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ABSTRACT

In a longitudinal study of 89 black children from different social classes, while there were no significant SES differences on the Cattell Infant Intelligence Scale at 18 and 24 months of age, there was a highly significant 23 point Mean IQ difference between children from welfare and middle class black families on the Stanford-Binet at 3 years of age. The range in Mean IQs of the black children in the extreme SES groups (93-116) was almost identical to that obtained by Terman and Merrill in their standardization sample of 831 white children between 2 1/2 and 5 years of age. The unique contribution of the present study is that the same pattern of social class differentiation in cognitive development, emerging during the third year of life, previously reported for white children has now been demonstrated for black children. (Author/MH)

Social Class Differentiation in Cognitive Development Among Black Preschool Children

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It is of theoretical and practical importance to determine when social class differences in intellectual performance first emerge and to identify the specific deficiencies which prevent many lower-class children from achieving academically. It might then be 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 mother or father 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.

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Contrary to our expectations, we did not find any social class differences in either the Cattell or the Object Scale scores during the first two years of life.

The present paper is a report of a longitudinal follow-up study, in which 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 follow-up study was to see whether the same pattern of social class differentiation in cognitive development, emerging during the third year of life, reported for white children was also present in black children (Terman and Merrill, 1937; Hindley, 1960; and Willerman et al, 1969).

In the present study only black children from different social class groups were compared. In this respect, it differs from other studies (Knobloch and Pasamanick, 1960; Wachs, Uzgiris, and Hunt, 1967), which include both black and white children, where race and social class may be confounded.

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 mothers' intellectual performance.

Every effort was made to retest as many of the 18 and 24 month children as possible. This included a payment of $10.00 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 principal one being that the families had moved and the new address was unknown. Comparisions 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.

As in the original cross-sectional study every effort was made to obtain each child's optimal intellectual performance. This included taking as much time as necessary to establish rapport and to elicit responses. Children were seen a second time, if the Examiner felt that the child was not doing his best. It was only necessary to see 4 out of 89 children twice.

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). Two independent

samples of children, one originally tested at 18 months and the other originally tested at 24 months, showed similar patterns of social class differences on the Stanford-Binet at 3 years of age. The fact that the same results were obtained at age 3 on two independent samples strengthens the validity of the findings.

The 3-year Binet scores for the 18 and 24 month 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; $p < .0005$). Scheffe Tests, involving all possible comparisons, yielded the following results: $C > A$, $p < .01$; $C > B$, $p < .05$; and $B > A$, $p < .10$ (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 signficance.

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

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

	Eighteen Month Sample			Twenty Four Month Sample		
Social Class	N	18m	36m	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.

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, 1965). 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 a somewhat 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 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

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 .05 level. The correlation between the Peabody and 3-year Stanford-Binet scores was .32, which is significant at the .01 level. The pattern of increasing correlations of childrens' IQ scores with that of their mothers in our sample of black families was similar to that previously reported for white families. Bayley (1954) and Honzig (1957) 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.

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 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

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 = 831	

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

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 difference in Mean IQ scores by about 3 years of age.

DISCUSSION

The results of the present longitudinal study of black children 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.

Why should social class differences in intellectual performance first manifest themselves during the third year of life and not earlier? Since SES differences in cognitive development emerge during a period of rapid language growth, it seems reasonable to assume that these difference may be due to language. There is reason to believe that 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.

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 terminology (1954), for the most part may not be socially transmitted but acquired through his own direct 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 different cultures, or in black ghettos and middle-class suburbs, learn that objects 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 sensorimotor level--in terms of the dimensions which Piaget has described, such as object permanence, spatial, causal, and temporal relations--may be acquired largely through their own direct experience, and hence may be universal. While language may be present, very little of what children learn during the first two years of life is acquired from other people 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 two years. During the third year of life, as children become increasingly capable of using language for these purposes, social class--and, in particular, the intellectual, verbal, and educational level of the parents--begins to make a difference in terms of facilitating a child's cognitve development.

In regard to the question of why social class differences in intellectual

performance were not found during the first two years of life, it is possible that social class differences are present but that infant tests, such as the Cattell, which largely seem to measure perceptual-motor skills, may not be sensitive enough to detect them. Operating on this assumption, in the original cross-sectional study (Golden and Birns, 1968) we included the Object Scale, a new measure of cognitive development based on Piaget. The Object Scale seemed more related to cognitive development, and therefore we had expected to find social class differences. However, we did not find SES differences on the Object Scale, among black children between 12 and 24 months of age. It is possible, of course, that other measures may be more sensitive to social class influences. There are two recent unpublished studies which report SES differences in cognitive development much earlier than other investigators have found. 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, Uzgiris, and Hunt (1967) obtained 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.

In the original cross-sectional study, while we did not find social class differences in the Cattell or object Scale scores, children in the fatherless-welfare families (Group A) seemed more difficult to test and more effort was required to get them to perform at their optimal intellectual level. This was reflected in the fact that significantly more of the welfare children had to be seen on more than one occasion to obtain a valid estimate of their intellectual ability. However, in a subsequent study to be reported more

fully elsewhere, when children were tested on the Cattell and the Piaget Object Scale under identical conditions, including number of testing sessions, we did not find any differences in intellectual performance in children between 18 and 24 months of age from black welfare (Group A), black middle-income (Group C), and white middle-income families.

To summarize, in a longitudinal follow-up study of 89 black children from different social classes, there were no significant social class differences on the Cattell or Piaget Object Scale at 18 or 24 months of age. When the same children were re-tested on the Stanford-Binet at approximately 3 years of age, there was a highly significant 23 point Mean IQ difference between children from black welfare and middle-income 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 (1937) for 831 white children between 2½ and 5 years of age in their standardization sample. The unique contribution of the present study is that the same pattern of social class differentiation in cognitive development, emerging during the third year of life, previously reported for white children has now been demonstrated for black children.

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