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THE HOUSING ENVIRONMENT AS A FACTOR IN CHILD DEVELOPMENT.  
FINAL REPORT.

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KANSAS CITY, MISSOURI

IN KANSAS CITY, MO., 208 NEGRO FIVE YEAR OLDS WERE  
STUDIED TO EXAMINE THE INFLUENCE OF HOUSING UPON CHILD  
DEVELOPMENT AND TO COMPARE THE RELATIVE INFLUENCE OF HOUSING  
ON HEAD START AND NON-HEAD START CHILDREN. FOUR GROUPS OF 52  
CHILDREN EACH INCLUDED. (1) HEAD START, PUBLIC HOUSING, (2)  
HEAD START, SLUM HOUSING, (3) NON-HEAD START, PUBLIC HOUSING,  
(4) NON-HEAD START, SLUM HOUSING. INSTRUMENTS USED WERE  
"MOTHER INTERVIEWS" AND CALDWELL'S "THE PRESCHOOL INVENTORY"  
WHICH WAS A POST-TEST. THREE HYPOTHESES WERE STATED (1) HEAD  
START CHILDREN FROM BETTER HOUSING (GROUP 1) WILL SURPASS THE  
OTHER GROUPS IN GROWTH AND DEVELOPMENT, (2) NON-HEAD START  
CHILDREN FROM SLUM HOUSING (GROUP 4) WILL SHOW LEAST GROWTH  
AND DEVELOPMENT, AND (3) GROUPS 2 AND 3 WILL SHOW THE  
RELATIVE IMPORTANCE OF HOUSING VERSUS AN ENRICHMENT PROGRAM  
IN FACILITATING DEVELOPMENT. RESULTS SUPPORTED THE THREE  
HYPOTHESES, BUT SOME UNCERTAINTY REMAINED BECAUSE PRE-TESTING  
HAD NOT OCCURRED. (LG)

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THE HOUSING ENVIRONMENT AS A FACTOR IN CHILD DEVELOPMENT

Project Director: Robert R. Rice

A Final Report OEO-583

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## I. ORIGINS AND COMPLETION OF THE RESEARCH

In February, 1965, at Cornell University, preparation was begun on a research design to examine the impact of the housing environment upon certain aspects of human activity and personality development. As plans for Project Head Start became known, it became apparent that such a program would present an unusual "natural laboratory" situation for the research being planned. The Head Start children offered an ideal population for experimental research with potential for valuable scientific data. Further, the research would not only be of value and interest to professionals in housing, education, and child development, but at the same time results would have immediate and practical application. They could be used to: (1) determine the success of the Head Start enrichment program for culturally disadvantaged children; (2) examine the relative influence of the home environment in helping or hindering the child's development once he had the opportunities of Head Start, and (3) provide insight and suggest directions for improved future programs in the War on Poverty.

During the spring, 1965, the research design underwent further development. Inquiries were made about planned Head Start Programs in various metropolitan areas. Considerable interest in the research was indicated by persons in Kansas City, Missouri. Their initial Head Start Program was in the

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planning stages and indications were that children living in both slum and public housing areas would be involved. A further advantage to the Kansas City location was its relative nearness to the University of Missouri, Columbia, Missouri, where I had accepted a teaching position for the fall, 1965.

As the research design developed, it became apparent that it could not be accomplished without financial aid. A proposal was prepared and submitted to the Office of Economic Opportunity on June 5, 1965. Shortly thereafter, verbal acceptance of the proposal was received with the assurance that when funds were officially available, written commitment would be received.

The research proposal stated that the research was to be conducted with the "follow-through" Head Start Program being planned for the fall of 1965 and to carry through the school year. This "follow-through" program offered the advantage of a much longer program than the initial 8 week summer program, and also gave additional time for the development and testing of field instruments.

A further opportunity developed when I was able to fill the position of research assistant in Kansas City's summer Head Start Program. This provided first hand experience with the Head Start Program, facilitated the development and testing of field instruments and procedures, and perhaps even more important, provided the opportunity to work with those people



whose cooperation and help were needed to accomplish the actual research.

By the end of summer, research plans and preparations were ready for the "follow-through" program. Certain details remained to be worked out, such as actual sample selection, as Head Start centers had not been selected. Local political difficulties developed in Kansas City regarding Head Start which caused numerous delays in getting the program underway. Finally, the "follow-through" program did begin on March 1, 1966. A major change in Head Start policy in the testing of children plus the shortened term of the Kansas City program necessitated some modification in the original research design.

The Head Start Program was completed on June 10, and the research field work by July 1. Preparation of the raw data took approximately 30 days and computer processing, scheduled as opportunities became available, was completed in November.

The initial publication resulting indirectly from this research project will be in the form of a doctoral dissertation at Cornell University, Ithaca, New York, and will be under the same title, "The Housing Environment as a Factor in Child Development."

## II. FUNDING OF THE RESEARCH

In a contract (No. OEO-583) dated 1 September, 1965, between the University of Missouri and the Office of Economic Opportunity, a grant was made in the amount of \$3,139.60 for research to be conducted in Kansas City, Missouri, under the direction of Robert R. Rice. The grant amount included no salary for the project director but did cover the cost of a research assistant in Kansas City (Mr. Alvin L. Brooks), transportation costs, and part of the data processing.

Indirect financial support from other sources contributed greatly to the conduct of the research.

1. Through the Kansas City Head Start Program, a special research assistant (Mrs. Lola Powell), working half-time, was funded to work specifically with this research project, particularly in testing the control groups. In addition, the Caldwell Preschool Inventory tests were paid for through the Kansas City Head Start budget.
2. Salary was paid to the project director during the period of the research for the performance of his teaching duties.
3. Typing and secretarial assistance was provided by the School of Home Economics, University of Missouri.
4. Part of the electronic data processing costs were borne by the University of Missouri since much of the data processing occurred after the end of the original term of the research contract.
5. Contributions of time and counsel were freely given by many persons at Cornell University, The University of Missouri, and in Kansas City.

### III. RESEARCH DESIGN AND OBJECTIVES

This research study has examined the influence of the housing environment upon aspects of child development which are important for normal progress and growth in the public school. It has compared the relative influence of the housing environment upon children who have been exposed to the special enrichment experiences of a Head Start Program with those who have not had such an opportunity.

Specifically, this research has included an inspection and appraisal of the dwelling and physical environment of 208 Negro preschool children in Kansas City, Missouri; an interview with the mother or guardian of each child and the collection of pertinent family demographic data and information on experiences of the child; and the administration of a special Preschool Inventory test to each child.

All 208 children came from economically disadvantaged families; each met the general requirements for participation in the Head Start Program. The preschool children, both boys and girls, were about 5 years of age, each being eligible for kindergarten in the coming fall term.

The sample population selected was highly homogeneous with the exception that half of the families lived in structurally sound public housing projects while the other half lived in substandard slum housing. Half of each of these two housing environment groups received the experimental treatment,



participation in Head Start. Thus, there were four groups of 52 children involved in the study:

- Group 1 (experimental) - 52 children living in public housing and enrolled in Head Start.
- Group 2 (experimental) - 52 children living in sub-standard (slum) housing and enrolled in Head Start.
- Group 3 (control) - 52 children living in public housing and not enrolled in Head Start.
- Group 4 (control) - 52 children living in sub-standard (slum) housing and not enrolled in Head Start.

Three general hypotheses were stated in the original research proposal:

- "1. Children living in better housing and participating in the enrichment program (group 1) will exhibit greater growth and development than the other three groups.
2. Conversely, children living in sub-standard housing and not enrolled in the enrichment program (group 4) will exhibit the least amount of growth and development.
3. Differences in growth and development evident in groups 2 and 3 will indicate the relative importance of housing versus a special enrichment program in facilitating growth and development of preschool children."

An analysis of the data collected supports the hypotheses, as will be shown. In addition, however, a considerable amount of data was collected which was not specifically limited to the dwelling appraisal nor to the children's test performance. Many of these data pertain to general family characteristics and experiences of the child. This information was gathered in an effort to control other important variables which are

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known to have an influence upon child development. These data also permitted an analysis of the relative importance of certain variables within each of the four groups.

#### IV. ANALYSIS OF CHARACTERISTICS OF THE FOUR GROUPS

The 208 preschool children involved in this study, as has been stated, were divided into four groups, first on the basis of their housing environment, i.e. public housing or slum, and secondly on their participation or non-participation in the Head Start Program.

The children from public housing were drawn from those living in four public housing projects. The majority lived in the Wayne Minor project, the largest in Kansas City and one which has, in addition to numerous two-story apartment buildings comparable to those in other projects, several large ten-story "high-rise" apartments.

The children living in sub-standard housing were drawn from neighboring elementary school districts. The control group of children from the slums was drawn from a school district which did not have a Head Start center until the summer following the study.

In comparing the characteristics of the four groups, the mean value for each variable in each of the four groups was computed. An analysis of variance was computed for each variable to determine whether or not statistically significant differences were present among the group means. To further evaluate differences between the groups, Duncan's "New

Multiple Range Test<sup>1</sup> was used to separate the variable means among groups at or beyond the 5% level of significance.

### Housing Quality

Each dwelling unit was visually inspected, immediately before or after the interview with the child's mother. This inspection followed a schedule which included major and minor structural items, both inside and outside. Of necessity, there were a few questions which had to be asked of the respondent such as working order of bathroom fixtures, adequacy of the heating system, etc. The dwelling inspection items were tallied to place the dwelling structure in one of four housing quality classifications: poor, fair, good, and excellent.

As would be expected, there were highly significant differences between the public housing groups and the sub-standard housing groups. However, there was also some statistically significant difference (at the 5% level) between group 2 (slum housing, experimental) and group 4 (slum housing, control), indicating that group 2 had somewhat better housing quality than group 4.

An attempt was made to obtain at least a cursory appraisal of a sample of the immediate neighborhood. This was done through a "windshield" type examination of four structures, one

1 David B. Duncan, "New Multiple range and multiple F tests," Biometrics 11:1-42, 1955.

directly opposite, one directly behind, and the one on each side of the subject dwelling. Land use was noted, such as vacant lot, residential, or non-residential, and structural condition was recorded simply as dilapidated, deteriorating, or sound. Again there were sharp differences between the public housing "neighborhoods" and those surrounding sub-standard houses. There was also a significant difference between group 2 and group 4 favoring better "neighborhoods" for group 2.

TABLE I  
HOUSING QUALITY RATINGS

<u>Rating</u>	<u>Group 1</u>	<u>Group 2</u>	<u>Group 3</u>	<u>Group 4</u>
poor	0	38	0	49
fair	0	11	0	3
good	6	3	1	0
excellent	46	0	51	0
Total	52	52	52	52

TABLE II  
PREDOMINANT CONDITION OF THE "SAMPLE NEIGHBORHOODS"

<u>Rating</u>	<u>Group 1</u>	<u>Group 2</u>	<u>Group 3</u>	<u>Group 4</u>
dilapidated	0	2	0	3
deteriorated	0	28	0	40
sound	52	22	52	9
Total	52	52	52	52



### Over-crowding

Using a persons per room ratio to compare over-crowding within the dwelling, it was found that over-crowding was predominant in all four groups, if we use the generally accepted standard of more than one person per room. The extent of over-crowding can be seen in the following:

Group	Ave. no. of persons per room
1	1.20
3	1.23
2	1.41
4	1.46

Statistically significant differences occurred between public housing (groups 1 and 3) and slum housing (groups 2 and 4).

The same differences held when we observed the number of others sleeping in the same room as the subject child. We found that in half of the public housing homes and in well over half of the slum homes, there were two or more other persons sleeping in the same room with the subject preschool child. Again groups 1 and 3 were quite similar as were groups 2 and 4, and the difference between the two housing categories was significant.

### Electrical Appliances

Respondents were asked to indicate whether or not they had certain electrical appliances in their home and to comment on their operational condition. These responses were not included in the computer analysis partly because it was obvious in the simple frequency tabulations that the four groups were

nearly identical. For example, not one single home in this study was without an electric refrigerator. Approximately 90% of the families in each group had a television set in operating condition. A radio was in the home of 80% of the families in each of the four groups and 60% or more had a phonograph. An electric vacuum cleaner was in 25% or less of the homes.

### Cleanliness

A four point rating scale was included in the field instrument for the interviewer to record the general state of cleanliness and housekeeping condition of the dwelling. This was accomplished through observation and without question or comment to the respondent. Although there were notable exceptions in both housing groups, the cleanliness rating for public housing homes was significantly higher than that for sub-standard homes.

### Family Composition

Household Size. The age, sex, and relationship of each person living in the household was recorded. When looking at the total number of persons in the households of each group it can be seen that those in sub-standard housing had larger households than those in public housing and this difference is statistically significant. The differences between the two groups with like housing are quite small as can be seen

below:

Group	Ave. No. in Household
1	6.69
2	8.48
3	6.84
4	8.25

Marital Status. Although the exact marital status of each respondent was recorded, categories were collapsed so that there was a simple dichotomous relationship of married versus all other marital conditions in which there was no father in the home (i.e. single, widowed, divorced and separated). The analysis of this variable indicated that group 3 (public housing, control) had the largest number of father absent families (significant at the 5% level from groups 2 and 4). Group 2 (slum housing, experimental) had the fewest father absent families and the difference is significant from groups 1 and 3.

Income and Rent. There was no statistically significant difference in family income among the four groups. The average income for all groups combined was \$3423.00.

Surprisingly, though rents paid in groups 2 and 4 were higher, there was no statistically significant difference in the amount of rent paid among the four groups. Average rents were slightly over \$50.00 per month in each group. The fact that three families in group 2 and two families in group 4 paid no rent at all, as they were living with relatives, would tend to bring down the average rents slightly in these

groups.

Knowing that the mean income and rent within the four groups were roughly comparable, it was surprising to find that the proportion of income spent on rent and utilities was significantly different between the slum housing families and the public housing families. Groups 2 and 4 paid 30% and 29% respectively, and groups 3 and 1 paid 22% and 21% respectively. The determining factor in this case was the inclusion of the respondent's estimate of average monthly utility bills with monthly rent before dividing by monthly income. In the public housing units, only electricity was paid in addition to rent. For those living in sub-standard housing, the additional cost of utilities, particularly gas for heat, increased the total monthly costs greatly, sometimes nearly doubling the amount of the basic rent.

It is interesting to note a significant difference in the source of income for those families living in public housing as compared with those in sub-standard housing. A significantly larger proportion of those living in public housing receive all or part of their income from some welfare agency such as ADC, unemployment compensation, etc.

Employment. In those families where the father was present and employed, 57% worked in unskilled jobs, and 36% worked in jobs classified as skilled. While few of the mothers were employed, those who were indicated that their work

was unskilled labor or was some type of service work.

Education. There was no significant difference among the groups in the level of education attained by either the fathers or mothers. Between 50% and 60% of the fathers in each group did not complete high school, and over 60% of the mothers did not graduate from high school.

Mobility. The respondents were predominantly Kansas Citians, with only 6 families in group 1, 3 in group 2, another 6 in group 3, and 2 families in group 4 having lived in the Kansas City area for less than five years. While on the average, those living in sub-standard housing had lived in their dwellings for a slightly longer period than those in public housing, the difference in time was only statistically significant between group 2 with an average occupancy of 3 years, 3 months, and group 1, where the average time in the dwelling was the shortest, 2 years and 4 months.

Families in groups 1 and 3 (public housing) had been more mobile averaging 1.7 moves per family within the last 5 years. Following in terms of frequency of moves, was group 4 with 1.4 and then group 2 with only slightly more than one move per family during the past 5 years. Only the relative stability of group 2 was statistically significant.



V. THE PRESCHOOL INVENTORY

Each child selected for study was given the Preschool Inventory test developed by Dr. Bettye M. Caldwell and Donald Soule for use in the Head Start Program. Originally, it was the research plan to administer both a "before" and an "after" test to all children. A number of circumstances intervened which prevented the administration of a "before" test. Primary among these was a policy change in Washington regarding the testing of children. This was not made known to the project director, nor to Kansas City officials administering the local Head Start program, until just prior to the program getting under way. In the initial summer Head Start program, a one-third sample had received both a "before" and an "after" test, but in the follow-up program the test was used much less extensively and not all centers were tested. A month before the beginning of the Kansas City program a rumor was heard that there might be a change in testing policy. An immediate letter of inquiry was sent to Washington. Less than a week before the beginning of the program, confirmation of a change was received and we were advised to purchase the testing materials direct from Dr. Caldwell in Syracuse, New York. The order was placed immediately but by the time the testing materials were received, six weeks of the program had already been completed.

One test, therefore, was administered to all children

during a six week period beginning late in April and ending the first week in June.

Since it was impossible to obtain the "before" tests, two primary assumptions were made. First, prior to Head Start, the experimental children were essentially comparable with their control group counterparts. The analysis of the housing quality, family characteristics, and experiences of the children support this assumption. Secondly, any difference in test score between groups with like housing environments reflects the influence of the only known variable, the Head Start Program.

In order to have some general idea of the level of the study children, it was useful to compare the group mean test scores with the provisional norms compiled by Dr. Caldwell.<sup>1</sup> Dr. Caldwell's table indicates the percentile rank at 5 percent intervals within four age groups of 6 months each from ages 4½ to 6½ years.

The percentile ranks for the study groups can only be used as rough guides as the provisional norms are based on relatively few children (270) and some interpolation was necessary to arrive at the percentile rankings for the study groups.

1 Bettye M. Caldwell and Donald Soule, "The Preschool Inventory," Children's Center, Department of Pediatrics, Upstate Medical Center, Syracuse, New York, Appendix B, p. 15-16, (Mineographed.)

TABLE III  
PERCENTILE RANK FOR THE GROUP MEAN SCORES  
COMPARED WITH PROVISIONAL NORMS

	<u>Group 1</u>	<u>Group 2</u>	<u>Group 3</u>	<u>Group 4</u>
Sub-test 1	50	55	20	15
2	30	35	10	5
3	40	40	25	25
4	35	35	30	15
Total Test	40	45	15	15

It is obvious from the percentile ranks of the study children, even of those having had the opportunity of participation in the Head Start Program, that they all rank in the lower half of the population. It is also obvious, however, that there is a marked difference between the experimental groups (1 and 2) and the controls (groups 3 and 4).

A two way analysis of variance of the total test scores was run. The results are shown in Table IV.

TABLE IV  
TWO WAY ANALYSIS OF VARIANCE OF TOTAL TEST SCORES

		Experimental	Control	Total
Public Housing	N	52	52	104
	Ave.	51.9808	38.2115	45.0962
	S.D.	11.5172 (Group 1)	12.3198 (Group 3)	13.7364
Slum Housing	N	52	52	104
	Ave.	53.9615	32.8846	43.4231
	S.D.	15.0137 (Group 2)	12.4675 (Group 4)	17.3411
Total	104	104	208	
	Ave.	52.9712	35.5481	44.2596
	S.D.	13.3522	12.6206	15.6276

The difference between the experimental group mean of 52.97 and the control group mean of 35.55 is statistically significant beyond the .0001 level. The difference for the two housing groups (45.09 for public housing and 43.42 for slum housing) is small and insignificant. The interaction between these variables is not significant.

In comparing the mean scores of the various parts of the test for the four groups, it was found that the basic relationship indicated in Table IV held with two exceptions in the control groups. The two experimental groups were statistically the same on all parts of the test. Their scores were also significantly higher than either of the two control groups. The two control groups were statistically equal (the mean raw scores for group 3 were higher, however) except for sub-test (Concept Activation, Sensory) and on the total test score. In these two instances, group 3 (public housing) had a significantly higher score than did group 4 (slum housing).



## VI. WITHIN GROUP ANALYSIS

Once relationships were determined between the two housing environments and preschool children's growth and development under the two conditions of having received or not received the enrichment experiences of Head Start, attention was turned to an examination of the variables within each group which may have influenced test scores. Within each of the four groups, the families appeared to be highly homogeneous, and the experimental groups were quite comparable with their control counterparts. Would there be discernable relationships within the groups between certain family characteristics, environmental factors, or childhood experiences which would significantly influence the test scores?

A product-moment correlation was computed for 63 variables in relation to the sub-test and total test scores within each of the four groups. In addition, a "b" value or slope of the relationship was computed for those variables indicating a significant correlation. Only the more salient relationships are reported here.

### Housing Environment Variables

Of primary interest for this study was an examination of those variables directly related to the housing environment. It was hypothesized, for example, that the larger the household, or at least the higher the person per room ratio, the

greater the likelihood of lower test scores. In regard to household size, it was found that the relationships were not statistically significant although the trends were consistent, strong, and in the expected direction for 3 of the 4 groups. Group 2 (slum housing, experimental) had an equally strong and consistent relationship, but in the opposite direction, i.e. the larger the household, the greater the tendency for better test scores. There was no obvious explanation for this reversal.

The persons per room ratio did not produce statistically significant relationships with the test scores either, however, the trends were perfectly consistent in the expected direction for all groups on all parts of the test.

In relating the number of others sleeping in the same room with the subject child to the test results, it was found that greater crowding in the subject child's sleeping area could consistently predict lower test scores for those children in groups 3 and 4. The correlations were significant beyond the 5% level for some but not all parts of the test. The correlations for groups 1 and 2 were neither consistent nor significant. Since the mean values for bedroom overcrowding indicate that group 1 and group 3 are equal, and that groups 2 and 4 are equal, but that 1 and 3 are significantly less crowded than 2 and 4, one may conclude that the detrimental effects of overcrowding in the children's bedroom may be at least temporarily masked or overshadowed by the opportunity to participate

in Head Start.

Four other variables related to housing were examined with the expectation that some relationship to test scores might be found but there were few statistically significant correlations. Two of the variables, rent and the proportion of income spent on rent and utilities, had no consistent relationship at all. The variable "length of time lived in the dwelling," had no correlations which were statistically significant. The trends for groups 2, 3, and 4, although generally weak, were all positive while trends for group 1 were in the opposite direction.

In comparing the correlations for the variable "number of times moved" with test scores, it was found that for groups 2, 3, and 4 the trends were negative, i.e. greater frequency of moving tended to be associated with lower scores. The correlations were fairly high, reaching significance above the 5% level for group 3 on sub-tests 3 and 4 and on total test score. The correlations for group 1 were low and in the opposite direction, which is consistent with the findings for the "length of time lived in the dwelling" variable reported above. It may be remembered that group 1 families had lived in their apartments a shorter period of time and had also moved more frequently than the other groups.

### Family Characteristic Variables

It was surprising to note that family characteristics variables, such as marital status and family income, had no statistically significant correlations with test scores. In the case of the educational level of the father and mother there were at least consistent trends, especially with the mother's education, in the direction of more parent education -- higher test scores for the child.

### Child Experience Variables

Here again, correlations were surprisingly low. For example, there was not even a consistent trend in the relationship between test scores and the amount of time the child spent watching television. This is especially surprising since nearly all the children were exposed to TV and in homes generally devoid of opportunity for stimulating experience, one would think television would have been of greater importance. Of course, quantitative figures can in no way measure the quality of the TV watching experience.

There was no significant correlation between previous experience in nursery school and test results which suggests that this experience was probably little more than a "baby-sitting" time and little different from the home environment.

If the child had been read to, the probability was greater that he would score higher on the test. The



correlations between this variable and the test scores were consistent and strong, reaching significance beyond the 5% level for the total test score and some sub-test scores in groups 1 and 2. The comparison of the means of this variable indicated that the children in groups 1 and 2 were read to more frequently (significant beyond the 5% level). It may be that these children demanded more reading due to their Head Start experience or that parents, stimulated to interest in their child's development by Head Start, wanted to read more to their children. This is an untested question but from experience in the Head Start Program, one can guess that perhaps both are true.



## VII WITHIN GROUP RANKING OF SELECTED VARIABLES

Following the analysis of within group correlations, a further within group analysis was conducted. This statistical procedure was a stepwise regression analysis on the means of 23 selected variables. The selection of the 23 variables was not entirely based upon their significant correlations with the Preschool Inventory test results. While all those with high correlations were included, other variables which had been hypothesized to have a relationship to the test results but showed low correlations were also included. This was done on the assumption that while an isolated variable might not show a distinct relationship to the test results, its accumulative effect, when placed with other variables might be important. The validity of this assumption was confirmed when it was found that a number of these low correlation variables ranked high in order of importance. The 23 variables selected were as follows:

1. Number of persons in the household.
2. Marital status.
3. Number of others sleeping in the child's room.
4. Amount of time the child watched TV.
5. Frequency of family members buying or borrowing books.
6. Frequency of family members buying magazines.
7. Frequency of reading to the child.
8. Frequency with which the child looked at books and magazines on his own.
9. Amount of sleep for the child.
10. Kind of punishment.
11. Frequency of shopping trips with the child.
12. Frequency of trips to parks or zoo with the child.
13. Frequency of church attendance for the child.

14. Previous nursery experience.
15. Frequency of the child helping with household tasks.
16. Educational level of the mother.
17. Time lived in the dwelling.
18. Number of times moved in last 5 years.
19. Amount of rent.
20. Proportion of income on rent.
21. Source of family income.
22. Amount of family income.
23. Persons per room ratio.

It was found that the percent of variation ( $R^2$ ), in test scores accounted for by all 23 of the selected variables, was generally in excess of 50%. The  $R^2$  for each sub-test and the total test score for each group is given in Table V.

TABLE V  
PERCENT OF VARIATION IN TEST SCORES ACCOUNTED FOR  
BY SELECTED VARIABLES

	Group 1	Group 2	Group 3	Group 4
Sub-test 1 (Personal-Soc. Responsiveness)	.8833	.5826	.9125	.7293
Sub-test 2 (Assoc. Vocab.)	.5470	.4554	.4139	.5428
Sub-test 3 (Concept Act. Numerical)	.5949	.5425	.4684	.4947
Sub-test 4 (Concept Act. Sensory)	.5373	.6017	.5493	.5036
Total Test	.4951	.4201	.3659	.5433

The  $R^2$  values in Table V indicate that the larger portion of the variation in test scores within each group is accounted for.

The remainder is probably due to other unknown variables such as intelligence and physical health.

With the variables rearranged in rank order of importance, Spearman's rank difference correlation coefficient formula was used to determine the rank order correlation between four combinations of the study groups: the experimental groups (1 and 2); the control groups (3 and 4); the public housing groups (1 and 3); and the sub-standard housing groups (2 and 4). These computations were completed for each of these combinations on each group mean sub-test and total test score. The results of this analysis indicated that there were few correlations in the ranked order of the above pairings. The computed "T" was significant beyond the 5% level in only two of the twenty pairings: on sub-test 1 for groups 1 and 3, and in rankings on the total test score for groups 3 and 4. The remaining correlation coefficients were not only quite low but were equally split between positive and negative. The general lack of consistent relationships becomes highly important, suggesting that each group possessed some unique characteristic or characteristics which influenced its different ranked ordering of the selected variables. The obvious unique feature of each group was its particular combination of housing quality and experimental treatment (or non-treatment). This finding demonstrates the fact that both the housing environment and the enrichment program were important variables in the children's test scores.

### VIII. CONCLUSIONS

In accordance with the original research plan, four groups of equal size were selected. Basically, they differed only in the quality of their physical dwelling or in the treatment the children received (participation or non-participation in Head Start). In all other respects, the four groups in the study represented a remarkably homogeneous sample.

The test results support the three original hypotheses. The first hypothesis stated that the children living in the better housing and also involved in Head Start (group 1) would exhibit greater growth and development. This was true in comparison with groups 3 and 4 but group 2 (sub-standard housing, experimental) showed slightly better but statistically equal progress. This unexpected and comparatively high scoring by group 2 may be accounted for by a combination of factors: their somewhat better housing (than group 4, sub-standard housing, control), fewer father absent families, and lower mobility rates.

The second hypothesis stated that the children living in sub-standard housing and not enrolled in Head Start (group 4) would exhibit the least amount of growth and development. Test results clearly indicate that this was the case.

The third hypothesis did not specify a direction, but



rather than differences in growth and development in groups 2 and 3 would suggest the relative importance of housing versus a special enrichment program in facilitating the growth and development of preschool children. Without the support of "before" tests, conclusions may be subject to question. Still, the following possibilities are evident:

First, the better showing of the public housing control group (3) over the sub-standard control group (4) indicates that better physical surroundings may provide a significantly better environment for the preschooler's growth and development.

Second, it is evident that both the physical housing environment and the Head Start Program were important variables in the growth and development of the study preschool children. The impact of Head Start has been widely reported. Its value is also quite evident in this study. The general lack of significant correlations or even a discernible pattern in the ranked order of the selected variables becomes very important and supports the conclusion that both the physical housing environment and Head Start were important in the growth and development of these culturally disadvantaged children. In fact, the "unique" combination of housing environment and experimental treatment which each group represented was apparently so strong as to force a unique re-ordering of the relative importance of other known variables.



Third, the enrichment program, as compared with the housing environment, can produce the more dramatic immediate results which suggests that at least for the short term, the rarified atmosphere in Head Start of new experiences, nearly constant care and attention, and pleasant, stimulating surroundings can compensate for one further disadvantage of the "culturally disadvantaged," that of living in the slums.

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