (1.59)	.02 (.35)		.05 (1.35)	.00 (.07)	
% Urban Residence	-.04 (.64)	-.07 (1.29)		-.03 (.68)	-.04 (.40)	
<i>Age 10/11 Contexts</i>						
Participate in Clubs or Activities	.00 (.08)	.09 (2.71)**	*	.04 (1.37)	.04 (.85)	
Neighborhood Safety	-.02 (.55)	.01 (.32)		.02 (.77)	-.09 (1.71)	
School Safety	.03 (.65)	.02 (.48)		.03 (.87)	.01 (.11)	
Teachers Not Care	.01 (.30)	.02 (.80)		.02 (.60)	.05 (1.13)	
Teachers Know Subjects	.11 (2.22)**	.11 (2.52)**		.07 (1.72)**	.16 (3.15)***	
Observations	1015	1027		1439	603	
R-squared	.37	.34		.35	.26	

Notes all models include covariates from Model 3 Tables 3-6. ***p<.01, **p<.05, *p<.01. The POOR subgroup is defined by having lived 50% or more of years between ages 0-5 in poverty. The NOT POOR subgroup is defined as having lived less than 50% of years between 0-5 in poverty. The B v. G column represents the significance of whether the effects differ between boys and girls. Likewise the NP v. P column represents the significance of whether the effects differ between not poor and poor children.

Appendix Table 10: Regression of **Reading Recognition Achievement** at age 13/14 on Middle Childhood Contexts with Controls for Early Childhood Experiences and Background Characteristics, By Gender and Poverty Subgroups

	<u>BOYS</u>	<u>GIRLS</u>	<u>B v. G</u>	<u>NOT POOR</u>	<u>POOR</u>	<u>NP v. P</u>
<i>Age 7-12 Contexts</i>						
% Years Poverty	-.02 (.46)	.02 (.34)		-.01 (.28)	.03 (.30)	
% Years Middle Income	-.03 (.74)	-.03 (.69)		-.02 (.60)	-.04 (.52)	
% Years Middle High Income	.00 (.12)	.01 (.17)		.01 (.25)	-.01 (.16)	
% Divorced	-.01 (.16)	-.07 (1.37)		-.03 (.71)	-.13 (1.64)	
% Years Never Married	.03 (.48)	-.02 (.23)		.05 (.84)	-.10 (1.10)	
% Years Blended	.01 (.15)	-.04 (1.08)		.01 (.38)	-.06 (1.20)	
% Years Cohabitation	.03 (.90)	-.04 (1.06)		.01 (.38)	-.06 (1.04)	
% Years Live with Grandmother	.02 (.73)	.01 (.27)		.04 (1.55)	-.03 (.67)	
HOME Emotional Environment	-.02 (.24)	.02 (.35)		-.01 (.13)	.00 (.04)	
HOME Cognitive Stimulation	.11 (2.31)**	.10 (1.79)		.10 (2.20)	.09 (1.48)	
Ave # Children	.06 (1.32)	-.11 (2.15)	**	-.01 (.23)	-.03 (.43)	
% Urban Residence	.00 (.05)	-.06 (1.00)		-.03 (.66)	.05 (.52)	
<i>Age 10/11 Contexts</i>						
Participate in Clubs or Activities	-.01 (.35)	-.02 (.63)		-.02 (.64)	-.02 (.56)	
Neighborhood Safety	.04 (.92)	.06 (1.50)		.07 (2.00)**	.01 (.10)	
School Safety	.07 (1.55)	.12 (2.53)**		.12 (3.06)***	.04 (.57)	
Teachers Not Care	.00 (.03)	.07 (2.37)**		.03 (1.05)	.05 (1.26)	
Teachers Know Subjects	.07 (1.44)	.08 (1.86)		.03 (.73)	.15 (2.69)***	*
Observations	1015	1027		1439	603	
R-squared	.40	.37		.32	.36	

Notes all models include covariates from Model 3 Tables 3-6. ***p<.01, **p<.05, *p<.01. The POOR subgroup is defined by having lived 50% or more of years between ages 0-5 in poverty. The NOT POOR subgroup is defined as having lived less than 50% of years between 0-5 in poverty. The B v. G column represents the significance of whether the effects differ between boys and girls. Likewise the NP v. P column represents the significance of whether the effects differ between not poor and poor children.