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AUTHOR	Gclden, Mark; And Others
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Abstract

In an effort to isolate the emergence and causes of social class differences in intellectual performance, this longitudinal study was undertaken as a follow-up on a cross-sectional study that yielded no social class differences on the Cattell Infant Intelligence Scale for 12-, 18-, and 24-month-old black children. In the present study, 89 children from the 18 and 24 month samples of the previous study were tested on the Stanford-Binet at 3 years of age, and their mothers were given the Peabody Picture Vocabulary Test. There were highly significant differences on the Stanford-Binet between groups based on different socioeconomic status. Correlations between child's score and mother's score tend to increase with the child's age. These findings match those previously reported for white children. Interpretation of the data seems to indicate that social class influences on intellectual performance are operating but statistically insignificant at 18 and 24 months, finally becoming significant during the third year of life. Rather than being caused by either malnutrition or hereditary factors, social class differences in intellectual development may be due to differences in the acquisition of abstract knowledge, the

Social Class Differentiation in Cognitive Development: A Longitudinal Study

Mark Golden, Beverly Birns, Wagner Bridger, and Abigail Moss

Albert Einstein College of Medicine, Yeshiva University

It is of theoretical and practical importance to determine when social class differences in intellectual performance first emerge, to identify the specific deficiencies which prevent many lower-class children from achieving academically, and if possible to discover the causal mechanisms or factors which account for social class differences in cognitive development. Only on the basis of such information can optimally timed and really effective compensatory education programs be designed.

In a cross-sectional study, which was reported previously (Golden and Birns, 1968), we compared 192 black children of 12, 18, and 24 months of age, from three Socio-Economic-Status (SES) groups, on the Cattell Infant Intelligence Scale and the Piaget Object Scale. Children from the following SES groups were studied: (A) Welfare Families-neither mother nor father was employed or going to school, family on welfare; (B) Lower-Educational Achievement Families-neither parent has had any schooling beyond high school; and (C) Higher-Educational-Achievement Families-either parent has had some schooling beyond high school (from a few months of secretarial school to completion of medical training). 93% of the Group A children were from fatherless families, in contrast to 5% of the B and 0% of the C children. Contrary to our expectations, we did not find any social class differences in intellectual performance on either the Cattell or the Object Scale during the

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first two years of life.

The present paper is a report of a longitudinal follow-up study, in which the children in the 18 and 24 month samples of the cross-sectional study were retested on the Stanford-Binet at 3 years of age. The purpose of the longitudinal study was to see whether the same pattern of social class differentiation in cognitive development, emerging during the third year of life, previously reported (Terman and Merrill, 1937; Hindley, 1960) for white children was also present in black children.

METHOD

89 of the original 126 A, B, and C children in the 18 and 24 month samples were retested on the 1960 revision (Form L-M) of the Stanford-Binet Intelligence Scale at approximately 3 years of age. Most of the children were retested between 3 and 3½ years of age. A few were a month or so under 3 years or over 4 years of age. The Mean chronological ages (CA's in years and months) for the A, B, and C children at the time they were tested on the Binet were 3.2, 3.5, and 3.4 years. The Peabody Picture Vocabulary Test was administered to the mothers in order to see at what age the children's IQ scores begin to correlate with the mothers' Vocabulary scores.

Every effort was made to retest as many of the 18 and 24 month children as possible. This included a payment of $10 to the mothers, several letters, and numerous telephone calls. We succeeded in retesting about 70% of the Ss in all three SES groups for both age samples combined. The follow-up rates for Groups A, B, and C were 53%, 70%, and 80%. We were unable to obtain the rest of the Ss for a variety of reasons, the principle one being that the families had moved and the new address was unknown. Comparisons were made, using the t-test, between the Cattell scores of children who were retested and those who did not return. There were no significant differences in this respect.

The children in the original cross-sectional study were recruited from Well-Baby Clinics, Child Health Stations, private pediatricians, and through mothers who had participated in the study. Where records were available, Ss were screened to include only normal healthy children, with no histories of serious prolonged illness, birth complications or prematurity (birth-weight less than 5½ pounds). Where records were not available, this information was obtained from the mothers.

RESULTS

Whereas there were no significant social class differences on the Cattell at 18 and 24 months of age, when the same children were tested on the Stanford-Binet at 3 years of age, there were highly significant SES differences in intellectual performance (see Table 1). Since the 3-year Binet Mean IQs for the 18 and 24 month samples for each SES group did not differ significantly, the Binet scores for the two age samples were combined for purposes of data analysis. The combined Binet Mean IQs for the A, B, and C Groups were 94, 103, and 112 respectively. A one-way analysis of variance resulted in highly significant SES differences in IQ ($F=13.25$ with 2 and 86 df; $p < .005$). Scheffe Tests, involving all possible comparisons, yielded the following results: $C > A$, $p < .01$; $C > B$, $p < .10$ (Edwards, 1965). Children from middle-income families obtained significantly higher Stanford-Binet IQ scores than children from poor stable families and those from fatherless welfare families. Children from poor stable families obtained higher IQ scores than those from fatherless welfare families, but this difference fell short of the .05 level of significance.

Insert Table 1 about here

In the original cross-sectional study, we did not employ a more widely used SES measure, such as Hollingshead's Index of Social Status, because it is based on the educational-occupational achievement of the head of the household, which in most cases is the father. In many black families the mothers' achievements in these respects may be higher than the fathers'. For this reason we had assumed that the Hollingshead Index would not adequately reflect important differences in social status among blacks. We had also assumed that by classifying the black children in our sample in terms of Hollingshead's Index, there would be a narrower range in Mean IQ scores than the range obtained on the basis of our A, B, C classification system. Both of these assumptions proved to be quite erroneous.

The children in our sample were classified on the basis of the following modification of Hollingshead's Index of Social Status: (1) Middle-class or higher; (2) Working class; (3) Lower-class/Non-Welfare; and (4) Lower-class/Welfare (Hollingshead, 1957). Group 1 corresponds to Hollingshead's Classes I, II, and III combined; Group 2 corresponds to Hollingshead's Class IV; and Groups 3 and 4 represent subclasses of Hollingshead's Class V. In terms of the original A, B, C classification system, all of the children in Group 1 were in Group C; Group 2 is about equally divided between B and C children; Group 3 were in Group B, with the exception of one child from Group C; and all of the children in Group 4 were in Group A.

When the same children were classified in terms of the modified Hollingshead Index, there were still no significant SES differences on the Cattell at 18 and 24 months of age, but there was an even greater range in Mean Stanford-Binet IQ scores than was obtained on the basis of the original A, B, C classification system. The Mean IQ scores for Groups 1, 2, 3, and 4 were 116, 107, 100, and 93 respectively, a spread of 23 IQ points (see Table 2). A one-way analysis of variance resulted in highly significant SES differences in IQ ($F=8.85$ with 2 and 85 df; $p < .0005$). The range in Mean IQ scores obtained on the basis of the modified Hollingshead SES Index in the present longitudinal study of black children was almost identical to that reported by Terman and Merrill (1937) for 831 white children between 2½ and 5 years of age in their standardization sample, classified into 7 SES groups on the basis of the fathers' occupations. Children in Class I (Professionals) obtained a Mean IQ score of 116 and children in Class VII (Laborers) obtained a Mean IQ score of 94 (see Table 3). The unique and perhaps significant contribution of the present longitudinal study is that the same pattern and degree of social class differentiation in intellectual performance, emerging during the third year of life, previously reported for white children has now been demonstrated for black children.

Insert Tables 2 and 3 about here

Two other findings provide further evidence that when only normal children are studied the behaviors measured by infant tests during the first 18 months of life appear to be unrelated to later measures of intelligence. Pearson rs were computed between mothers' Peabody Picture Vocabulary scores and children's IQ scores at 18, 24, and 36 months of age. The correlation between the Peabody and 18-month Cattell scores was .10, which is not significant. The correlation between the Peabody and the 24-month Cattell scores was .28, which is significant at the .02 level. The correlation between the Peabody and 3-year Stanford-Binet scores was .32, which is significant at the .01 level. Bayley (1954) and Honzig (1957) also found that children's IQ scores do not correlate at all with their mothers' intelligence or education during the first 18 months of life, but after 18 months the correlations gradually increase, reaching an asymptote of about .50 by 5 years of age.

Pearson rs were also computed between the Cattell and the Stanford-Binet scores for the 18 and 24 month samples. The correlation between the 18-month Cattell and the 3-year Binet scores was .13, which is not significant. The correlation between the 24-month Cattell and the 3-year Binet scores was .60, which is significant at the .005 level. There is an apparent paradox in the data which requires some explanation. How is it possible for there to be no significant SES differences in IQs at 24 months of age, highly significant SES differences in IQs at 3 years of age, and still obtain a fairly high correlation between the two sets of intelligence scores? The correlation of .60 was based on the total 24-month longitudinal sample, i.e., for all SES groups combined. The paradox is partially resolved if one examines the correlations for each SES group separately. The Pearson rs between the 24-month Cattell and the 3-year Stanford-Binet scores for SES groups A, B, and C were .64, .53, and .57 respectively. While social class differences in Mean IQ scores increased greatly between 2 and 3 years of age, Ss within each SES group maintained their relative positions in terms of intelligence from 2 to 3 years of age.

The correlations between the Cattell and Stanford-Binet indicate that while there appears to be very little relationship between the behaviors measured by the Cattell at 18 months and the Binet at 3 years, there is some overlap in the abilities measured by the Cattell at 2 years and the Binet at 3 years of age. In regard to the kinds of changes in the compositions of intelligence test items between 18 and 36 months of age which could account for the findings in the present longitudinal study, one factor which may be particularly important is that the proportion of verbal items increases with age. For example, the average 18-month old child may be exposed to Cattell items within the 12 to 22 month range which contains 33% verbal items. The average 24-month old child may be exposed to Cattell items within the 20 to 30 month range which contains 48% verbal items. The average 3 year old may be exposed to Binet items within the 2 to 5 year range which contains 64% verbal items. This might explain why the 24-month Cattell scores correlate more highly than the 18-month Cattell scores with the 3-year Binet scores, as well as with the mothers' Peabody Picture Vocabulary scores.

Social class influences on cognitive development already appear to be operating between 18 and 24 months of age. These are reflected in low but significant correlations between children's IQ scores and mothers' intelligence and education after 18 months of age. In the present longitudinal study the rank order of the Mean IQ scores at 24 months of age corresponds perfectly with social class (see Tables 1 and 2), whereas at 18 months of age this is not the case. However, the differences in the Mean IQ scores at 24 months are not great enough to produce a significant F. Low significant correlations between social class factors, such as mothers' intelligence and education, reflect a relatively weak effect, whereas Mean IQ differences between SES groups reflect a relatively strong effect. The process of social class differentiation in cognitive development appears to begin somewhere between 18 and 24 months of age, but the divergence in intellectual ability only becomes great enough to be reflected in statistically significant SES differences in Mean IQ scores by about 3 years of age.

DISCUSSION

The results of the present longitudinal study confirm the findings of other investigators (Knobloch and Pasamanick, 1960; Hindley, 1960; Bayley, 1965). When such factors as birth complications and poor nutrition and health are ruled out, social class differences in intellectual performance have not been demonstrated until the third year of life. The only contradictory evidence which we know of appears in some unpublished studies. One of these is a report by Kagan (1966) in which social class differences in perceptual discrimination, attention, and persistence were observed in infants of about a year of age. In another study Wachs, Uzgirus, and Hunt (1967) reported SES differences on several new cognitive measures based on Piaget as early as the first year of life. More specific details of these studies and replication of the results are necessary however before the findings can be properly evaluated.

The discussion will focus on the specific question of why social class differences in intellectual performance first manifest themselves during the third year of life and not earlier. Our position is similar to Whorf's (1956) to the extent that we believe that social class and cultural differences in cognitive development may largely be a function of language. Since SES differences in intellectual performance emerge during a period of rapid growth of language, it seems reasonable to assume that these differences may be due to language. There is reason to believe that roughly between 18 and 36 months of age there is a shift from the preverbal or sensorimotor to the verbal or symbolic level of intelligence and that different environmental conditions facilitate or retard development on these two qualitatively different levels of intelligence. Sensorimotor intelligence in human infants probably differs very little from animal intelligence, whereas verbal intelligence is uniquely human. The period from 18 to 36 months of age may be considered a transitional phase from sensorimotor to verbal intelligence. The research evidence strongly indicates that social class does not appear to have any measurable effect on the development of sensorimotor intelligence, but social class does have a pronounced effect on the development of verbal intelligence. Our conclusions pertain only to the absence of SES influences on sensorimotor intelligence. They do not apply to other important environmental factors, such as institutionalization, variations in maternal behavior unrelated to social class, etc., which may affect cognitive development during the preverbal period.

The reasons why social class differences in intellectual performance first manifest themselves during the third year of life will now be discussed. On the sensorimotor level of intelligence, given an average expectable environment with an opportunity to explore and manipulate objects, and a sufficient amount of attention or handling by parents or care-taking adults, children reared under a variety of social conditions can acquire on their own the kinds of perceptual-motor skills measured by infant tests or Piaget-type scales. On the sensorimotor level the child's construction of reality, to borrow Piaget's (1954) terminology, for the most part is not socially transmitted, but is based on his own experience or activity. To be sure, during the first 18 to 24 months of life children in

New York City learn something about elevators and automobiles, while children in a rural village in India learn about elephants and tigers. In this respect the knowledge which they acquire is different. But children in both cultures learn, for example, that objects continue to exist when they are no longer in the perceptual field, that objects fall down and not up, and so forth. The basic knowledge which children acquire about the world on the sensori-motor level - in terms of the dimensions which Piaget has described, such as object permanence, spatial, causal, and temporal relations - may be universal. While language may be present, very little of what children learn during the first 2 years of life is acquired through language. Their ability to understand and express ideas verbally is fairly limited. Their capacity to use language as a tool for symbolic or representational thinking is probably not present to any significant degree during the first 2 years.

During the third year of life, as children develop an increasing capacity to use language for these purposes, the social group or society in which a child is reared can transmit its particular construction of reality and its own characteristic linguistic and conceptual style. Social class differences in linguistic and conceptual style have been described by a number of recent writers (Bernstein, 1967; Brophy, Hess, and Shipman, 1966; John, 1963; Kagan, 1966; Reissman, 1962; Whiteman and Deutsch, 1967) and need not be reiterated again here. Social class differences in intellectual performance may be largely due to differences in abstract knowledge, differences in the ability to understand and express ideas verbally, and differences in symbolic or abstract thinking ability, which are mediated by language. When children become capable of using language for these purposes, social class begins to make a difference in terms of facilitating cognitive development. We suspect that middle-class parents place greater emphasis on the acquisition of abstract knowledge and do more than lower-class parents to stimulate their children's verbal facility and abstract thinking ability. They do so by teaching more verbal concepts, by giving reasons and causal explanations, by asking their children questions and expecting answers, by encouraging children to ask questions and by attempting to answer their questions, and so forth. In these verbal exchanges, middle-class children learn certain language and intellectual skills, as well as concepts. But they also acquire a pattern of verbal interaction with adults which prepares them better than lower-class children to perform on standardized intelligence tests and to relate to teachers in a group learning situation. Brophy, Hess, and Shipman (1966) postulate that the mechanism by which social class affects cognitive development and learning ability may best be understood in terms of the patterns of verbal interaction between children and parents in their roles as pupil and teacher.

While we believe that the emergence of social class differences in cognitive development during the third year of life may be due to the rapid growth of language during this period, and in particular children's increasing capacity to use language as a tool for symbolic or abstract thinking, there are other alternative explanations of the data which should be considered.

(1) The first alternative explanation, which is now receiving a great deal of attention, is that the relative intellectual retardation of children living in poverty may be due to the greater incidence among poor families of malnutrition and poor health during infancy and early childhood, prenatal and perinatal complications, and prematurity

(Birch, 1968).

In regard to the effects of malnutrition on intelligence, it has been hypothesized that malnutrition may operate directly on the biological level or indirectly on the psychological level. On the biological level malnutrition in early childhood may interfere with maturation of the central nervous system, which in turn could interfere with intellectual development. On the psychological level malnutrition may interfere with children's learning ability due to poor health, low energy, apathy, etc. One of the major problems in evaluating the effects of malnutrition on intellectual development is that children who suffer from serious nutritional deficiencies also come from the most underdeveloped areas in the world and the lowest socio-economic strata in society. For this reason it is very difficult to separate the effects of poor nutrition from those of poor education on intelligence. For example, Cravioto, DeLicardi, and Birch (1966) reported the results of a recent retrospective study of the effects of malnutrition in early childhood on the intellectual development of school age children in a rural village in Guatemala. While they did find a relationship between an indirect measure of early nutritional deficiency (height) and intellectual performance, these factors also correlated with the mothers' education so that the effects of poor nutrition and poor educational environment were confounded. The authors also imply that the relatively poor intellectual performance of the undernourished children in their study was due to the effects of malnutrition operating on the biological level, but they do not offer any direct evidence for this. There has been a great deal of concern expressed recently that malnutrition in infancy may produce irreparable damage to the brain and intellectual retardation. Hunger, poor nutrition, and ill health exist in this country and may seriously interfere with children's ability to learn. These intolerable conditions must be eliminated as soon as possible. However, there is no direct empirical evidence that the kinds of mild to moderate degrees of nutritional deficiency suffered by poor children in the United States, and particularly children in northern urban ghettos, results in cerebral damage or permanent intellectual retardation. There is reason to believe that inadequate intellectual nutriment, beginning at about 18 to 24 months of age when language comes into the picture, is more responsible for the intellectual deficiencies of poor children in our society than inadequate diet.

In regard to the effects of prenatal and perinatal complications and prematurity on intelligence, it has been hypothesized that these biological factors may result in varying degrees of damage to the central nervous system, which in turn may result in impairment of intellectual functioning and serious learning problems in school (Knobloch and Pasamanick, 1960). Since the incidence of these conditions is greater in lower-class than in middle-class families, social class differences in intellectual performance have been explained on this basis. The data in the present longitudinal study cannot adequately be explained on the basis of such biological factors. If the infant tests are of any values, it is in their sensitivity in detecting early signs of neurological impairment and mental retardation. On the basis of our present knowledge, we would not expect such impairment to be manifested in significantly lower intellectual performance by the lower-class children in our sample at age 3, when it was not evident in the same children at 18 and 24 months of age. It is possible that minimal subclinical damage to certain parts of the brain, responsible for higher mental functions, may first manifest itself in lower intellectual performance when these functions emerge in older children. As far as we know, there is no research evidence for this. There are retrospective studies (Knobloch, Pasamanick, and Lilienfeld, 1956) in which older children with varying degrees of intellectual retardation and serious learning problems in school have been found to have a high incidence of histories of prenatal and perinatal complications and prematurity. However, these children were not studied in infancy, so that it is not known whether they were developing normally during the first few years of life. The preponderence of evidence from recent prospective longitudinal studies, (Braine, et al, 1966; Drillien, 1964; Werner, et al, 1968; and Willerman, 1969), in which children have been studied from birth through childhood, indicates that: (1) Children who perform poorly on intelligence tests after 2 years of age also do poorly on infant tests during the first 2 years of life. (2) During the first few years of life there appears to be an interaction between social class and birth complications and prematurity on intellectual development. These biological factors seem to have a much more detrimental effect on early intellectual development of lower-class than middle-class children. SES differences in intellectual performance are present as early as the first year of life in the case of children with histories of birth complications or prematurity, whereas SES differences in intellectual performance in normal children without such histories do not emerge until the third year of life. (3) Finally, and this is particularly important, except in cases of severe prenatal and perinatal complications or very low birth weight (less than 3½ pounds), whose incidence is extremely small, the early detrimental effects on intellectual development from such biological factors on middle-class children tend to diminish or completely wash out as these children grow older. Premature children (Drillien, 1964) and children with mild to moderate degrees of prenatal and perinatal complications (Werner, et al, 1968) from middle-class families, who are reared in a favorable environment for cognitive development, do well intellectually, both in their performance on standard intelligence tests and in school. On the basis of a large-scale 10 year longitudinal study on the effects of prenatal and perinatal complications on intellectual development, Werner and her associates (1968) conclude that we should be much more concerned with the "environmental casualties," who by far make up the vast proportion of poor children in our society, than with "reproductive casualties." The latter should not be ignored, but it must be recognized that they constitute a relatively small proportion of poor children. Only 2% of the children in the study by Werner, et al (1968) manifested severe perinatal complications and later serious intellectual impairment and learning disability. The vast majority of the children in their study with learning and behavior problems at 10 years of age had relatively minor or no birth complications, but they grew up in homes from the lowest socio-economic strata in society, where there was inadequate intellectual stimulation.

(2) A second alternative explanation of the data in the present longitudinal study can be made on the basis of genetics or heredity. This argument has received a great deal of recent attention, since the appearance of a series of articles by Arthur Jensen (1968, 1969). Jensen takes the position that social class and black-white differences in intelligence are largely due to heredity. In regard to the present study, it can be argued that both sensorimotor and verbal intelligence may be primarily genetically determined. While there appear to be no SES differences in sensorimotor intelligence, there may be genetic differences in verbal intelligence among different social classes, and these

hereditary differences merely manifest themselves by about 3 years of age when tests begin to measure verbal intelligence.

In one article Jensen (1968) states "...because there is a high correlation (of the order of 0.8 - 0.9) between phenotype and genotype for intelligence as measured by tests such as the Stanford-Binet, it is inevitable that SES differences in intelligence are due largely to genetic factors." The high correlation between phenotype and genotype refers to correlations in the IQ scores of identical twins reared separately from infancy. On the basis of such correlations, Jensen computes r^2, the estimate of the variance in intelligence scores which may be attributed to heredity. He arrives at a variance estimate of .80, which essentially is the basis for his statement that 80% of individual differences in intelligence are genetically determined. From this Jensen concludes that social class and black-white differences in intelligence must be largely due to heredity.

The basic fallacy in Jensen's logic is that he attempts to account for Mean IQ differences between SES or racial groups on the basis of correlations among individuals. In the twin studies, for example, which provide the strongest evidence for Jensen's position, it is theoretically possible to obtain a perfect correlation of 1.0 between the IQ scores of pairs of identical twins reared separately from birth and still have a Mean IQ difference of 20 points between the pairs of twins. Correlations and Mean differences between any two sets of measures are completely independent of one another, and there is no necessary logical or statistical basis of predicting one on the basis of a knowledge of the other. Jensen cannot even account for possible Mean IQ differences between pairs of twins on the basis of correlations in their IQ scores, much less account for Mean IQ differences between SES or racial groups on the basis of such correlations.

Jensen's fallacious reasoning can perhaps be seen more clearly if we examine in greater detail the basis for his statement that 80% of the variance in individual differences in intelligence is genetically determined. It is important to keep in mind that the variance estimate based on the twin studies directly pertains only to the variance in the intelligence scores within each group of twins and not to the variance between the groups. The latter would reflect any Mean IQ differences which may be present between the two groups of twins. Furthermore, we would assume that such high correlations in the intelligence scores of identical twins can be obtained only if environmental differences which could affect their IQ scores are minimal within each group of twins, although not necessarily between groups. In the twin studies, while the children were reared separately from infancy, environmental differences were probably not very great, since adopted children are usually placed in better-than-average homes. Jensen makes a serious error in statistical inference when he generalizes from a variance estimate based on a small environmentally homogeneous sample to the population at large, which is known to be environmentally quite heterogeneous with respect to social class and race.

Jensen also refers to studies of children adopted in infancy (Skeels and Harms, 1948; Skodak and Skeels, 1949; Honzig, 1957). He points out that when these children are tested many years later, their IQs correlate with the intelligence or education of their true mothers, and do not correlate at all with the intelligence or education of their adoptive parents. In fact, the correlation in the intelligence scores of adopted children and those of their true mothers was .44, which is about what it would have been if these children had been reared by their own mothers. On the basis of such evidence Jensen concludes that heredity and not environment is the crucial factor in individual differences in intelligence. However, Jensen fails to mention the fact that the mean IQ scores of the adopted children was 106 and the mean IQ scores of their true mothers was 80, a difference of 26 points. While the IQ scores of the adopted children did not correlate with the education or intelligence of their adoptive parents, the Mean IQs of the children would probably not differ from the Mean IQs of the adoptive parents, whereas the IQ scores of the true mothers averaged more than 20 points lower than those of their children while most of the natural mothers of these children came from the lowest strata of society, the adoptive parents were of a higher socio-economic status.

The studies of adopted children offer a partial refutation of Jensen's position and provide a demonstration of Hunt's "interaction hypothesis" (Hunt, 1961). Social class differences in child-rearing environment may produce mean IQ differences of more than 20 points but genetic factors may still be reflected in individual differences within SES groups. Environment and heredity appear to interact in the following way: Mean IQ differences between different social groups (whether they are classified in terms of social class, ethnicity, culture, race, geographical location, such as North-South, urban-rural, and institution vs home-reared) may reflect environmental influences while individual differences in intelligence within such social groups may reflect hereditary or genetic influences.

To summarize, in a longitudinal study of 89 black children from different social classes, there were no significant SES differences on the Cattell Infant Intelligence Scale at 18 and 24 months of age. When the same children were tested on the Stanford-Binet at

3 years of age, there was a highly significant 23 point Mean IQ difference between children from welfare and middle-class black families. The range in the Mean IQ scores of the black children from the two extreme SES groups (93-116) was almost identical to that reported by Terman and Merrill for 831 white children between $2\frac{1}{2}$ and 5 years of age in their standardization sample. The process of social class differentiation in cognitive development appears to begin somewhere between 18 and 24 months of age. This is reflected in low but significant correlations between children's IQ scores and social class factors such as mothers' intelligence and education after 18 months of age. The divergence in intellectual ability only becomes great enough to be reflected in statistically significant SES differences in Mean IQ scores by about 3 years of age.

The discussion focussed on the question of why social class differences in cognitive development emerge during the third year of life and not earlier. On the basis of the research evidence we concluded that differences in educational environment play a more significant role than biological or genetic factors in social class differences in intellectual performance. More specifically, we have suggested that social class differences in intellectual development may be due largely to differences in the acquisition of abstract knowledge, differences in the pattern of verbal interaction between parents and children, and differences in symbolic or abstract thinking ability. These are mediated by language. Social class differences in cognitive development emerge during the third year of life as children become increasingly capable of using language for these purposes.

Table 1

Mean IQ Scores of Children in the 18 and 24 Month Samples Retested at 3 Years of Age Classified by A, B, C SES System

Social Class	Eighteen Month Sample N	18m	36m	Twenty Four Month Sample N	24m	36m
C > High School	16	110	112	21	102	113
B < High School	10	113	104	21	99	101
A - Welfare	10	110	94	11	96	93

Note: The 18 and 24 month scores are based on the Cattell and the 36 month scores are based on the Stanford-Binet.

Table 2

Mean IQ Scores of Children in the 18 and 24 Month Sample Retested at 3 Years of Age Classified by Modified Hollingshead SES System

	Social Class	Eighteen Month Sample			Twenty-Four Month Sample		
		N	18m	36m	N	24m	36m
1	Middle-class	5	106	115	11	102	115
2	Working-class	15	113	110	23	101	106
3	Lower-class/Non-Welfare	5	114	102	8	98	101
4	Lower-class/Welfare	10	110	94	11	96	93

Table 3

Comparisons of Stanford-Binet IQ Scores of Black Children in Longitudinal Study Classified by A, B, C System and Hollingshead's Modified System, and White Children from Terman and Merrill's Standardization Sample

Black Children in Longitudinal Study Classified by A, B, C System			Black Children in Longitudinal Study Classified by Modified Hollingshead System			Terman and Merrill's White Children Classified by Fathers' Occupation	
	N	IQ		N	IQ		IQ
C > High School	37	112	1. Middle-class	16	116	I Professional	116
B < High School	31	102	2. Working-class	38	107	II Semi-Professional Managerial	112
A Welfare	21	93	3. Lower-class/Non-Welfare	13	100	III Clerical, Skilled Trades, Retail	108
			4. Lower-class/Welfare	21	93	IV Rural Owners	99
						V Semi-skilled, Minor Clerical, Small Business	104
						VI Semi-skilled Laborers	95
						VII Unskilled Laborers	94
N = 89	p>.0005		N = 88	p>.0005		N = 331	

Note: One child was excluded because there was not enough information to classify him in terms of Hollingshead's Index.

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