LASTING EFFECTS OF ELEMENTARY SCHOOL

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The causes of long-term continuity in the level of children's school performance are not completely understood. Some of the continuity undoubtedly stems from the persistence of cognitive status. But this article, which reports on a follow-up study of schoolchildren in Baltimore, shows that it can also be related to the child's early social environment. That is, the influences of parents and teachers on children in Grades 1–3 were linked to the children's reading and mathematics performance four to nine years later. The reasons for this persistence are explored, including the maintenance of higher achievement levels originally fostered by teachers and parents, the continuance of a pattern of social dependence, and the reliance of parents and teachers on the child's cumulative record.

This article is a continuation of our efforts to investigate the nature of educational attainment in light of the social structural and interpersonal forces that impinge on children early in their school careers. The initial report was concerned with modeling children's performance in the first three grades of elementary school (Entwisle and Hayduk 1982). In that study, structural models explained children's early school performance in terms of the ascriptive and performance characteristics of the children, their parents' expectations, and feedback from their teachers. This article focuses on how the nature of that early performance relates to these same children's performance four to nine years later.

Much of the research on the process of educational attainment at the secondary level, a major focus in sociology for the past two decades, has been guided by three questions (Sewell and Hauser 1975:1): (1) To what degree does achievement depend on factors that are not under the individual's control? (2) What are the organizational and social psychological mechanisms of this dependence? and (3) To what extent do ability, aspiration, and effort depend on factors other than the individual's experiences and previous achievement? The third question promises more than studies of educational attainment at the secondary level have delivered, however, because it implies that the individual's unique educational history will be taken into account.

Most research on secondary school students, however, provides only a snapshot of current circumstances. Panel studies that attempt to take earlier life events into account typically cover only a short period, rarely predating high school. Yet, by high school, a pupil's academic self-image, level of achievement, study habits, and general receptiveness to schooling are already well established. Furthermore, parents and peers, who figure prominently in models designed to explain educational attainment at the secondary level (see, for example, Alexander and Eckland 1975; Sewell and Hauser 1975), are "significant others" for students long before high school. For many reasons, the effects of family context are likely to be more important in primary than in secondary schooling (Alexander and Cook 1982; Alwin and Otto 1977), so that formative experiences during the primary grades establish the conditions under which various factors come into play at the secondary level. There are few comprehensive models of achievement at the primary level, though, and longitudinal studies that trace patterns of achievement by following students from elementary school into high school are rare.

The information that is available on continuities in school performance starting in first grade or earlier comes from diverse sources. Some of the best evidence comes from evaluations of Head Start and other

The research on which this article is based was supported by Grant No. 5T32MH15735 from the National Institute of Mental Health and Grant No. NIE-G-83-0002 from the National Institute of Education. Preparation of this article was made possible by Grant No. SES-8510535 from the National Science Foundation. Address all correspondence to Dr. Doris R. Entwisle, Department of Sociology, Johns Hopkins University, Baltimore, MD 21218.

programs for preschoolers. Darlington et al. (1980) and Lazar and Darlington (1982) reported continuities in children's school performance from preschool through age 19. Low-income children who attended infant and preschool programs in the 1960s were retained in grade or placed in special education classes less often as they progressed through school than were their control-group counterparts who did not attend such programs. One portion of this advantage was mediated through the experimental-group children's increased IQ scores at age 6; another portion of this advantage was mediated through "non-cognitive characteristics of the child." With respect to these "non-cognitive" factors, Lazar and Darlington noted that teachers in the primary grades tended to rate children who had participated in Head Start programs higher than they rated the control-group children on attitudes, classroom conduct, and social development. Also, mothers of children who had participated in the programs continued to have higher aspirations for their children than the children had for themselves, and these mothers reported more satisfaction with their children's schoolwork than did the control-group parents. Thus, the long-term beneficial effects of preschool programs are attributed to improvements in the students' cognitive status *and* to changes in significant others' reactions to the students.

Two other studies that began to follow children in their prekindergarten years likewise attributed superior school performance later on to a combination of children's superior cognitive status and the effects of significant others in the early years. Hess et al. (1984) found that preschoolers who tested high in cognitive abilities at ages 5 and 6 did well on mathematics and vocabulary in Grade 6. And maternal expectations (preschool) for the child's achievement predicted the child's achievement in Grade 6. In a similar study, Stevenson and Newman (1986) found that middle-class preschoolers in Minneapolis who tested high on decoding and comprehension tested high in Grade 10 on reading achievement. In addition, these youngsters' self-concept and academic attitudes in Grade 10 were predicted by their mothers' ratings of them in Grade 5 and earlier.

A less conventional study by Pedersen, Faucher, and Eaton (1978) provided a different kind of evidence documenting the persistence of children's levels of performance over long periods. These researchers followed children who were enrolled in the first-grade classes of three different teachers (Miss A, Miss B, and Miss C). The classroom effort, as well as the early academic performance, of children who had Miss A was significantly higher than that of the children who had Misses B or C. What is more relevant to our interests is that Miss A's children continued to exert more effort and to excel in their school marks in later years. Except for their teacher, the children from the three classes were comparable. Pedersen et al. concluded that a particular "significant other"—Miss A—fostered academic growth and noncognitive changes in her pupils that persisted for many years.

Actually, the causes of the long-term consistency in children's performance are debatable. As implied by the research just summarized, some of the consistency no doubt stems from the stability of the children's cognitive characteristics (see also Kagan and Moss, 1962). But some of it could stem from the stability of the children's responses to their social environments. Parents and other family members who support children's achievement in school are associated with students for a long time, and children are probably especially susceptible to their influence when they are young. Another possibility is that children who easily make the transition into full-time schooling profit more from school in the early grades than do their classmates for whom the school "collar" does not fit as well (Entwisle et al. 1987). This early fit between students and their school environments may confer a long-lasting advantage. Having done well in the first grade predisposes children to do better in the second and later grades because the early curriculum, especially reading, is taught in a series of graded steps.

When children begin school, they must construct an image of themselves as students, discover the norms of the school, learn how to get along with peers and authority figures, and formulate strategies for mastering the necessary skills. In accomplishing these tasks, children develop strategies, including styles of relating to significant others. Our earlier work (Entwisle and Hayduk 1982) indicated that some children who did well in the early grades responded strongly to their parents' beliefs and expectations. Other children who did well paid less attention to

their parents and depended more on feedback from their teachers. These styles of depending on significant others may become entrenched as part of the child's adaptation to the student role in the early years of school and be one cause of long-term continuities in performance. In other words, achievement in the upper grades may depend on the student's processes of social adaptation, which are established in the early years. The studies reviewed earlier all supported this view because they assigned some role to students' early social environments (teachers and parents). Except for our earlier research, however, these studies did not use an explicit structural model in which several types of variables, including significant others, were considered jointly.

The purpose of this article is to examine further the nature of continuities in children's school performance, especially the means by which early school performance impinges on later school performance. In doing so, we draw on a four-to-nine-year follow-up of children who were studied intensively in their first three years of elementary school. This follow-up focused on the children's susceptibility to the influences of their parents and teachers during the first three grades and its relation to the level of their performance when they were followed up several years later.

METHODS

In 1980, we traced schoolchildren in Baltimore who had participated in a study carried out between 1971 and 1977 when they were in the first, second, and third grades (Entwisle and Hayduk 1982). The follow-up focused on whether the effects of variables measured in the early grades were visible four to nine years later. In the original study, parents' ability ratings and parents' expectations affected the performance of some children, and the influence of teachers was important for explaining the performance of others.

The original study was carried out in two urban working-class schools and one suburban middle-class school. Children in the three schools, as well as their mothers, teachers, and peers, were questioned on many separate occasions (see Entwisle and Hayduk 1982, chap. 5, for a full description of the sample). Variables measured semiannually for three years included children's expectations and children's marks. Other variables measured once a year over the same period were parents' expectations, parents' ability estimates, peers' expectations, and absence. A brief description of the measures obtained in 1971–77 follows.

Children's expectations. Just before report cards were issued, children guessed their forthcoming marks in reading, arithmetic, and conduct. A trained interviewer explained to each child what report cards are, what marks are, how marks are coded, and, if necessary, the meaning of "reading," "arithmetic," and "conduct." Great care was taken that each child understood the task and the meaning of marks and report cards. The children's expectations were coded from 1 (high or A) to 4 (low or D).

There are several indicators of the validity of these expectations. One is that the children clearly differentiated between their expectations for reading and arithmetic and expected to do better, on average, in reading than in arithmetic. There was no correlation between the children's initial expectations for these two subjects, despite high correlations for the two kinds of expectations when procured from teachers and parents. Furthermore, children's expectations for reading were consistently higher than those for arithmetic, irrespective of the order in which the expectations for the two subjects were obtained. If the children were merely saying what they thought the interviewer wanted to hear or did not understand what they were doing, an overmatching (rather than an undermatching) of expectations in the two areas would be expected, and the level of expectations in reading and arithmetic would not have differed consistently.

Other evidence of validity is the significant correlation between expectations for arithmetic obtained by two different procedures: from asking children to guess their forthcoming marks, as was already described, versus children's answers to an item on a self-esteem test that covered the same point, obtained at a different time and under different testing conditions (see Entwisle and Hayduk, Appendix B, 1982).

Still further evidence of validity is found in developmental trends. In both schools, increasing amounts of variance in the children's expectations are accounted for at each time cycle. For example, at the end of the third

grade, twice as much variance in reading expectations was accounted for as at the end of the second grade (see Entwisle and Hayduk, 1982).

Mother's expectations. Each child's mother was asked to indicate her expectations for her child's marks in reading, arithmetic, and conduct shortly before report cards were issued in the fall of the first, second, and third grades. Interviews with the mothers always preceded the interviews with the children when the two were obtained within a single time cycle. The mothers' expectations were coded from 1 (high) to 4 (low).

Mother's estimate of the child's general ability. Each mother was asked, "How do you rate your child in school ability compared with other children in this school?" Responses were coded from 1 (among the best) to 5 (among the poorest).

Teacher's expectations. After schools had closed for the summer, first- and second-grade teachers forecast the marks they expected the children to receive in reading and arithmetic in the next grade.[1] The teachers' expectations were coded from 1 (high) to 4 (low). There are no teachers' expectations for third graders.

Friends' expectations. Each child named a "best" and "second-best" friend in his or her classroom, and these friends were later queried about the marks they expected the child to get in reading and arithmetic. The friends' expectations were coded from 1 (high) to 4 (low).

Peer-popularity rating. The ranking of a child's popularity with classmates was generally obtained by noting the order in which children were chosen to play a reading game. Each child's rank was normalized to lie between 0 and 1, with the highest ranks scored "0" (see Entwisle and Hayduk, 1982, for a complete description).

Race. This variable was coded 1 for white and 2 for black. The few Orientals and Hispanics were classed as white.

Marks. Children's marks in reading, arithmetic, and conduct were ascertained from school records at mid-term and year-end.[2] The mid-year marks were recorded either one-third or one-half the way through the year, depending on whether the school used three marking periods (working-class schools) or four marking periods per year (the middle-class school). Marks are coded from 1 to 4, with 1 being high.

Absence. The year-end report card gave the number of absences for the year.

In a follow-up carried out in 1980, we searched school records to find standardized test scores for all students who had participated as first, second, or third graders in 1971–77. The student's most recent scores on the Cognitive Abilities Test (COG) and on the California Achievement Test (CAT) and/or the Iowa Test of Basic Skills (ITBS) in English and mathematics were obtained from the school records. Cognitive ability tests are given on a three-year cycle (Grades 3, 6, and 9), and achievement tests are given at least annually, sometimes semiannually.

The samples of children whose scores were available in 1980 on the CAT and the ITBS overlapped, but not perfectly. All had COG scores for Grade 6 *or* 9.

All CAT and ITBS scores were first standardized for academic age. For example, if a child entered first grade in 1971, that child should have finished the ninth grade by summer 1980. A grade-equivalent score of 8.7 units at that time for a ninth-grade child pegged that child 0.3 units below the expected grade level (9.0). If the child had been retained for a year somewhere along the line, however, and had finished eighth grade by 1980, a score of 8.7 units was interpreted *not* as 0.7 units above the actual grade level,

[1] Teachers' expectations were teachers' guesses for marks the children would receive from their *next* teacher and so are likely to be based on the teachers' current evaluations (their end-of-year marks) *plus* knowledge of the child's work habits, temperament, and so on, as distinct from the current marks. When only teachers' marks are available, teachers' expectations are likely to be confounded with the marks. If so, marks should be stronger predictors when expectations are not available than when they are, and this is what we observed in the third grade.

[2] One systematic way the schools differed was in marking policies. In the working-class schools (Baltimore City), the evaluation was in relation to the performance considered average for that grade, while in the middle-class school (Baltimore County), marks were supposed to indicate the effort, net of actual ability. The implementation of these policies, however, differed greatly between teachers. Probably, the marking policies differed somewhat between schools in the first grade, but not nearly as much as the policies suggested.

Table 1. Means, Standard Deviations, and Numbers for the Follow-up Achievement Measures

	White Middle-Class School			Integrated Lower-Class School			Black Lower-Class School		
	Mean	*SD*	Number	Mean	*SD*	Number	Mean	*SD*	Number
California Achievement Test (CAT)[a]									
Reading (total)	3.12	1.91	58	−1.12	2.46	314	−1.31	2.25	265
Arithmetic (total)	3.55	1.65	25	−.56	2.02	319	−.75	1.97	262
Iowa Test of Basic Skills (ITBS)[a]									
Reading (total)	1.59	1.17	67	−1.19	1.64	312	−1.01	1.68	244
Arithmetic (total)	1.93	1.25	68	−.67	1.47	310	−.53	1.47	241
Cognitive Abilities Test	116.4	13.5	70	92.3	15.4	295	93.5	13.5	251

[a] CAT and ITBS scores were reported as "grade equivalents." These scores are transformed to be age standardized so the values represent the number of years' difference between the grade level at which the children should have performed according to their age and the actual grade level of their performance. The transformation equation is age-standardized score = score (in years and fractions of a year) − age (in years and fractions) + 6.0.

but as 0.3 units below the appropriate grade level according to the child's academic age. Many children repeated grades, so this standardization was essential. Cognitive ability scores are already age standardized.

Table 1 lists the follow-up measures for the children from the 1971–77 study who could be traced in 1980,[3] and Table 2 lists the average values of variables measured at the time of the original study. The differences among the schools on the average performance on the standardized tests when the children were in third grade[4] persisted, and in some cases had increased moderately by 1980.

ANALYSIS

Regression models[5] to explain the scores on the 1980 standardized achievement tests (CAT and ITBS) for children who had earlier attended the three elementary schools took two main forms: a single-equation model that included all variables measured in 1971–77 and a stepwise model with the 1971–77 variables entered in order of explanatory power. The stepwise estimates were carried out as a check on the substantive importance of variables identified in the single-equation models. In both models, the COG score procured at the time of the follow-up replaced the IQ score obtained during the first three grades. One reason for doing so is that IQ scores, as used in the original study, were not available for all the students. (Systemwide IQ tests were discontinued by the schools part way through the earlier study.) But the key reason for preferring the "current" cognitive score is to partial out the persistence in the students' cognitive status, which was not of interest in our study. Accounting for variation in the scores on the achievement tests net of concurrent ability provides a more direct test of continuities in performance that are attributable to factors *other* than persistence in cognitive traits than would an accounting net of ability measured at some earlier time.

Both the single-equation and stepwise regressions were estimated separately for the 1980 CAT scores in English and in mathematics and for the ITBS scores in English and in mathematics, with children grouped according to the elementary schools they had attended in the first, second, or third grade (see Tables 3, 4, and 5). As would be expected, the current scores on cognitive ability are a significant predictor of standardized achievement scores in every analysis. This fact is not of major interest here, however.

In none of the schools was there compelling evidence of any long-term predictive power of the children's expectations or those of their friends when they were in the first

[3] Mainly because we could not obtain direct access to systemwide school records in Baltimore County, the numbers for the children who had attended the white middle-class school are much lower than those for the two urban schools in Baltimore City.

[4] In April-May of the third-grade year, the suburban children averaged 0.8 to 1.1 years above the grade level in reading, and 0.5 to 0.9 years above the grade level in arithmetic. Comparable figures for the urban children were 1.0 to 1.1 years below the grade level in reading and 0.9 to 1.0 years below the grade level in arithmetic.

[5] Correlation matrices for measures obtained in the first three grades and follow-up measures are available from the authors on request.

Table 2. Means, Standard Deviations, and Numbers for Variables Measured When Children Were in the First Three Grades

	White Middle-Class School									Integrated Working-Class School									Black Working-Class School								
	First Grade			Second Grade			Third Grade			First Grade			Second Grade			Third Grade			First Grade			Second Grade			Third Grade		
	Mean	*SD*	*N*	Mean	*SD*	*N*	Mean	*SD*	*N*	Mean	*SD*	*N*	Mean	*SD*	*N*	Mean	*SD*	*N*	Mean	*SD*	*N*	Mean	*SD*	*N*	Mean	*SD*	*N*
Mark in reading	1.82	0.56	380	1.89	0.57	332	1.80	0.50	259	3.31	0.77	341	3.11	0.85	242	3.02	0.90	156	2.96	0.87	220	2.86	0.86	105	2.89	0.61	105
Mark in arithmetic	1.85	0.51	380	1.97	0.50	338	1.88	0.51	268	3.00	0.72	397	3.14	0.69	287	2.94	0.82	204	3.01	0.66	231	3.08	0.59	173	2.98	0.66	165
Mark in conduct	1.80	0.66	380	1.63	0.67	337	1.96	0.57	268	1.87	0.68	393	2.05	0.73	288	1.91	0.59	205	2.12	0.61	243	1.77	0.57	174	1.79	0.68	166
Child's expectations for reading	1.60	0.77	408	1.65	0.59	344	1.78	0.52	270	1.46	0.76	364	1.46	0.75	286	1.70	0.78	211	1.54	0.82	260	1.48	0.76	183	1.68	0.73	158
Child's expectations for arithmetic	1.79	0.78	408	1.69	0.73	344	1.81	0.64	270	1.70	0.72	365	1.72	0.78	284	1.86	0.85	212	1.78	0.84	260	1.80	0.85	183	1.71	0.82	158
Parent's expectations for reading	1.78	0.63	348	1.71	0.61	271	1.68	0.57	222	2.44	0.76	348	2.39	0.74	257	2.33	0.80	170	2.39	0.78	90	2.54	0.78	79	2.46	0.88	114
Parent's expectations for arithmetic	1.80	0.63	348	1.86	0.62	270	1.81	0.50	223	2.36	0.74	349	2.41	0.68	259	2.39	0.73	170	2.39	0.70	88	2.48	0.71	79	2.51	0.74	113
Parent's ability estimate	2.28	0.81	193	2.31	0.84	198	2.42	0.90	223	2.73	0.72	241	2.67	0.82	258	2.77	0.83	171	2.83	0.75	96	2.95	0.65	82	2.74	0.80	117
Sex	1.49	0.50	550	1.49	0.50	550	1.49	0.50	550	1.49	0.50	604	1.49	0.50	604	1.49	0.50	604	1.46	0.50	406	1.46	0.50	406	1.46	0.50	406
Peer popularity	0.49	0.30	364	0.57	0.31	332	0.64	0.30	271	0.49	0.30	327	0.61	0.31	211	0.64	0.29	162	0.50	0.30	238	0.67	0.30	160	0.65	0.31	150
Absence	8.64	5.94	302	8.04	6.17	336	9.56	7.62	271	21.42	18.83	422	20.98	17.55	307	22.28	20.42	214	20.68	15.28	265	18.17	14.84	189	13.78	13.84	175
Teacher's expectations for reading	1.89	0.76	321	1.95	0.63	337	—	—	—	2.90	0.84	353	3.23	0.83	269	—	—	—	3.10	0.81	193	2.96	0.88	103	—	—	—
Teacher's expectations for arithmetic	1.79	0.62	258	1.95	0.68	335	—	—	—	2.87	0.80	350	2.99	0.79	266	—	—	—	2.91	0.86	194	2.89	0.85	103	—	—	—
Friends' expectations for reading	—	—	—	—	—	—	—	—	—	—	—	—	1.93	0.82	102	1.87	.082	122	—	—	—	1.97	0.85	116	1.91	0.82	111
Friends' expectations for arithmetic	—	—	—	—	—	—	—	—	—	—	—	—	1.95	0.81	102	2.00	0.82	122	—	—	—	1.96	0.85	116	1.97	0.82	111
Race	—	—	—	—	—	—	—	—	—	1.58	0.49	582	1.58	0.49	582	1.58	0.49	582	—	—	—	—	—	—	—	—	—

Table 3. Standardized Regression Coefficients for Predicting Follow-up Achievement (CAT, ITBS) from Variables Obtained in Grades 1, 2, or 3 of the Original Study[a]: White Middle-Class School

	Grade 1 Variables				Grade 2 Variables				Grade 3 Variables			
	Follow-up CAT		Follow-up ITBS		Follow-up CAT		Follow-up ITBS		Follow-up CAT		Follow-up ITBS	
	Reading	Arithmetic	Reading	Arithmetic	Reading	Arithmetic	Reading	Arithmetic	Reading	Arithmetic	Reading	Arithmetic
Independent Variables												
Child's mark M_R or M_A	−.01	—	.06	.05	−.17	—	−.05	.16	.12	—	−.11	.08
Child's conduct mark	.22	—	.12	.05	.09	—	−.12	−.02	.13	—	.18	.11
Child's expectation (E)	−.13	—	−.27*	.04	.21*	—	.21	−.03	−.08	—	.10	−.04
Parent's expectation (PE)	.21	—	.18	.15	.04	—	.45*	.07	−.02	—	.24	.11
Parent's rating of child's ability (ABIL)	[b]	—	[b]	[b]	.15	—	.03	.14	.39**	—	.30*	.32**
Sex	.02	—	−.09	−.07	.08	—	−.02	−.04	.10	—	−.06	−.09
COG	.58**	—	.36*	.40*	.54**	—	.31*	.49**	.57**	—	.37**	.51**
Peer popularity rating	.06	—	−.11	−.14	−.07	—	−.02	.02	−.11	—	−.14	−.13
Absences	−.05	—	.20	.12	−.07	—	.04	−.00	−.18	—	−.01	−.03
Teacher's expectation (TE)	.31*	—	.43**	.27	.27*	—	.14	.01	—	—	—	—
Friends' expectations (FE)	—	—	—	—	[b]	—	[b]	[b]	[b]	—	[b]	[b]
Race	—	—	—	—	—	—	—	—	—	—	—	—
R^2	.71	—	.60	.51	.59	—	.52	.45	.67	—	.46	.56
R^2 adjusted	.60	—	.47	.28	.45	—	.34	.26	.58	—	.35	.47
df residual	24	—	27	19	30	—	28	29	34	—	43	44
Variables entering stepwise	*COG* .64**	—	*TE* .48**	*COG* .61**	*COG* .58**	—	*PE* .50*	*COG* .61**	*COG* .56**	—	*ABIL* .41**	*COG* .54**
	TE .44**	—	*COG* .45**		*TE* .27**	—	*COG* .36**		*ABIL* .42**	—	*COG* .37**	*ABIL* .37**
					E .23*	—						
Incremental R^2 (adj.) in order of variables entered	.394 .581		.208 .404	.353	.398 .465 .507		.305 .419	.360	.399 .560		.223 .344	.364 .488

[a] The signs of the regression coefficients for all marks, expectations (E, PE, TE, FE), ABIL, and PEER have been reversed so that positive slopes provide the intuitively correct interpretation of high marks, expectations, or popularity corresponding to superior follow-up achievement. The coefficients for Sex, COG, Absences, and Race are unchanged. COG is the Cognitive Abilities Test obtained at the time of the followup, CAT is the California Achievement Test, and ITBS is the Iowa Test of Basic Skills.

[b] This variable had to be deleted owing to insufficient cases for stable estimation.

* $p<.05$, one tailed.

** $p<.01$.

three grades, although in one analysis or another, these variables were occasionally significant. Aside from the current COG scores, the main variables that were associated with consistent long-term effects were those linked to parents or teachers. Since these effects look somewhat different according to the elementary school the child attended, the parent and teacher effects are taken up in turn for each school.

White middle-class school. The most consistent patterns in the follow-up of children who attended the white middle-class school appear for the parent's estimate of the child's general ability (ABIL)—a variable like the parents' ratings in Stevenson and Newman (1986) (see Table 3). The parent's estimate of the child's ability to do schoolwork relative to other children in the third grade had significant effects on the child's long-term achievement in both English and mathematics. In the stepwise analysis, with the parents' ability estimates inserted *after* current cognitive ability, substantial increments appeared in the explained variance (16.1 percent and 12.4 percent). Other variables in the single equation models that occasionally predicted the later performance of these children included the children's own expectations (significant twice: first grade for reading, ITBS, and second grade for reading, CAT), and teachers' expectations (significant three times: first grade for reading, CAT and ITBS, and second grade for reading, CAT).

Integrated working-class school. For children who earlier attended the integrated working-class elementary school, the major long-term predictors of standardized achievement were the teachers' expectations in the first two grades and the teachers' marks in the third grade (see Table 4). In the third grade, since the teachers' expectations were not obtained, the effects associated with teachers' marks included some portion of the (unmeasured) teachers' expectations variable. Other variables in the single-equation models that occasionally predicted the later performance of these children were sex (significant twice: first and third grade for arithmetic, CAT) and the children's own expectations (significant for first grade for arithmetic, ITBS). The major long-term effects for children who attended this school were those linked to the third-grade teachers' marks, however, and they accounted for increments in variance of 5–10 percent after COG was taken into account in the stepwise analysis.

Black working-class school. For children who attended the black working-class school, parents' ability estimates had long-term effects, being significant in three of the four first-grade single-equation models (see Table 5). The parents' ability estimates of their children in the third grade also affected the follow-up CAT score in arithmetic. But the first-grade teachers' expectations were additional strong predictors of the later performance of these children. Also, the third-grade teachers' marks, with one exception, were significant predictors of long-term achievement.

The long-term effects for children who attended the black-working class school are thus a mixture of the patterns seen in the other two schools. As in the other working-class school, the third-grade marks were strong predictors of long-term achievement net of current cognitive ability, and, as in the middle-class school, the black-working class children were later affected by parental influences measured in the early grades.

DISCUSSION

A few words are needed about the limitations of this study. Its methodological features are not ideal. The original sample was not random. It potentially included all children entering first grade in the three schools for a number of years. For 1971–73, this inclusion was virtually 100 percent. From 1974 on, the regulations on human subjects required parental permission, so samples were less exhaustive. The numbers for the follow-up variables (see Table 1) are considerably below the number of cases available for the original study (the maximum original numbers were 550, 604, and 406 for the white, integrated, and black schools, respectively), so the possibility of bias in the follow-up is substantial. Therefore, the nature of attrition was investigated extensively.

Attrition bias. The first strategy to detect bias involved identifying lost cases versus those that were retrieved and then comparing the two groups to see if they differed with respect to any of the variables recorded in the original study, as judged by *t*- and *F*-tests of the differences between means and variances. From 90 percent to 93 percent of the tests showed no real differences between the

Table 4. Standardized Regression Coefficients for Predicting Follow-up Achievement (CAT, ITBS) from Variables Obtained in Grades 1, 2, or 3 of the Original Study[a]: Integrated Lower-Class School

	Grade 1 Variables				Grade 2 Variables				Grade 3 Variables			
	Follow-up CAT		Follow-up ITBS		Follow-up CAT		Follow-up ITBS		Follow-up CAT		Follow-up ITBS	
	Reading	Arithmetic	Reading	Arithmetic	Reading	Arithmetic	Reading	Arithmetic	Reading	Arithmetic	Reading	Arithmetic
Independent Variables												
Child's mark M_R or M_A	.07	.13	.07	.03	−.10	.06	−.15	−.04	.31**	.18*	.30**	.26*
Child's conduct mark	−.04	.01	−.11	−.01	.03	−.03	−.01	.11	.05	.05	.08	.11
Child's expectation (E)	−.00	.05	−.08	.11	.04	.02	.04	.00	.17*	.12	.09	.07
Parent's expectation (PE)	.09	−.05	.02	−.14*	.18	−.03	.01	.01	−.01	−.11	.04	.09
Parent's rating of child's ability (ABIL)	.06	.03	.02	.01	−.03	.06	.04	−.00	−.02	.01	−.06	−.11
Sex	.03	.11*	.08	.07	.07	.11	.01	.05	−.05	.14*	−.03	.07
COG	.46**	.59**	.43**	.56**	.56**	.58**	.46**	.55**	.47**	.56**	.45**	.48**
Peer popularity rating	−.03	−.00	.05	−.04	.00	−.05	−.07	−.11	.05	.01	.03	−.13
Absences	−.01	−.05	.00	.01	.03	−.06	−.01	−.04	.03	−.15*	.05	−.02
Teacher's expectation (TE)	.21*	.13	.15	.23*	.27	.14	.39*	.26	—	—	—	—
Friends' expectations (FE)	—	—	—	—	−.19	.14	.01	−.01	.01	.07	−.13	.04
Race	−.01	−.05	−.12	−.00	.05	−.05	−.06	.03	−.02	−.08	−.09	.02
R^2	.42	.56	.34	—	.42	.56	.38	.47	.45	.60	.39	.51
R^2 adjusted	.37	.52	.28	—	.27	.44	.21	.33	.37	.54	.30	.44
df residual	116	116	116	—	46	46	46	46	74	73	74	74
Variables entering stepwise	*COG* .47**	*COG* .59**	*COG* .46**	*COG* .55**	*COG* .51**	*COG* .62**	*COG* .44**	*COG* .64**	*COG* .48**	*COG* .59**	*COG* .44**	*COG* .53**
	TE .30**	*TE* .24**	*TE* .20**	*TE* .21**	*TE* .24*	*TE* .21*	*TE* .30**		M_R .33**	M_A .25**	M_R .28**	M_A .27**
Incremental R^2 (adj.) in order of variables entered	.316 .394	.476 .521	.267 .295	.399 .432	.309 .351	.471 .503	.260 .333	.393	.313 .406	.474 .523	.264 .331	.397 .451

[a] The signs of the regression coefficients for all marks, expectations (E, PE, TE, FE), ABIL, and PEER have been reversed so that positive slopes provide the intuitively correct interpretation of high marks, expectations, or popularity corresponding to superior follow-up achievement. The coefficients for Sex, COG, Absences, and Race are unchanged. COG is the Cognitive Abilities Test obtained at the time of the followup, CAT is the California Achievement Test, and ITBS is the Iowa Test of Basic Skills.

* $p<.05$, one tailed.

** $p<.01$.

Table 5. Standardized Regression Coefficients for Predicting Follow-up Achievement (CAT, ITBS) from Variables Obtained in Grades 1, 2, or 3 of the Original Study[a]: Black Lower-Class School

	Grade 1 Variables				Grade 2 Variables				Grade 3 Variables			
	Follow-up CAT		Follow-up ITBS		Follow-up CAT		Follow-up ITBS		Follow-up CAT		Follow-up ITBS	
	Reading	Arithmetic	Reading	Arithmetic	Reading	Arithmetic	Reading	Arithmetic	Reading	Arithmetic	Reading	Arithmetic
Independent Variables												
Child's mark M_R or M_A	−.13	−.11	−.09	.03	.16	.02	.06	.16	.39**	.28**	.22	.26*
Child's conduct mark	−.07	−.07	−.16	−.04	.03	.00	−.07	−.04	−.02	.08	.06	.03
Child's expectations (E)	.06	.01	.04	−.01	−.02	−.07	.03	−.06	−.01	.03	.07	−.02
Parent's expectation (PE)	.13	.00	.17	.09	.13	−.08	−.04	−.04	.12	−.07	.04	.08
Parent's rating of child's ability (ABIL)	.29**	.41**	.29*	.22	−.08	.18	.11	.24	.12	.22**	−.02	−.02
Sex	.00	.12	−.10	−.00	.00	.08	−.12	−.03	.14	.13	.03	.07
COG	.28**	.41**	.30**	.37**	.40*	.51**	.34*	.47**	.31**	.47**	.39**	.49**
Peer popularity rating	−.02	.05	−.11	−.03	−.02	.01	−.10	−.09	.07	−.02	−.03	−.08
Absences	−.03	−.04	.05	.02	.10	−.06	.03	−.10	.08	.01	−.08	−.14
Teacher's expectation (TE)	.55**	.45**	.46**	.30*	.38	.22	.41	.00	—	—	—	—
Friends' expectations (FE)	—	—	—	—	.06	.11	−.06	.09	.05	.21**	−.05	−.09
Race	—	—	—	—	—	—	—	—	—	—	—	—
R^2	.66	.72	.54	.49	.56	.57	.43	.44	.54	.64	.32	.43
R^2 adjusted	.58	.65	.42	.36	.31	.34	.11	.12	.46	.58	.20	.33
df residual	41	41	41	41	20	20	20	20	54	60	54	60
Variables entering stepwise	*TE* .50**	*COG* .40**	*TE* .35**	*COG* .38**	*TE* .49**	*COG* .53**	*TE* .40**	*COG* .57**	M_R .39**	*COG* .45**	*COG* .40**	*COG* .49**
	ABIL .31**	*ABIL* .38**	*ABIL* .31**	*TE* .33**	*COG* .38**	*TE* .35**	*COG* .37**		*COG* .29*	M_A .26**	M_R .26*	M_A .27**
	COG .29**	*TE* .39**	*COG* .30**	*ABIL* .25*					*PE* .23*	*ABIL* .23**		
										FE .21**		
Incremental R^2 (adj.) in order of variables entered	.417	.403	.248	.314	.364	.395	.245	.305	.332	.406	.239	.317
	.537	.545	.366	.396	.477	.492	.348		.444	.515	.287	.374
	.602	.672	.434	.445					.476	.549		
										.584		

[a] The signs of the regression coefficients for all marks, expectations (E, PE, TE, FE), ABIL, and PEER have been reversed so that positive slopes provide the intuitively correct interpretation of high marks, expectations, or popularity corresponding to superior follow-up achievement. The coefficients for Sex, COG, Absences, and Race are unchanged. COG is the Cognitive Abilities Test obtained at the time of the followup, CAT is the California Achievement Test, and ITBS is the Iowa Test of Basic Skills.

* $p<.05$, one tailed.

** $p<.01$.

"followed" and "lost" cases, which we take as a strong indication that the loss of cases during the follow-up did not produce serious bias.

The second strategy involved comparing the sprinkling of significant differences across the parallel CAT and ITBS regressions to see if the patterns of the regression results corresponded to any of the significant followed/lost differences. In all instances in which checking was possible (with the minor exception of the negative parental expectation effect in the ITBS regression for the Grade 1 integrated working-class school), the scattering of significant differences was not coordinated with the pattern of regression effects.

The third major strategy involved estimating regressions from listwise data for only the variables that were significant when entered stepwise from the pairwise matrices. For these equations, listwise and pairwise results were comparable.[6] Listwise regressions for the variables selected via stepwise regressions showed no hint that attrition affected the findings in the follow-up.

Apart from these several analyses suggesting that attrition bias is unlikely, attrition is of less concern here than it normally is in follow-up studies because the aim of our analysis was to show that social processes that are visible early in children's school careers have long-term effects. Having shown effects for *some* children, we will have made our point. We were not trying to predict relative levels of long-term achievement. The basic question here is whether effects of variables involving significant others that influenced children's achievement in the third grade or earlier continued to affect the children's achievement several years later.

Long-term effects. In every school, there were long-term effects of the "significant others" who were present when the children were in the first three grades. These effects are statistically significant and substantial in practical terms. For example, adding the parent's third-grade ability estimate to the child's concurrent cognitive ability score to predict follow-up reading scores increased the explained variance by over 16 percent for children from the white middle-class school. Similarly large increments in explained variance are produced by adding the early influences of teachers and parents in the other two schools.[7] These findings dovetail nicely with those of Stevenson and Newman (1986), who followed preschool children in Minneapolis through Grade 10. The standardized test scores in reading and mathematics in Grade 10 of the children in Stevenson and Newman's study were also accounted for by the mothers' or teachers' ratings of the children in

[6] Listwise deletion was not possible with the full set of variables, but it was often possible to produce listwise regressions containing only the variables that were sufficiently powerful to enter stepwise. Twenty-seven of the 33 listwise regression equations had sufficient cases to provide degrees of freedom exceeding the pairwise degrees of freedom. For these equations, both the standardized and unstandardized slopes are similar in magnitude, and the significance of the listwise slopes is consistent with that of the pairwise slopes in 38 of 51 instances. Of the 13 instances in which significance levels were different, the significance increased in 10 but decreased in only 3, and none of the initially significant predictors dropped below the .05 level of significance. The adjusted R^2 increased in 16 equations and decreased in 11, but the magnitude of the changes was not substantial. Even the 6 listwise regressions with degrees of freedom smaller than the pairwise degrees of freedom (all in the black school) did not differ much more from the pairwise results. The reduced numbers resulted in some loss of significance, but there was no consistent pattern to the differences.

[7] Since social class and school effects were partially confounded in our samples, the differences observed at follow-up could be ascribed to the children's social class, to the particular school they attended, or both. School factors may outweigh social-class factors, however, since effects associated with the parental variables differed between the working-class schools. Neither the parents' expectations nor their ability estimates were ever significant for the children from the integrated working-class school, whereas these variables were significant in 6 of 12 stepwise regressions for the children from the black working-class school. Yet, a comparison of the middle-class and working-class schools, in which the social class is different, reveals some parental effects in *both* schools.

The likelihood of school differences is further borne out by comparing metric coefficients, two at a time, for the key variables in Tables 3, 4, and 5 that differ among the schools (parents' ability estimates and teachers' marks in the third grade). Seven out of 13 possible differences among the schools were significant beyond the 5 percent level, and these differences were consistent across outcomes in English and mathematics for both the CAT and the ITBS tests.

grades 2 and 5. Thus, Stevenson and Newman's data contained convincing links between early parental influences and children's achievement much later and these researchers used the same parent variable (parent's ability beliefs) and follow-up period (four to nine years) as we did.

How could students' standardized achievement scores in English and mathematics continue to respond so many years later to the influences of parents and teachers in the first through third grades? One answer was suggested earlier. In making the transition to full-time schooling, students need emotional support. In the early grades, they are building their academic self-images, learning what it is important to do, and discovering ways to cope in a potentially threatening and frightening environment. Over the period of this stressful transition, students come to depend on particular significant others. They hit on ways of coping early in their school careers—relying on particular significant others—that enable them to do better than their classmates. Getting off to a good start gives them a competitive advantage from then on.

The precise mechanisms involved in explaining the long-term effects observed in our data are debatable, but, with later cognitive ability strongly controlled, persistence in cognitive traits cannot be the answer. For some youngsters, constancy in the social environment is a real possibility because their parents were the efficacious "others." Most children are associated with the same parent in the early and later grades, and parents who held particular beliefs about children in the early grades would be likely to hold similar beliefs later on. Thus, the effects linked to the beliefs of parents when their children were in the third grade may appear because these beliefs are a proxy for the parents' later beliefs.

The persistence of the effects of teachers cannot be explained in terms of the continuity of a particular significant other, though. Teachers could resemble each other at the earlier and later points in time, but it seems unlikely that any resemblance between a third-grade teacher and later teachers would be strong enough to produce effects of the size that were observed. What seems more likely is that the teachers prompted a superior performance in some of the students in elementary school. Children for whom teachers have high expectations are held to stricter standards, called on more, and more often pressed for answers (Brophy and Good, 1974). The favorable expectations of the teachers would promote more learning in the early grades and lead the children to establish a high level of achievement. In other words, teachers helped some of these children make an especially successful transition. Not only does a high level of performance in one year facilitate a high level in the next, but, as was mentioned, a "paper person" is created that follows the child from grade to grade. Cumulative records that follow children through school could support the children's high performance in the later grades by affecting subsequent teachers' expectations.

This explanation, of course, could apply to parents as well. Parents' beliefs could improve the quality of the students' performance when the children are making the transition into full-time schooling, so parents could influence the children's later performance by the high early-achievement and indirect "paper-person" routes as well.

Whatever the actual mechanisms involved, our follow-up data and other similar data suggest that continuity in achievement over a substantial period can be linked to social resources in children's early environments. The social context of early schooling accounts for the persistence in children's achievement trajectories, apart from persistence that can be ascribed to the stability of children's cognitive characteristics.

These observations support a proposition that is often voiced but seldom tested, namely, that children's development is embedded in their social life, so that to understand it, one must take account of the social system in which children function. The Baltimore children in our sample appeared to develop "distinctive intellectual adaptations to the special demands of their environment" (Ginsburg 1986:186). Some relied more on parents than on teachers; others relied more on teachers than on parents. And the follow-up suggests that children's achievement responded *for a long time* to the social influences present in their early school environments. By no means all the continuity in these children's performance can be attributed to persistence in their cognitive traits.

If children's early social experience has such long-lasting effects, much of the "home background" influence measured in models of educational attainment in the secondary school

may actually represent influences that were exerted much earlier in the schooling process. And long-lasting early "teacher effects" may identify "school effects" that have yet to be clearly identified. If so, taking into account children's early school experiences could substantially alter the interpretation of the secondary school models.

More lengthy longitudinal studies are evidently required for a full understanding of the school attainment process. In particular, the early years of schooling invite more extensive and more rigorous study using strategies like those that have proved so useful at the secondary level.

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