FAMILY LINGUISTIC CULTURE AND SOCIAL REPRODUCTION: VERBAL SKILL FROM PARENT TO CHILD IN THE PRESCHOOL AND SCHOOL YEARS

George Farkas
Department of Sociology
Pennsylvania State University
University Park, PA

Gfarkas@pop.psu.edu

Kurt Beron
School of Social Sciences
University of Texas at Dallas
Richardson, TX

Kberon@utdallas.edu

Prepared for presentation at the session on Consequences of Child Poverty and Deprivation, at the Annual Meetings of the Population Association of America, Washington, D.C., March 31, 2001

ABSTRACT

We use the NLSY data so as to reveal unprecedented detail on the age pattern of oral vocabulary growth. Separately for Whites and Blacks, we find that social class differences in vocabulary growth emerge at the very earliest ages, and attain a substantial magnitude by 36 months of age. These social class differences continue to widen during ages three and four, although this occurs more strongly among African-Americans than among Whites. Approximately half of these social class differences in vocabulary growth rates can be attributed to the differential family linguistic instruction provided by mothers of varying social classes. These early language instruction differences are quite consequential for later cognitive and school performance.

By age five and above, vocabulary growth rates are relatively similar across social classes. This suggests that attendance in kindergarten and the higher school grades has an equalizing effect as children from lower social strata are exposed to teacher and peer social interaction and school instruction.

Implications are drawn for our understanding of the causal mechanisms underlying social reproduction and interventions and policies to reduce it.

A statistical tendency toward social reproduction – the child's inheritance of the parent's social class – is among the best documented of social facts. A large "status attainment" literature has shown that the educational success of parents and their children are positively associated, and this association at least partially explains the positive association between the occupational standing of parent and child. Yet this work is incomplete. The detailed mechanisms by which parental education affects the child's school success are imperfectly understood.

This paper investigates one such mechanism – the language socialization provided by parents to their children. This socialization begins at birth, and proceeds strongly through the preschool years. The child's resulting oral language skills and habits – including vocabulary and grammar as they are used receptively to understand others, expressively to make oneself understood, and analytically to represent the concepts that the child employs for thinking – are the principal vehicles for cognitive development until the child learns to read. Such reading instruction typically begins in first grade, when the child is six years

old. Since the child's educational trajectory is well established by the end of high school at age 18, the learning occurring during the first 1/3 of this age span occurs orally, and is based on the language skills provided to children by their parents.

Perhaps even more important, learning to read is itself the first real test of the child's ability to succeed at schoolwork. And when this test occurs in first grade, the principal resources the child draws upon in the effort to succeed are the oral language skills acquired from parents. Studies show that children from lower class families often perform poorly at first grade reading, and that such poor early reading performance is very consequential for their later school careers. It thus becomes plausible that social class differences in the process of parental language socialization play an important role in the passing of social class status from parent to child.

And yet we know relatively little about the timing and details of this process. What is needed is a detailed investigation of the effects of social class background on children's oral language development.

This paper reports the results of such an investigation. We focus on the child's oral vocabulary knowledge, since such knowledge provides a good summary of language skill, is easily measured, and is quite consequential for later schooling success. Utilizing a large national data set in a way designed to reveal unprecedented detail on the age pattern of oral vocabulary growth, we address the following questions. First, what is the pattern of growth? In particular, how do vocabulary growth rates differ in the preschool and school-attending ages? Second, what is the timing and magnitude of the effect of parental social class on children's vocabulary growth? At what age do social class differences in vocabulary knowledge first appear? How large are they? How does this social class effect evolve as children age? In particular, does it diminish when children move outside the home and begin attending school? Finally, to what extent can social class differences in children's vocabulary knowledge be explained by the linguistic cultural capital of their parents – the explicit skills and habits that parents employ in their child-rearing behaviors? And how do these parental cultural capital effects vary as the child moves through the preschool and school-attending ages?

PREVIOUS STUDIES AND THEORETICAL DEVELOPMENT

The mechanisms of social class reproduction are of perennial interest to sociologists. Once focused around a debate over the existence of a "culture of poverty," at other times concerned with "high culture" activities such as museum and opera going, studies in this field have more recently profited from an emerging synthesis in which the cultural capital provided by parents to their children importantly includes skills and habits in everyday use, which orient the individual to action within the worlds of school and work. Within this version of social reproduction theory, the parent and child's spoken vocabulary and grammar, reading and writing ability, arithmetic and other mathematics-related skills, aspirations, effort, and organization, are central to the mechanisms by which social class position is passed from parent to child. We refer to studies in this area as the *cultural capital* research literature.[1]

At the same time, two other literatures have been emerging. One of these has focused on cognitive skills and behaviors within and between class and ethnic groups. This research tradition has utilized data and measures more traditionally associated with the fields of developmental and cognitive psychology to examine how the child's home environment impacts his or her cognitive skill development, and how variation in this home environment explains cognitive skill differentials across social class and ethnic groupings. We refer to this as the *sociological child development* literature. The other relevant research literature focuses on the effects of schools on children's cognitive development, and the extent to which such school effects determine the differential achievement of children from different social class and ethnic group backgrounds. We refer to this as the *school effects* literature.

This paper draws on all three of these research traditions. Where cultural capital is concerned, we emphasize ideas on family linguistic culture and its transmission from parent to child which have been most extensively discussed within the social reproduction literature. However, our treatment of these, combined with our empirical results, suggest a reorientation of this discussion. This reorientation directs attention to a process of skill and habit formation beginning at the very youngest ages, and determining skills, habits, styles, attitudes and aspirations at later ages. It also emphasizes the importance of parental

[1] The cultural capital label has been applied to studies with very different emphases, including high culture (DiMaggio 1982), parental ability to to further their children's school careers by dealing successfully with teachers (Lareau 1987; Lareau and Horvat 1999), and the mundane skills, habits and orientations used by individual children and adults to cope with school and other aspects of everyday life (Farkas 1990, 1996; De Graaf et al 2000). The third of these is the focus of this paper. It should also be noted that the cultural capital (skills and habits) focused on here is conceptually distinct from *social capital*, which is most fruitfully defined as depending upon network connections (Bourdieu 1985; Portes 1998).

linguistic culture in the process of social reproduction. This culture comprises skills and habits which are passed on to young children via parental behaviors which are more involuntary than voluntary. Consequently, it becomes possible to understand how, despite their best-intentioned efforts, parental behaviors contribute to the school failure of low-income children.

Regarding the other two research traditions, we analyze data and measures which have been used by researchers within the sociological child development approach, but do so in a way which makes more intensive use of these data, and reveals greater detail on children's cognitive skill growth trajectories, than has been the case before. As for the school effects literature, our contribution here is to provide separate estimates of cognitive skill development for children at the preschool and school-attending ages. Our finding that attending school narrows class and ethnic inequalities is consistent with the "summer fallback" findings of Heyns (1978) and Entwisle and Alexander (1992, 1994).

Social Reproduction Theory

MacLeod (1995: Chapter 2) provides a useful summary of the foundations of social reproduction theory. He identifies these as the Marxist view of Bowles and Gintis (1976), the cultural capital/habitus view of Bourdieu (1977a, b; Bourdieu and Passeron 1977), the linguistic cultural capital views of Bernstein (1975) and Heath (1983), and the oppositional culture views of Willis (1977) and Giroux (1983a, b).

These authors are concerned to understand the tendency of working and lower-class youth to perform poorly in school, leading to their consignment to low skill and poorly paid jobs in adulthood. All believe that some aspect of *culture* provides a key part of the explanation.

For Bowles and Gintis, schools serve as socializing mechanisms for the capitalist economy. In lower class neighborhoods they are authoritarian, socializing students to habits and mind-sets consistent with their future place in low skill jobs. By contrast, in middle and upper class neighborhoods the schools emphasize independence, creativity, and the internalization of good academic work habits, preparing these students to boss rather than to be bossed. The causal mechanism of social reproduction lies with the differential cultures of schools in middle and lower class neighborhoods, which produce different internalized cultures among their students.

A related view is advanced by Bourdieu, who finds the causal mechanism of social reproduction in the *cultural capital* passed from parent to child within different social classes. *Cultural capital* refers to the

"general cultural background, knowledge, disposition, and skills that are passed from one generation to the next" (MacLeod 1995: 13). This cultural capital, which differs dramatically across social classes, then determines an individual's internalized culture, his or her *habitus.*

"…the habitus is composed of the attitudes, beliefs, and experiences of those inhabiting one's social world. This conglomeration of deeply internalized values defines an individual's attitudes toward, for example, schooling. The structure of schooling, with its high regard for the cultural capital of the upper classes, promotes a belief among working-class students that they are unlikely to achieve academic success. Thus, there is a correlation between objective probabilities and subjective aspirations, between institutional structures and cultural practices." (MacLeod 1995: 15)

Thus, upper and lower class parents socialize their children differently, inculcating in them different knowledge, dispositions, and skills. These then lead to class differences in the children's attitudes toward schooling, which, along with the attitudes of their teachers, lead to the students' differential aspirations and success in the worlds of school and work.

Note that whereas Bourdieu's definition of cultural capital includes skills, knowledge, and dispositions, the definition of the resulting habitus of the individual seems to place more emphasis upon the causal importance of attitudes and aspirations than of skills per se. A similar point of view is advanced by both Willis and Giroux, whose discussions of the cultural aspects of school resistance by lower class youth also emphasize the oppositional attitudes and aspirations of these youth, rather than their lack of academic skills and the causal process by which their school-related skills and attitudes evolve together as they age through the schooling system. Further, the skills which Bourdieu does discuss tend to be those high cultural music and art activities which are rarely undertaken seriously before middle school and typically play little or no role in working class life. Indeed, even middle class families spend relatively little time engaged in high culture activities.

By contrast, Bernstein and Heath give greater emphasis to those skills – primarily linguistic in character – which begin at the earliest ages and are omnipresent in everyday life, both within and outside of school. Bernstein focuses on *linguistic codes* which vary by social class.

"Bernstein claims that working class children generally grow up in homes where common circumstances, knowledge, and values give rise to speech patterns in which meaning remain implicit and dependent on their context (a restricted code). Middle-class families, in contrast, use elaborated codes to express the unique perspective and experience of the speaker; meanings are less tied to a local relationship and local social structure and consequently are made linguistically explicit…because schools operate in accordance with the symbolic order of elaborated codes, working-class children are at a significant disadvantage." (MacLeod 1995: 17)

Heath examined language use in two rural working-class communities, one white ("Roadville) and the other African-American ("Trackton"), and compared these to the speech patterns of middle-class townspeople, including teachers. Heath focused on everyday parental linguistic skills and practices as the parents interact with their children, and the resulting cognitive skills acquired by the children. She observed that, by contrast with the working-class, middle class parents often question their children, engage them in extensive discussions, and in general teach the vocabulary, grammar, and thought processes necessary to succeed in school.

"The result is that black working-class children are not socialized to cope with the language patterns used in school and quickly fall into a pattern of academic failure. The white working-class children from Roadville fare better in that they develop many of the cognitive and linguistic patterns required in elementary school. But they fail to develop 'the integrative types of skills necessary for sustained academic success.' Like their Trackton counterparts, only later, many Roadville students fall behind, drift through school in a fog of failure, or drop out altogether." MacLeod (1995: 18)

This explicit focus on *skills*, in combination with habits and aspirations, has also been characteristic of the synthetic view recently emerging in this field. Perhaps the clearest statement of this view is provided by Swidler (1986). Reacting against the "culture of poverty" argument that poor people have different values than middle class people, Swidler (1986: 275, 277) argued that

"The culture-of-poverty example suggests a misdirection of our explanatory efforts. Students of culture keep looking for cultural values that will explain what is distinctive about the behavior of groups or societies, and neglect other distinctively *cultural* phenomena which offer greater promise of explaining patterns of action. These factors are better described as culturally-shaped skills, habits, and styles than as values or preferences...This revised imagery – culture as a 'tool-kit' for constructing 'strategies of action,' rather than as a switchman directing an engine propelled by interests – turns our attention toward different causal issues than do traditional perspectives in the sociology of culture."

In our view, the key breakthrough here is the inclusion of *skills* in the definition of culture, and the commitment to seriously study the causal issues associated with the intertwined development of skills and habits as the individual ages from child to adult. A further necessity is that of moving beyond the emphasis of Bourdieu and others on highbrow skills and habits, to explore the more mundane skills and habits which are most important for the school and work success of lower and middle class children and adults.

Several recent studies have taken this approach to the study of social reproduction. Perhaps the best known is Wilson's (1996) examination of the opportunities and constraints faced by residents of concentrated poverty neighborhoods in inner-city ghettos. At the heart of Wilson's discussion of "Ghetto-Related Behavior and the Structure of Opportunity" (Chapter 3) is a focus on Swidler's discussion of culturally shaped skills, habits, and styles:

"Skills, habits, and styles are often shaped by the frequency at which they are found in their own community….ghetto-related behaviors often represent particular cultural adaptations to the systematic blockage of opportunities in the environment of the inner city and the society as a whole. These adaptations are reflected in habits, skills, styles, and attitudes that are shaped over time." (Wilson 1996: 72)

A study by Annette Lareau (1987, 1989) focused on the role played by parent-school interactions in social reproduction and the difficulties encountered by lower-class parents in assisting their children to succeed in school. At least some of these difficulties centered around social class differences in the academically-related skills of the parents. Thus, in a section which echoes Swidler in being titled "More than Values," Lareau says:

"…upper-middle-class parents have the capacity to understand the diagnostic and instructional language used by teachers, or, more generally, the *competence* to help their children in school…Working-class parents found it a struggle to deal with fractions and pre-school readers—how could they take a leadership role in schooling?" Lareau (1989: 171-72)

In a study emphasizing quantitative data on student achievement, Farkas (1990, 1996) constructed explicit measures of students' skills, habits, and styles, and estimated the relative magnitude of their contribution to school success. He found that student skills and habits contributed approximately equally to the course grades that teachers assigned to their students, and that inter-group differences in school-related skills and habits explained much of the social class and ethnic group differentials in school success. In related work, Crook (1997) utilized Australian data, and De Graaf et al (2000) utilized Dutch data to show that it is not so much the mastery of highbrow cultural codes as specific parental reading and linguistic skills and habits which lead to schooling success for their children.

Thus, an emerging synthesis within the literature of social reproduction has given equal attention to skills as to habits and aspirations as determinants of socioeconomic success. At the same time, a similar approach has been taken by a recent upsurge of studies, by both psychologists and sociologists, of children's cognitive development.

Studies of Children's Cognitive Development

In one of the most detailed observational studies ever conducted, psychologists Hart and Risley (1995) observed and recorded data on thousands of oral language interactions of lower and upper class children and their parents. They found striking social class differences in the quantity of verbal interaction and the number of different words used in this interaction. Upper class parents had far more conversations with their children than did lower class parents, and used a much more extensive vocabulary in these

conversations than did lower class parents. As a consequence, even at very young ages, upper class children were adding words to their vocabulary at a much higher rate than were lower class children.

"Projecting the developmental trajectories of the vocabulary growth curves we could see an ever-widening gap between the vocabulary resources the children would bring to reading in school." Hart and Risley (1995: 233)

Following these children as they aged, it was found that

"SES-related differences in child language prior to school were predictive of subsequent verbal ability, receptive and spoken language, and academic achievement assessed on standardized tests in kindergarten through grade 3." (Walker, Greenwood, Hart, and Carta 1994)

An even longer time span was covered in research by Baydar, Brooks-Gunn, and Furstenberg (1993). These authors used 20-year longitudinal data from a sample of black children of teenaged mothers in Baltimore, and found that "preschool cognitive and behavioral functioning is highly predictive of literacy in young adulthood." In related work Ensminger and Slusarcik (1992) and Alexander, Entwisle, and Horsey (1997) found that behavior and performance in first grade was highly predictive of high school graduation or dropout twelve years later. Taking these skills and behaviors back to their preschool roots, Alexander, Entwisle and Horsey (1997: 88) observe that "how well children manage the transition from 'home child' to 'school child' has implications that reverberate far into the future."

The opportunity for a larger number of sociologists to focus on these issues received a major impetus from the availability of the Children of the NLSY79 data, collected by the Center for Human Resources Research at Ohio State University. These data are remarkable for consisting of a large national sample of families with deliberate overrepresentation of low-income families; for having utilized a panel of developmental psychologists to select cognitive and behavioral development measures to be administered to the children and young adults in these families; for having extensive measures of the parents' characteristics, including the mother's cognitive skills; for having collected explicit measures of the cognitive and emotional support provided by parents to children in the home; and for comprising panel data on the children and their parents.

One of the first large studies to utilize these data was conducted by Parcel and Menaghan (1994). They investigated the effect of parental employment characteristics on cognitive and behavioral outcomes for young children (ages 3 – 8). Given their research focus, these authors restricted attention to families where the mother was employed outside the home, which somewhat restricts the generalizability of their

results. However, Parcel and Menaghan's extensive analysis of social class and ethnic group differences in children's cognitive outcomes makes their findings relevant to the review of results in this area.

Parcel and Menaghan estimate a two-stage model for the determination of children's cognitive and behavioral outcomes. In the first stage, exogenous parental characteristics including social class (measured by parental education), ethnicity, household characteristics (such as marital status and number of children) and job characteristics (occupational complexity and hourly wage) determine the quality of the home environment provided to children (measured by the HOME scale combining explicit measures of cognitive stimulation, maternal warmth toward the child, and the provision of a safe and clean environment (Bradley and Caldwell 1977; Bradley 1985)). In the second stage, the authors augment the set of parental characteristics by including a measure of the mother's cognitive skill and of the social class of the family of origin (grandmother's education), and estimate the effects of this full set of parental characteristics on child cognitive and behavioral outcomes, without and with the home environment measure in the equation.

Parcel and Menaghan's first stage analysis found that parental social class is positively associated with the quality of the home environment provided to their children. They also found that, net of social class and the other variables, African-American and Hispanic parents provided a less positive home environment than did White parents.

The authors' second stage analysis measured the effects of these variables on children's cognitive skills. They found that the children of higher social class parents, as well as Whites (compared with African-Americans and Hispanics) achieved higher cognitive skill outcomes, and that these effects are at least partially attributable to the effects of home environment. However, these analyses do not provide sharp estimates of the relative magnitudes of these effects (doing so was not a primary focus for the authors).

More detail on these issues has been provided by Duncan, Brooks-Gunn and Klebanov (1994), Brooks-Gunn, Klebanov, and Duncan (1996), Smith, Brooks-Gunn and Klebanov (1997), Mayer (1997), and Phillips, Brooks-Gunn, Duncan, Klebanov, and Crane (1998).

Duncan, Brooks-Gunn and Klebanov (1994; hereafter D, B-G, and K) use data from the Infant Health and Development Program (IHDP) to measure the effect of parental characteristics and home

environment on the cognitive skill of children, measured by the Wechsler Preschool and Primary Scale of Intelligence (WPPSI) administered to five year olds.[2]

As with Parcel and Menaghan, these authors estimate a model in which the effects of parental social class, ethnicity, and other variables on the child's cognitive performance are mediated by the effects of the home environment. And also as with Parcel and Menaghan, D, B-G, and K use the HOME scale to measure the quality of the household environment provided by parents for their child. However, instead of using a single summary measure of this variable, D, B-G, and K separately include the three HOME subscales (learning environment, warmth environment, physical environment) in their regressions, and supplement these with measures of parental social support, depression, and active behavioral coping.

The authors find that the total effect of social class (mother's education and family income) is large, significant and positive, and the total effect of ethnicity (African-American) is large, significant, and negative. In addition, the social class and ethnicity effects decline by half when the home environment measures are added to the regression. Finally, of these home environment measures, only one is statistically significant – the home learning environment. The implication is clear – for low social class and African-American children, a relatively weak home learning environment is an important mechanism leading to lower cognitive skills at age five.

In a related paper, Brooks-Gunn, Klebanov, and Duncan (1996) repeated this calculation utilizing a somewhat different set of control variables. In addition to the mother's education, they controlled a test-score measure of her verbal ability. And in place of the six home environment measures from the prior paper, they used two home learning environment measures (at 12 and 36 months) and a home warmth measure (at 36 months). The results are striking. The mother's verbal ability is a significant mediator of the effects of social class (education and income) on the child's cognitive performance, and the effects of ethnicity and the mother's education are completely explained (decline to insignificance) once the home environment variables are controlled. In addition, the separate variables for the home learning environment and home warmth measures are both statistically significant, indicating that they make separate contributions to the overall effect.

[2] Despite the name given to the Wechsler, we do not believe that this and other cognitive skill measures simply reflect inherited, unchanging individual *intelligence*. Rather we take these measures at face value as

These analyses of IHDP data strongly implicate the child's preschool home environment as leading to weaker cognitive skill development among children from lower social class and ethnic minority backgrounds. As summarized below, further analyses of the IHDP data, the Panel Study of Income Dynamics (PSID) data, and the NLYSY79 data support this view.

Smith, Brooks-Gunn, and Klebanov (1997) analyzed the determinants of oral vocabulary (Peabody Picture Vocabulary Test (PPVT)) at ages 3 and 5, and intelligence (Stanford-Binet at age 3 and WPPSI at age 5) using the IHDP data. They also analyzed the determinants of oral vocabulary (PPVT) at ages 3-4 (1986 data), Peabody Individual Achievement Test (PIAT) reading and mathematics at ages 5-6 (1988 data) and ages 7-8 (1990 data) from the NLSY data. Their goal was to measure the magnitude of the deficits on these variables for children raised in poverty, and to see the extent to which these deficits are due to the child's home environment. The authors found that both family income and the percentage of years the family lived in poverty had negative and significant effects on all outcomes. They also found that controlling the child's home environment (measured via the HOME cognitive and emotional support subscales) significantly reduced the magnitude of these effects. Once again, the family environment was indicated as playing a key role in social reproduction.

Mayer (1997) provides a book-length set of similar statistical results from the NLSY and PSID data, as well as an extended discussion of the theoretical and policy implications of these findings. Her conclusion echoes the emerging synthesis within the social reproduction literature: parental skills and habits are the link between parental socioeconomic background and the cognitive and school success of their children. These skills and habits, rather than parental income *per se*, provide the causal mechanisms underlying the lower life achievement of low-income and ethnic minority children.

Phillips, Brooks-Gunn, Duncan, Klebanov, and Crane (1998) provide further analysis of NLSY and IHDP oral vocabulary and Wechsler scores for five and six year olds, utilizing an unusually extensive set of control variables. As in the work cited above, these authors find that cognitive and emotional support in the home plays a significant role in explaining social class and ethnic differentials in children's cognitive skill at ages five and six.

---

estimating the child's achieved skill at certain cognitive tasks, which we believe to be strongly influenced by the environment the child was raised in.

Guo (1998) used the NLSY data to test for the differential effects of poverty on children's cognitive development during childhood versus early adolescence. He found that where oral vocabulary (our focus here) is concerned, childhood is the period when poverty exerts its greatest effect in reducing development. He did not, however, as we shall, consider these timing differences as possibly flowing from the absence or presence of school as the child ages into the school attendance years. Guo and Harris (2000) followed up this work by showing that five latent factors completely explain the effect of childhood poverty on children's intellectual development. The most powerful of these is cognitive stimulation in the home.

Finally, a random assignment study of a language-focused instrructional intervention for low-income children found that intervention during the preschool years was more powerful than intervention when the child was older (Campbell and Ramey 1994; Vernon-Feagans 1996; Ramey, Campbell and Blair 1998).

School Effects

The literature on the nature, existence, and magnitude of school effects on student achievement is enormous. It dates from the work of Coleman et al (1966), and continues to be controversial (for reviews see Hedges, Laine, and Greenwald 1994; Burtless 1996; Hanushek 1997). However, we seek to build on a much sparser but very innovative and important strand of this literature. This was begun by Heyns' (1978) study of the cognitive skill (word knowledge) growth of sixth and seventh grade Atlanta school children during the school year and summer. She demonstrated that achievement differentials by social class and ethnic group background widened during the summer, when the children were out of school, and narrowed during the school year. The author concludes:

"The gap between black and white children, and between low- and high-income children, widens disproportionately during the months when schools are not in session. Schooling apparently attenuates the influence of socioeconomc status on achievement and thereby reduces the direct dependence of outcomes on family background." (Heyns 1978: 187)

This finding is consistent with the child development studies summarized above: when low income and ethnic minority children experience only their home environment, without the positive effects of school instruction, their cognitive development falls further behind that of middle class, ethnic majority children.

Similar results were obtained by Entwisle and Alexander (1992, 1994), who used data they collected in Baltimore to study the school-year and summer mathematics and reading gains of first and second graders. In a later analysis of the first five years of schooling, the authors conclude that

"The generally higher level of test scores of the high socioeconomic status children thus accrues entirely from gains made in the summers." (Entwisle, Alexander and Olson 1997)

Further support for these results was provided by O'Brien (1999), who studied cohorts of children aging from grades three to six, four to seven, and five to eight in one Texas school district. In particular, O'Brien found strong evidence of summer fallback for the cognitive skills of low-income, African-American, and Hispanic students, although his analyses did not find summer fallback to be the *sole* cause of cognitive skill gaps for these children.

KEY QUESTIONS AND STUDY DESIGN

Sociologists studying child development from the NLSY and IDHP data have utilized the cognitive skill measures provided in these data somewhat indiscriminately, often presenting regressions for several different outcome measures side-by-side. By contrast, we will focus on a single one of these measures, that for oral vocabulary. We do this because, from a developmental perspective, the child's oral language development precedes most other skills measured in these data, while also continuing to develop into adulthood. This skill is also central to the development of those higher-order reading and mathematics-related skills that determine later schooling and labor market success. Oral vocabulary is thus an ideal measure with which to undertake a detailed examination of the determinants and over-time evolution of socioeconomic differentials in cognitive functioning.

A central goal of this paper is to bring detailed quantitative study of oral language development into sociologists' discussion of the intergenerational reproduction of social class advantage and disadvantage. Most children do not learn to read until age six or higher. Instead, cognitive development during the first five years of life occurs through oral interaction, so that oral language is central to cognitive development during these years. And when the child *does* make the transition to reading, typically in first grade at age six, the rapidity and success of this transition depends upon the oral language skills that the child brings to first grade. Consequently, social class differentials in school achievement, which typically emerge as early as first grade, are dependent upon such differentials in oral language development during the first five years of life (Farkas 1996, 2000).

Thus, the first question addressed by this paper concerns the pattern of vocabulary growth as the child ages. What is the shape of this growth curve? In particular, how do vocabulary growth rates differ in the preschool and school-attending ages?

The second question concerns the timing and magnitude of the effect of parental social class on children's vocabulary growth. At what age do social class differences in vocabulary knowledge first appear? How large are they? How does this social class effect evolve as children age? In particular, does it diminish when children move outside the home and begin attending school?

Finally, to what extent can social class differences in children's vocabulary knowledge be explained by the linguistic cultural capital of their parents – the explicit skills and habits that parents employ in their child-rearing behaviors? And how do these parental cultural capital effects vary as the child moves through the preschool and school-attending ages?

We use the NLSY data to address these questions by pooling together the scores from multiple over-time oral vocabulary tests (the Peabody Picture Vocabulary Test, or PPVT), administered to the children of mothers in the study. Between 1986 and 1996 children were tested several times, at irregular intervals, when they were between the ages of three and fourteen. By analyzing these data according to the child's month of age, beginning at 36 months, we will be able to examine the trajectory of oral vocabulary growth in unprecedented detail.

We measure the mother's linguistic cultural capital by her score on an English language test. We measure the positive aspects of her child-rearing habits along two related dimensions. These represent the cognitive and emotional support she provides to her child as indicated by her responses to survey items and by the observations of her behavior with the child recorded by the survey data collector who visited the home.

To answer the key questions we break the data into two year age groupings, and examine the determinants of oral vocabulary growth separately within each of these: ages 3 – 4 (preschool), 5 – 6 (kindergarten and first grade), 7 – 8 (typically second and third grade), 9 – 10 (typically fourth and fifth grade), and 11 – 12 (typically sixth and seventh grade). Note that because children were rarely tested more than once within each of these age groupings, and because we wish to see as much detail as possible within each of these groupings, we treat each as a separate time period and sample, with no linkages across them.

For each of these age groupings we run regressions to predict oral vocabulary, separately for African-American and White Non-Hispanic children. (Hispanics were dropped from the study due to smaller sample sizes and significant ethnic divesity within the group.) At first the dependent variable is expressed simply as a function of time (age in months). This shows the time trend of the dependent variable. Following this, the additive effects of parental social class, as well as its interaction with age, are added to the regression. This shows how vocabulary growth differs by class. Finally, we add a measure of parental linguistic instruction (FLI) to the regression. This provides an estimate of the role of linguistic cultural capital in creating differential vocabulary growth in children

DATA , MEASUREMENT, AND ANALYSIS STRATEGY

The data used in this study come from the NLSY79, a panel study of a national sample of young men and women who were 14 to 21 years of age in 1979. Between 1986 and 1996, during the home interview data collection, children between the ages of three and fourteen years of age were administered several cognitive skill assessments. We analyze the oral vocabulary scores, pooling across years of administration and child ages to produce a single large data set. This is broken into two year age groupings for the detailed regression analyses.

Oral Vocabulary Measure. The Peabody Picture Vocabulary Test (PPVT) was used to measure oral vocabulary. The PPVT of spoken vocabulary consists of 175 words of generally increasing difficulty. The tester reads the word to the child, and the child points to one of four pictures that best describes its meaning. Testing stops and the child's score ("ceiling") is established when he or she incorrectly identifies six of eight consecutive items. The child's score is the number of words identified correctly.

Ethnicity, Age, and Class Measures.. *Ethnicity* is coded as dummy variables to distinguish African-Americans and non-Hispanic, non-African-Americans (which we will refer to as white). The *child's age* is measured as age in months at the date the oral language assessment was administered.

Adequately measuring the *socioeconomic status* (SES) of the child's immediate family presents complex issues, since the child's parents were quite young during the study sample period, and were thus still actively involved in the schooling and early work career activities necessary to *achieve* their socioeconomic status. We have dealt with this situation by utilizing a scale based on multiple measures – the child's maternal grandmother's educational level (highest grade achieved), the child's mother's highest

grade achieved at the end of the study period in 1996, and the family's poverty status as measured by the proportion of years between the child's year of birth and the child's test date that the family's total income fell below the poverty level. We use the first principal component of these variables as our measure of the socioeconomic status of the child's family of origin. (For details on the creation of this variable see the Appendix.)

Family Linguistic Instruction. We wish to measure the effects of the linguistic skills and habits imparted from parent to child during social interaction. We conceptualize this as consisting of three components: the mother's own *linguistic cultural capital* (skills and habits of vocabulary and speech), and the *cognitive stimulation* and *emotional warmth* with which she employs these skills and habits to interact with her child.

We measure the mother's linguistic cultural capital by using the Armed Forces Qualification Test (AFQT) verbal subscore the mother achieved when the test was given to all NLSY79 participants in 1980. This consists of the sum of scores on two sub-tests of the Armed Services Vocational Aptitude Battery -- word knowledge and paragraph comprehension. Ideally, as with poverty status and educational level, we would have these scores for each of the years of the study. But since the test was given only once, in 1980, we must make do with this measure. The resulting measurement error will cause estimates of this variable's effect to be biased downward; our results for this variable will thus be conservative estimates of its true effect. Interestingly, as we shall see, even these conservative estimates indicate quite substantial magnitudes of effect

For the mother's linguistic cultural capital to be transferred to her child it is not sufficient that she herself have a good vocabulary; it is also necessary for her to *use* these skills in her interactions with her child in such a way that the skills are transferred. At least two conditions must be present: the mother must *instruct* by word and deed, and she must do so in a sufficiently *warm and attractive* manner so that the lesson takes. The NLSY used the Home Observation for Measurement of the Environment (HOME) scales (Bradley and Caldwell 1984a, b) to collect data on each of these: the HOME *Cognitive Stimulation* Score and the HOME *Emotional Warmth* Score.

The Cognitive Stimulation scale administered to preschool children included questions about number of children's books and the provision of help with learning numbers, shapes, and letters; for elementary school aged children it included the number of child's own books, and the frequency of

attending performances or visiting museums. The Emotional Warmth scale for preschool children included a measure of the mother conversing pleasantly with the child and verbal response to the child's requests. For school age children the same items were used, with encouragement of the child's verbal contributions replacing one item from the preschool scale.

Finally, Family Linguistic Instruction (FLI) is measured by the first principal component of the three variables, the mother's verbal AFQT score, and the cognitive stimulation and emotional warmth she provides to her child. Technical details concerning the creation of this variable are discussed in the Appendix. Because social class and and therefore FLI are found to only significantly affect the vocabulary growth of 3-4 year old children, this variable is measured only for these children.

Additional Control Variables. We employed a variety of additional control variables in preliminary analyses of the data. These included the child's gender, the mother's age at the child's birth, dummy variables for the year the child's vocabulary score was measured, and the mother's Mathematics AFQT subscore (numeric operations and arithmetic reasoning). Since inclusion of these variables had little effect on the pattern of results for the social class and family linguistic instruction variables of primary interest in this study, for simplicity in understanding these calculations these controls have been omitted in the results shown below.

Analysis Strategy. We began the analysis by pooling the PPVT scores and plotting them by the child's age in months when the test was administered. We then computed mean values by month, separately for Whites and African-Americans. The resulting graphs show characteristic growth patterns with increasing age, as well as different average levels across the two ethnic groups. These patterns are clarified by the use of three-month moving averages to smooth the data, separately by ethnicity.

We then split the sample into five separate age groups: 3-4 years, 5-6 years, 7-8 years, 9-10 years, and 11-12 years. For each age group, for each ethnicity, we ran a regression to predict PPVT, with the child's age in months at the time of testing (age is measured in months elapsed since the beginning of the relevant age period[3]), as the independent variable. This estimates the child's oral vocabulary growth rate within each of the age groupings.

[3] This indicates elapsed months since the beginning age for the period. Thus for children aged 3-4 years the variable is (age in months – 36), for children aged 5-6 years it is (age in months – 60) and so on.

Following this, we repeated these calculations with social class and the interaction between social class and the child's age added to the regression. This shows social class differentials at the beginning of each age period, as well as the extent to which vocabulary growth rates differ by social class within each age period.

Finally, we added the measure of family linguistic instruction and the interaction of this variable with the child's age to the regression. This shows the effect of this variable in accounting for social class differentials at the beginning of each age period, as well as the extent to which this variable accounts for differential vocabulary growth during the age period.

RESULTS

Figure 1 shows average oral vocabulary (PPVT) scores, by single month of age, separately for African-Americans and Whites. To simplify the identification of patterns, irregularities in these growth curves have been reduced by the calculation of three-month moving averages. Over the span from 36 to 156 months of age (ages three to thirteen) the children's oral vocabulary scores grew from approximately 20 words identified correctly to approximately 120 words identified correctly, and for all groups the trend was continuously upward over these ages.

Beginning with the earliest observation at 36 months of age, Whites average significantly higher scores than African-Americans. This pattern is consistent over the age span. To see how substantial this gap is, note that Whites cross the 40-word level at approximately 52 months of age; whereas African-Americans do not reach this level until approximately 66 months, which puts them 14 months, or more than one year, behind in vocabulary development. Similarly, Whites cross the 60-word level at approximately 70 months of age, whereas African-Americans do so at approximately 84 months, and so on.

To see these growth patterns in greater detail, we ran regressions of vocabulary against the child's age, separately by ethnicity and (two-year) age groups. The results are shown in Table 1.

For whites, we find that the vocabulary regression constant term is 24.1 at ages 3-4. That is, where our data begin at 36 months of age, when the (Age – 36) variable is zero, the predicted vocabulary

score for this group is 24.1. This provides an implicit rate of growth during the first 36 months of life. Our regressions then measure this growth rate explicitly for successive two-year age period. These estimated growth rates are 1.32 at ages 3-4, 1.35 at ages 5-6, 0.84 at ages 7-8, 0.60 at ages 9-10, and 0.50 at ages 11-12. The pattern is clear: the highest vocabulary growth rates occur at the preschool and kindergarten ages 3-4 and 5-6, with monotonically declining rates of vocabulary growth thereafter.

For African-Americans, the regression constant term for the 3-4 age group is 12.1, half of that for Whites. That is, during the first three years of life, the spoken vocabularies of African-American children grow at only half the rate of White children, leading to a White-Black vocabulary gap which is never made up in later life.

The vocabulary growth rates for African-Americans are 0.93 for 3-4 year olds, 1.19 for 5-6 year olds, 0.82 for 7-8 year olds, 0.57 for 9-10 year olds, and 0.50 for 11-12 year olds. Thus, as with Whites, the highest growth rates are for the preschool and kindergarten ages 3-4 and 5-6, and decline monotonically thereafter. Each of these growth rates is lower than the comparable rate for Whites. However, the largest Black-White vocabulary growth rate gaps occur at the youngest ages, whereas by ages seven and above the rates are relatively similar. The implication is clear: most of the Black-White gap is vocabulary growth occurs while the child is at home, prior to the time when he or she begins regular schooling.

Table 2 repeats these calculations, with social class and its interaction with age added to the regressions. For Whites, the main effect of social class is significant for each age group, but its interaction with Age never achieves significance. Only for the 3-4 age-group is this interaction positive and approaching statistical significance.

What does this pattern mean? The significant positive main effect of social class on vocabulary growth for the 3-4 age-group means that at the beginning of this age period, that is, at 36 months of age, there are large, positive social class differences in vocabulary. That is, from birth to 36 months of age, the vocabularies of higher SES White children grow faster than those of lower SES children, and this early differential growth is the main reason for the later vocabulary differences across social class groupings. In addition, there is differential growth in the 3-4 age group, although this differential does not quite achieve statistical significance. However, after age four, there is no differential vocabulary growth by SES for

White children. In particular, once children reach the age where they begin attending school, differential growth in vocabulary effectively ceases.

The pattern for African-Americans is similar in overall shape, but different in some details. Overall, for African-Americans, as for Whites, we find that the largest social class effects on vocabulary growth occur at the youngest ages. Thus, the interaction between SES and Age for African-Americans is smaller for each successive age group, and is statistically significant only for 3-4 year olds. The detailed difference is that while, as with Whites, the main effect of SES for 3-4 year olds is also significant for Blacks, it is smaller in magnitude than the White effect, whereas the interaction between SES and Age for Black 3-4 year olds is larger than for Whites, and is statistically significant. In sum, both Whites and Blacks show differential vocabulary growth by social class, but only at very young ages. For Whites this differential is strongest prior to three years of age; for Blacks it is strongest at ages 3-4. However, for both groups, school attendance is associated with an absence of social class differences in vocabulary growth.

Finally we come to analyzing the extent to which these social class differentials in vocabulary growth can be attributed to differences in family linguistic instruction (FLI). Since, as noted above, social class differences exist only for the 3-4 age group, our analysis is conducted only for this group. The results are reported in Table 3. The first two columns repeat previous results for purposes of reference; column 3 shows the results with FLI and its interaction with Age added to the regression.

For Whites, the main effect of FLI is positive and significant, but its interaction with Age is close to zero and insignificant. With FLI controlled, the main effect of SES is reduced by 56%, from 4.35 to 1.93. The interaction of SES with Age, which was positive but not significant, becomes slightly larger but remains insignificant. Thus, for Whites, somewhat more than half of the social class differential in vocabulary growth, which occurs primarily at ages younger than three, can be attributed to differential family linguistic instruction by social class.

For Blacks, the FLI main effect is not significant, but its interaction with Age is statistically significant. With these variables controlled, the SES main effect declines from .99 to .80, or by 19%; the SES interaction with Age declines from .20 to .11, or by 45%. That is, for Blacks, where the largest social

class effect on vocabulary growth occurs among children aged 3-4, close to half of this effect can be attributed to the differential family linguistic instruction provided by parents of different social classes.

We also note that for Whites in Table 3, the proportion of variance explained after adding the social class and family linguistic instruction variables increased from 31% to 46%. For African-Americans this proportion increased from 23% to 39%. These are substantial increases for the addition of just a few variables. Further, we note that despite the trouble that has been taken to create these variables they remain rather imperfect measures of the underlying variables. Thus, better measures would likely explain even greater proportions of the variance in the dependent variable.

We undertook a variety of further calculations with these data. We found that, as reported by other researchers, oral vocabulary scores at ages 5-6 were significantly predictive of vocabulary, reading, and mathematics scores in the teenage years. (Results available on request.) Clearly, the early social class differences in vocabulary growth demonstrated above are quite consequential for the later cognitive and schooling success of these youths.

DISCUSSION

We have found that for a large national sample of White and Black American youth, significant social class differences in oral vocabulary growth emerge at the very earliest ages, and attain a substantial magnitude by 36 months of age. These social class differences continue to widen during ages three and four, although this occurs more strongly among African-Americans than among Whites. Approximately half of these social class differences in vocabulary growth rates can be attributed to the differential family linguistic instruction provided by mothers of varying social classes. These early language instruction differences are quite consequential for later cognitive and school performance.

By age five and above, vocabulary growth rates are relatively similar across social classes. This suggests that attendance in kindergarten and the later schooling grades has an equalizing effect as children from lower social strata are exposed to teacher and peer social interaction and school instruction.

At least two sets of implications follow. On the theoretical side, a proper understanding of the causal mechanisms underlying social reproduction must include the linguistic skills and habits passed from parent to child. Knowing that social class differences in these become significant in the preschool years

opens up the ages from five to the early teen years for exploration. What linguistic and instructional mechanisms account for the lesser success of lower class children in learning to read in first grade (Farkas 2000)? What patterns and trajectories of school performance are established in elementary school, to emerge as full-blown social class differentials in schooling aspirations and success in middle and high school? How much better might we understand the aspirations, behavior, and school performance of MacLeod's (1995) Hallway Hangers and Brothers if we had this information from their earlier years? One is reminded of Becker's (1986) use of jazz musicians as an example to explain his sociological definition of culture. The key to understanding their performance on the band stand on any given night lies in the skills and habits, understandings and aspirations they developed in their previous jazz playing experiences.

On the policy and program intervention side, our findings suggest the importance of very early intervention, with a serious targeting toward language-related and school-readiness instruction. Recent studies of the national Head Start program suggest that it does increase the vocabulary growth of low-income preschoolers, but is less successful at teaching letter and word recognition, and other school and reading-readiness skills (Zill, Resnick, and McKey 2000). Further efforts in this direction and clearly indicated.

References

Alexander, Karl, Doris Entwisle, and Carrie Horsey. 1997. "From First Grade Forward: Early Foundations of High School Dropout." *Sociology of Education* 70 (April): 87 – 107.

Bayder, Nazli, Jeanne Brooks-Gunn, and Frank Furstenberg. 1993. "Early Warning Signs of Functional Illiteracy: Predictors in Childhood and Adolescence." *Child Development* 64: 815-29.

Becker, Howard S. 1986. "Culture: A Sociological View." Pp. 11-24 in *Doing Things Together: Selected Papers.* Evanston, IL: Northwestern University Press.

Bernstein, Basil. 1975. *Class, Codes, and Control.* London: Routlege and Kegan.

Bourdieu, Pierre. 1977. "Cultural Reproduction and Social Reproduction." In *Power and Ideology in Education*. Edited by Jerome Karabel and A.H. Halsey. New York: Oxford University Press.

Bourdieu, Pierre. 1985. "The Forms of Capital." In *Handbook of Theory and Research For the Sociology of Education,* edited by J.G. Richardson. New York: Greenwood.

Bourdieu, Pierre and Jean-Claude Passeron. 1977. *Reproduction in Education, Society, and Culture.* Londaon, Sage.

Bowles, Samuel and Herbert Gintis. 1976. *Schooling in Capitalist America.* New York: Basic Books.

Bradley, R.H. 1985. "The Home Inventory: Rationale and Research." Pp. 191-201 in *Recent Research in Developmental Psychopathology*. *Book Supplement to the Journal of Child Psychology and Psychiatry,* edited by J. Stevenson. Oxford: Pergamon.

Bradley and Caldwell. 1984a. "The HOME Inventory and Family Demographics." *Developmental Psychology* 20: 315 – 20.

_____. 1984b. "The Relation of Infants' Home Environments to Achievement Test Performance in First Grade: A Follow-Up Study." *Child Development* 55: 803-9.

Brooks-Gunn, Jeanne, Pamela Klebanov, and Greg Duncan. 1996. "Ethnic Differences in Childen's Intelligence Test Scores: Role of Economic Deprivation, Home Environment, and Maternal Characteristics." *Child Development* 67: 396-408.

Burtless, Gary. 1996. *Does Money Matter? The Effect of School Resources on Student Achievement and Adult Success.* Washington, D.C.: Brookings Institution.

Campbell, Frances and Craig Ramey. 1994. "Effects of Early Intervention on Intellectual and Academic Achievement: A Follow-Up Study of Children from Low-Income Families." *Child Development* 65: 684-98.

Crook, Chris.1997. *Cultural Practices and Socioeconomic Attainment; The Australian Experience.* Wesport, CT: Greenwood.

De Graaf, Nan, Paul De Graaf, and Gerbert Kraaykamp. 2000. "Parental Cultural Capital and Educational Attainment in the Netherlands: A Refinement of the Cultural Capital Perspective." *Sociology of Education* 73: 92 – 111.

DiMaggio, Paul. 1982. "Cultural Capital and School Success." *American Sociological Review* 47: 189-201.

Duncan, Greg, Jeanne Brooks-Gunn, and P.K. Klebanov. 1994. "Economic Deprivation and Early Childhood Development." *Child Development* 65: 296-318.

Ensminger, Margaret and Anita Slusarcik. 1992. "Paths to High School Graduation or Dropout: A Longitudinal Study of a First-Grade Cohort." *Sociology of Education* 65 (April): 95-113.

Entwisle, Doris and Karl Alexander. 1992. "Summer Setback: Race, Poverty, School Composition and Mathematics Achievement in the First Two Years of School." *American Sociological Review* 57 (February): 72-84.

Entwisle, Doris and Karl Alexander. 1994. "Winter Setback: The Racial Composition of Schools and Learning to Read." *American Sociological Review* 59 (June): 446-460.

Entwisle, Doris, Karl Alexander and Linda Steffel Olson. 1997. *Children, Schools, and Inequality.* Boulder, CO: Westview Press.

Farkas, George et al. 1990. "Cultural Resources and School Success: Gender, Ethnicity, and Poverty Groups Within an Urban School District." *American Sociological Review* 55: 127-42.

Farkas, George. 1996. *Human Capital or Cultural Capital? Ethnicity and Poverty Groups in an Urban School District.* New York: Aldine de Gruyter.

Farkas, George. 2000. "Teaching Low-Income Children to Read at Grade Level." *Contemporary Sociology* 29: 53-61.

Giroux, Henry. 1983a. "Theories of Reproduction and Resistance in the New Sociology of Education." *Harvard Educational Review* 53: 257-93.

_____. 1983b. *Theory and Resistance in Education.* London: Heinemann.

Guo, Guang. 1998. "The Timing of the Influences of Cumulative Poverty on Children's Cognitive Ability and Achievement." *Social Forces* 77: 257-88.

Guo, Guang and Kathleen Mullan Harris. 2000. "The Mechanisms Mediating the Effects of Poverty on Children's Intellectual Development." *Demography* 37 No. 4 (November): 431-447.

Hart, Betty and Todd Risley. 1995. *Meaningful Differences in Everyday Experience of Young American Children.* Baltimore: Paul Brookes Publishing Co.

Heath, Shirely Brice. 1983. *Ways with Words.* Cambridge: Cambridge University Press.

Hedges, Larry, Richard Laine, and Rob Greenwald. 1994. "Does Money Matter? *Educational Researcher* 23: 5-14.

Heyns, Barbara. 1978. *Summer Learning and the Effects of Schooling.* New York: Academic Press.

Lareau, Annette. 1987. "Social Class Differences in Family-School Relationships: The Importance of Cultural Capital." *Sociology of Education* 60: 73-85.

_____. 1989. *Home Advantage: Social Class and Parental Intervention in Elementary Education.* London: Falmer.

Lareau, Annette, and E.M. Horvat. 1999. "Moments of Social Exclusion and Inclusion: Race, Class, and Cultural Capital in Family-School Relationships." *Sociology of Education* 72: 37-53.

MacLeod, Jay. 1995. *Ain't No Makin' It.* Boulder, CO.: Westview Press.

Mayer, Susan. 1997. *What Money Can't Buy: Family Income and Children's Life Chances.* Cambridge: Harvard University Press.

O'Brien, Daniel. 1999. *Three Essays on Early Academic Achievement of Minority and Disadvantaged Students.* Ph.D. Dissertation in Political Economy, University of Texas at Dallas.

Parcel, Toby and Elizabeth Menaghan. 1994. *Parents' Jobs and Children's Lives*. New York: Aldine de Gruyter.

Phillips, Meredith, Jeanne Brooks-Gunn, Greg Duncan, Pamela Klebanov, and Jonathan Crane. 1998. "Family Background, Parenting Practices, and the Black-White Test-Score Gap." Pp. 103-148 in Christopher Jencks and Meredith Phillips (eds.) *The Black-White Test Score Gap.* Washington, D.C.: Brookings Institution.

Portes, Alejandro. 1998. "Social Capital: Its Origins and Applications in Modern Sociology." *Annual Review of Sociology* 24: 1-24.

Ramey, Craig, Frances Campbell, and Clancy Blair. 1998. "Enhancing the Life Course for High-Risk Children: Results from the Abecedarian Project." Pp. 163-83 in J. Crane (ed.), *Social Programs That Work.* New York: Russell Sage Foundation.

Smith, J.R., Jeanne Brooks-Gunn, and P.K. Klebanov. 1997. "Consequences of Living in Poverty for Young Children's Cognitive and Verbal Ability and Early School Achievement." Pp. 132-89 in *Consequences of Growing Up Poor*, edited by Greg Duncan and Jeanne Brooks-Gunn. New York: Russell Sage Foundation.

Swidler, Anne. 1986. "Culture in Action: Symbols and Strategies." *American Sociological Review* 51: 273-86.

Vernon-Feagans, Lynne. 1996. *Children's Talk in Communities and Classrooms.* Oxford: Blackwell.

Walker, Dale, Charles Greenwood, Betty Hart, and Judith Carta. 1994. "Prediction of School Outcomes Based on Early Language Production and Socioeconomic Factors." *Child Development* 65: 606-21.

Wilson, William Julius. 1996. *When Work Disappears.* New York: Knopf.

Zill, Nicholas, Gary Resnick, nad Ruth McKey. 2000. "What Children Know and Can Do at the End of Head Start and What It Tells Us About the Program's Performance." In FACES: The Head Start Family and Child Experiences Survey. Advisory Committee on
Head Start Research and Evaluation.

Figure 1.

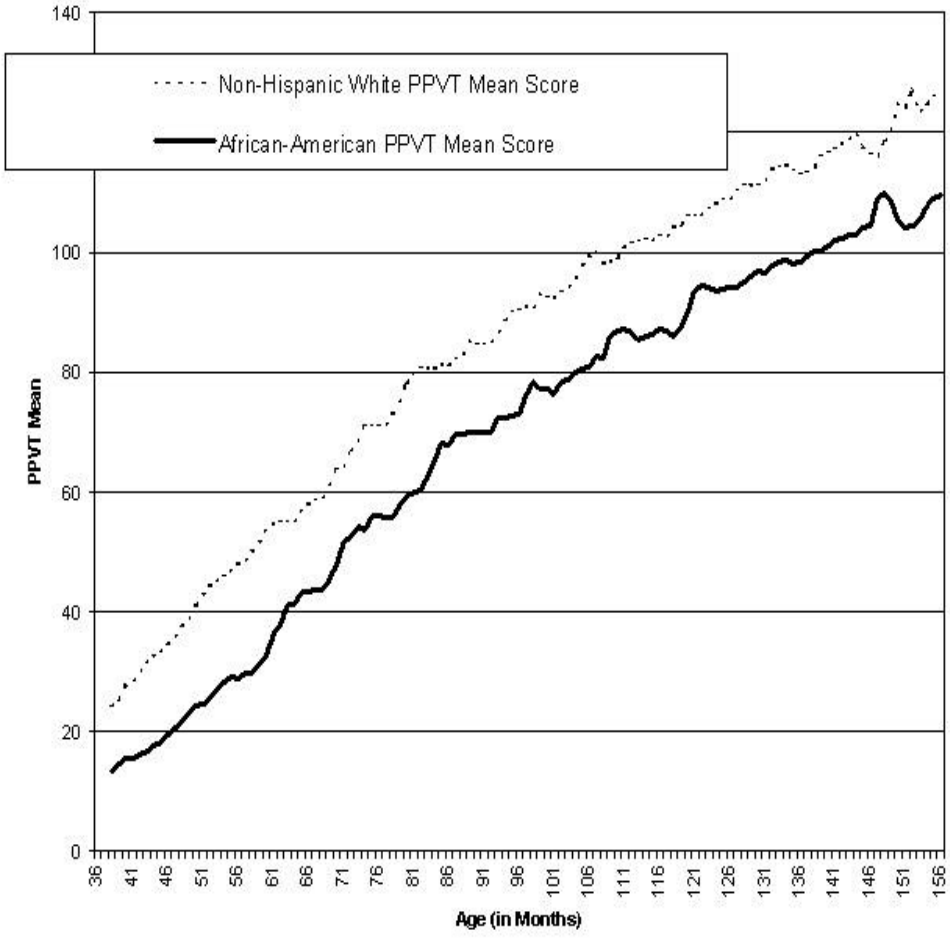

Figure 1. Growth Curves of Oral Vocabulary, By Race
(Means by Month of Age, Smoothed Via Three Month Moving Average)

Table 1. Oral Vocabulary Growth Rate Regressions By Two-Year Age Groupings

Panel A. Non-Hispanic Whites

	3-4 Year Olds	5-6 Year Olds	7-8 Year Olds	9-10 Year Olds	11-12 Year Olds
AGE-36_0	1.3202				
	(26.46)**				
AGE-60_0		1.3511			
		(17.66)**			
AGE-84_0			0.8425		
			(12.90)**		
AGE-108_0				0.6042	
				(9.53)**	
AGE-132_0					0.5024
					(5.64)**
Constant	24.0591	52.8062	81.1686	99.8553	113.9910
	(35.79)**	(55.64)**	(88.76)**	(106.35)**	(131.99)**
Observations	1539	748	745	907	675
R-squared	0.31	0.30	0.17	0.09	0.04

Panel B. African-Americans

	3-4 Year Olds	5-6 Year Olds	7-8 Year Olds	9-10 Year Olds	11-12 Year Olds
AGE-36_0	0.9289				
	(17.13)**				
AGE-60_0		1.1874			
		(13.01)**			
AGE-84_0			0.8205		
			(8.27)**		
AGE-108_0				0.5702	
				(6.81)**	
AGE-132_0					0.4975
					(4.53)**
Constant	12.0502	38.0387	65.9166	85.6794	98.5798
	(19.33)**	(35.28)**	(52.13)**	(67.51)**	(82.85)**
Observations	896	555	515	761	601
R-squared	0.23	0.26	0.13	0.06	0.03

Robust t-statistics in parentheses
* significant at 5%; ** significant at 1%

Table 2. Regression Tests of Differential Vocabulary Growth by Social Class

Panel A. Non-Hispanic Whites

	3-4 Year Olds	5-6 Year Olds	7-8 Year Olds	9-10 Year Olds	11-12 Year Olds
AGE-36_0	1.2957				
	(25.79)**				
SES	4.3456	4.4527	5.0982	4.8851	5.7743
	(7.24)**	(5.23)**	(6.42)**	(5.47)**	(6.43)**
SES x (AGE-36_0)	0.0755				
	(1.59)				
AGE-60_0		1.3498			
		(17.84)**			
SES x (AGE-60_0)		-0.0483			
		(0.69)			
AGE-84_0			0.8652		
			(12.77)**		
SES x (AGE-84_0)			-0.0471		
			(0.79)		
AGE-108_0				0.6274	
				(10.29)**	
SES x (AGE-108_0)				-0.0023	
				(0.04)	
AGE-132_0					0.5915
					(6.86)**
SES x (AGE-132_0)					-0.1272
					(1.41)
Constant	21.6560	51.5532	79.3178	98.6742	112.7939
	(32.68)**	(56.00)**	(85.28)**	(108.68)**	(134.91)**
Observations	1539	748	745	907	675
R-squared	0.42	0.35	0.28	0.22	0.15

Table 2. Regression Tests of Differential Vocabulary Growth by Social Class
(Continued)

Panel B. African-Americans

	3-4 Year Olds	5-6 Year Olds	7-8 Year Olds	9-10 Year Olds	11-12 Year Olds
AGE-36_0	1.0199				
	(18.08)**				
SES	0.9901	3.6688	3.6808	4.4129	6.7495
	(1.99)*	(4.51)**	(4.41)**	(5.34)**	(7.39)**
SES x (AGE-36_0)	0.1976				
	(5.05)**				
AGE-60_0		1.2408			
		(14.32)**			
SES x (AGE-60_0)		0.0870			
		(1.26)			
AGE-84_0			0.8119		
			(7.95)**		
SES x (AGE-84_0)			0.0694		
			(1.00)		
AGE-108_0				0.6092	
				(6.47)**	
SES x (AGE-108_0)				0.0431	
				(0.75)	
AGE-132_0					0.4310
					(3.40)**
SES x (AGE-132_0)					-0.1191
					(1.34)
Constant	12.2520	39.7605	68.7319	88.4267	103.3392
	(17.91)**	(36.98)**	(50.31)**	(61.52)**	(76.84)**
Observations	896	555	515	761	601
R-squared	0.36	0.38	0.25	0.22	0.21

Robust t-statistics in parentheses
* significant at 5%; ** significant at 1%

Table 3. Regression Tests of Differential Vocabulary Growth by Social Class Including Family Linguistic Instruction for Three - and Four-Year-Olds

Panel A. Non-Hispanic Whites

	(1)	(2)	(3)
AGE-36_0	1.3202	1.2957	1.2812
	(26.46)**	(25.79)**	(25.30)**
SES		4.3456	1.9266
		(7.24)**	(2.58)*
SES x (AGE-36_0)		0.0755	0.0838
		(1.59)	(1.40)
FLI			3.5323
			(5.77)**
FLI x (AGE-36_0)			-0.0082
			(0.17)
Constant	24.0591	21.6560	22.6081
	(35.79)**	(32.68)**	(33.76)**
Observations	1539	1539	1539
R-squared	0.31	0.42	0.46

Panel B. African-Americans

	(1)	(2)	(3)
AGE-36_0	0.9289	1.0199	0.9686
	(17.13)**	(18.08)**	(17.02)**
SES		0.9901	0.7997
		(1.99)*	(1.33)
SES x (AGE-36_0)		0.1976	0.1142
		(5.05)**	(2.27)*
FLI			0.3650
			(0.59)
FLI x (AGE-36_0)			0.1451
			(2.64)**
Constant	12.0502	12.2520	12.2436
	(19.33)**	(17.91)**	(18.09)**
Observations	896	896	896
R-squared	0.23	0.36	0.39

Robust t-statistics in parentheses
* significant at 5%; ** significant at 1%

Appendix - Descriptive Statistics and Principal Components

I. Age and PPVT Descriptive Statistics by Age Group and Race

Non-Hispanic Whites

	3-4 Year Olds	5-6 Year Olds	7-8 Year Olds	9-10 Year Olds	11-12 Year Olds
AGE Mean (Months)	48.43	70.02	94.85	121.37	139.54
AGE Std. Deviation	6.70	7.05	6.97	6.64	5.79
PPVT Mean	40.48	66.35	90.31	107.94	117.78
PPVT Std. Deviation	16.02	17.49	14.13	13.70	14.29
N	1539	748	745	907	675

African-Americans

	3-4 Year Olds	5-6 Year Olds	7-8 Year Olds	9-10 Year Olds	11-12 Year Olds
AGE Mean (Months)	48.66	70.83	95.18	121.37	140.02
AGE Std. Deviation	6.76	7.34	6.95	6.81	6.23
PPVT Mean	23.81	50.90	75.09	93.30	102.57
PPVT Std. Deviation	12.97	17.00	16.01	15.71	16.97
N	896	555	515	761	601

II. Principal Component Variable Construction

SES Variable Construction

The construction of the SES variable is based on a principal components analysis that uses three variables current as of 1996, which is the last year of our sample. The variables are the highest grade the mother achieved, the highest grade the grandmother achieved and the percent of years in poverty between 1981 and 1996. The descriptive statistics for the underlying variables in the factor are given in the following table. Note that SES is constructed from all mothers in the NLSY sample with available data and not just those in the samples we construct for analysis in the paper.

Variable	Mean	Standard Deviation	Minimum	Maximum
Mother's Highest Grade	12.74	2.39	0	20
Grandmother's Highest Grade	10.54	3.20	0	20
Percent Years in Poverty	0.24	0.30	0	1

N = 3268

Since only the first Eigenvalue is above 1 (1.74) we construct our component using just the first Eigenvector with scoring coefficients:

Variable	Mean
Mother's Highest Grade	0.61160
Grandmother's Highest Grade	0.56390
Percent Years in Poverty	-0.55494

Family Linguistic Instruction (FLI) Construction

As discussed in the paper the FLI is constructed using a principal components analysis of the mother's verbal AFQT score, Home Cognitive score and HOME Emotional score. The FLI is restricted only to those three to four years old, and is constructed separately by race. All three to four year olds in our sample are included in the construction and not just those with nonmissing values on other variables analyzed in the paper. The descriptive statistics for the underlying variables in the factor are given in the following table.

African-Americans

Variable	Mean	Standard Deviation	Minimum	Maximum
Mother's Verbal AFQT	38.79	9.57	20	61
HOME Cognitive Score	901.47	180.03	87	1192
HOME Emotional Score	889.82	163.35	212	1279

N = 1163

Since only the first Eigenvalue is above 1 (1.59) we construct our component using just the first Eigenvector with scoring coefficients:

Variable	Mean
Mother's Verbal AFQT	0.53359
HOME Cognitive Score	0.62357
HOME Emotional Score	0.57135

Non-Hispanic Whites

Variable	Mean	Standard Deviation	Minimum	Maximum
Mother's Verbal AFQT	50.46	8.83	20	62
HOME Cognitive Score	1016.33	133.64	305	1213
HOME Emotional Score	1016.13	142.72	481	1336

N = 2277

Since, again, only the first Eigenvalue is above 1 (1.63) we construct our component using just the first Eigenvector with scoring coefficients:

Variable	Mean
Mother's Verbal AFQT	0.58251
HOME Cognitive Score	0.60990
HOME Emotional Score	0.53731