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Comparison of Mosaic Responses of Disadvantaged and Advantaged Preschool Children

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COMPARISON OF MOSAIC RESPONSES OF DISADVANTAGED AND ADVANTAGED PRESCHOOL CHILDREN

by

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ABSTRACT

Comparison of Mosaic Responses of

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by

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Developmental age differences were studied between a group of Head Start children and a group of preschool children attending the Utah State University Child Development Laboratory. The Lowenfeld Mosaic Test was used to make distinctions between the child whose developmental age was equal to his age in years and the child whose developmental age was below his age in years. The results were compared to the four-year and five-year chronological age level of the Ames and Ilg scoring criteria.

Although behavior in response to the Mosaic test developed in the same way for both the disadvantaged children and the advantaged children, the products or Mosaic designs of the disadvantaged children were less mature and developed more slowly.

It was fairly evident from the data that the Utah State University children responded at a more mature level than the Head Start children.

The data seemed to substantiate the fact that there was a difference in maturity of design between all the males and all the females treatment or patterning of the Mosaic.

(143 pages)

INTRODUCTION

Since 1962 the Congress has launched attacks on many social ills such as poverty, delinquency, unemployment, illiteracy and school dropouts, in the form of legislation and financial assistance to educational agencies. One way of attacking the social ills poverty causes is to establish rehabilitation programs for adults. This is being attempted through basic education programs for illiterate adults, programs to combat delinquency, and job training for the unemployed. Prevention, however, is a better approach from a long term point of view, and the path for prevention is undoubtedly education--specifically early childhood education. This means the initiation of preschool education programs for disadvantaged children aged three, four and five (Frost and Hawkes, 1966).

More than a million children starting school each fall are disadvantaged (Frost and Hawkes, 1966). The impoverishment of their lives is so great that a natural consequence is failure. A child coming to school from such a background has already formed more than 50 percent of his thinking patterns--thinking patterns which reflect his deprived environment (Frost and Hawkes, 1966). Most children born into poverty have a strike against them before they even begin. They usually come to the school situation unprepared for the "middle class" educational

experience which confronts them. Compensatory education is urgently needed for those caught up in this vicious cycle. Inadequacies in the social background of the deprived child can be compensated for by a planned enrichment program, channeled through improved schools. The more things a child has seen and the more he has heard, the more things he is interested in seeing and hearing (Hunt, 1961). A preschool program, such as Head Start, gives the child more time to absorb the complexities of life and also conceptual learning sets, habit patterns, and interest areas may be more favorably established at early rather than at later stages of the developmental cycle. Therefore, one can see that time is very valuable if the deficits are not to be cumulative and hinder the total functioning of the child.

The Lowenfeld Mosaic, a test which has not been used extensively in the past, may have definite possibilities for assessing the level at which the deprived child is functioning. In this particular test the child is an active participant in a well-structured task and it permits a wide variety of response. The Mosaic does not require minute motor coordination but instead a perceptual motor organizational skill of a rather generalized Gestalt type.

Potentially, the Mosaic is one of the most basic and useful of all the various projective techniques because, if properly interpreted, it can give information about two important factors: (1) just where an

individual is functioning, or rather, his maturity level; and (2) something of what his individuality is like--not in potential but in action.

Virtually no research appears to be available that compares responses of the disadvantaged and middle class nursery school child on projective techniques. There is one recent study in the literature (Downing, 1965) that compares teen-age Negro and white Rorschach responses, and one that compares Negro and white primary-school children's Mosaic responses (Ames and August, 1966) but none that compares nursery school responses on the Lowenfeld Mosaic, a test which might be expected to be somewhat free of cultural influences (Ames and Ilg, 1962; Lowenfeld, 1954). The present study offers such a comparison.

Statement of Problem

The purpose of this study was to explore and compare the levels of development of the disadvantaged and advantaged child by describing and analyzing their Mosaic designs.

In recent years many attempts have been made to assess the low developmental level of the disadvantaged child. Developmental level can be explained as follows. Behavior, any behavior, develops through patterned stages. Generally speaking, whatever the behavior, for any given group of children, four-year-olds can be expected to behave in a

certain way and five-year-olds in a certain somewhat more mature way. Since it was the belief of the author that the disadvantaged child is not as mature developmentally as the advantaged child due to poor environmental experiences, the problem was investigated.

In a study conducted by Bloom (1964), it was found that a child has gone 50 percent of the way in organizing the thinking patterns that we call his intelligence by the time he has reached four years of age. The next 30 percent is reached by the time he is eight. By the time a boy is three, half of his patterns of aggressiveness are normally established. A child's capacity for learning in school is half established by the age of nine. Abilities and intelligence of the child can be increased later, of course, but it is much more difficult to do. If these findings are true, then the developmental level of the disadvantaged child should be affected. The Mosaic was used to make the distinction between the developmental age (age at which an individual functions as a total organism) of the disadvantaged child and that of the advantaged Utah State University preschool child. This age at which the child is functioning was utilized in accordance with Ames and Ilg's (1962) developmental age norms.

Ames and August (1966) have summarized that disadvantaged children seem to develop along very similar lines as the advantaged, but at a slower rate. The present study also tried to substantiate this point and the author feels that this could have important implications for programs

such as Head Start as it would be through enriching experiences, such as those provided for in Head Start classrooms, that the deprived child could accelerate his over-all development.

Hypotheses

(1) Though behavior in response to the Mosaic test develops in the same way for both the disadvantaged children and the advantaged children, the products or Mosaic designs of the disadvantaged children will be less mature and develop more slowly.

(2) The Mosaic designs produced by the males and females of the Head Start sample will be significantly different from the Mosaic designs constructed by the males and females of the Utah State University sample with reference to the quantitative and qualitative scoring criteria in the Ames and Ilg study (1962).

(3) There will be a significant difference in maturity of design between all the males treatment of the Mosaic and all the females treatment or patterning of the Mosaic.

REVIEW OF LITERATURE

The review of literature will consist of two parts, the first part dealing specifically with the Lowenfeld Mosaic Test and the other with the deprived child.

The literature on the Lowenfeld Mosaic Test, though not extensive in comparison with that dealing with other projective tests, is increasing steadily. This literature has already been reviewed comprehensively by Dorken (1952 and 1956), by Walker (1957), and by Kilburn (1963), and reference is made to these papers.

The available literature deals with many facets of the Mosaic test. An attempt shall not be made here to review all minor publications on the subject but shall be confined chiefly to studies which discuss children's Mosaics; which investigate age, sex, and cultural and intellectual differences; which outline research studies with respect to reliability and validity; or which deal with diagnosis and personality evaluation. The areas delineated in this review may not all be pertinent to the current study but they are areas where research has been conducted.

The available literature on the deprived child is exhaustive. An attempt shall not be made here to review all publications on the subject but shall be confined to studies which discuss the background from which he comes with focus on his low level of development as opposed to a child

from an advantaged background, and the criteria necessary to participate in a Head Start program. Any related studies utilizing projective tests with the deprived child shall also be discussed.

Review of the Lowenfeld Mosaic Test

Age and sex differences

Very few references to responses characteristic of specific age levels are in the literature, and even fewer references are made to age changes. Lowenfeld's (1954) chapter, "The Use of the Lowenfeld Mosaic Test in the Study of Children," contains the most detailed treatment of developmental changes in the products of children.

The other studies are sparse which mention behavior characteristics of any given age. Two of the best are by Stewart and Leland (1955) and Stewart, Leland and Strieter (1957), as quoted in Ames and Ilg (1962). The first of these, "Lowenfeld Mosaics Made by First Grade Children," reviews the Mosaics made by 100 first grade children in two Long Island schools. Stewart and Leland reach the following conclusions:

1. Within the 'normal' group and after preschool age, intelligence apparently plays little part in the type of Mosaic made.
2. A prefundamental pattern made by a 6-year-old child is indicative of some type of maladjustment.
3. Children making rigid, stereotyped patterns which cover much or all of the tray show evidence of personality difficulties.
4. Children who make freer patterns which cover much or all of the tray but contain elements of good organization are apt to be adequately adjusted youngsters.

5. The subjects who made miscellaneous objects were, on the whole, the brighter, better adjusted children who seemed to have no need to project personality difficulties.
6. Designs, whether symmetric or not, if made toward the center of the tray, usually indicated the better adjusted child while those which clung to the edge seemed symptomatic of immaturity.
7. In comparing the present findings with those of English children, it continues to be evident that the American boy and girl is much more apt to be concrete, or representational in his Mosaic and less apt to make the symmetrical design so common with the English child.

(Ames and Ilg, 1962, pp. 16-17)

Stewart and Leland in a second study, "Mosaic Patterns of Eighth Grade Children" aimed:

> ...to determine the types of Mosaic patterns made by the early adolescent; to observe developmental trends; to note whether sexual differences are reflected; to study the predictive value of specific patterns (such as had been found in an earlier study with first grade children); to note any cultural differences that might be found between American and English children of this age as had been observed in a previous study. (Stewart and Leland, 1957, p. 73)

Stewart and Leland (1952) in a study entitled "American vs. English Mosaics" found that there seemed to be a clear-cut increase with age in abstract patterns, an increase to 11 years or so in representational patterns and then a subsequent decrease, and a gradual decrease, and a gradual decrease in prefundamental patterns.

Two publications (Ames and Ilg, 1962; Ames and Ilg, in preparation), one a full-length book complete with illustrations, the other a monograph, detail findings as to the age changes which occur in children's Mosaic productions. Both of these studies suggest that rather clear-cut age

changes take place in a majority though not all child subjects as studied by Ames and Ilg.

A study conducted by Ames and Ilg (1964) analyzed responses of 132 primary school children aged 5 through 10 years, each one tested at four successive age periods, to the Lowenfeld Test. Data for this study suggests that the Mosaic response of any individual subject tends to change with age in a relatively patterned and predictable manner, and that it is possible, in general, to assign a developmental level in terms of age to the Mosaic responses of children between the ages of 5 and 10 years. Sex differences are clear-cut and quite consistent, boys for the most part making chiefly representational patterns, girls being more likely to make nonrepresentational patterns. Both sexes use triangles predominately at the earlier ages and then shift to a predominance of the square, though this shift comes earlier in boys. Blue was used predominately throughout by both sexes. As to content, girls make more flowers than do boys; boys make more vehicles and more missiles than do girls. These findings were further substantiated in a later study by Ames, Ilg and August (1964).

Ames and Ilg (1962) have found striking sex differences in Mosaic products but there is relatively little in the literature on this aspect of individual differences.

In his 1952 review, Dorken (1952, p. 168) notes that "Little in the

way of sex differences has been reported, and these are apparently attributable to the differing rate of maturation between the sexes in childhood."

In their 1952 study, Stewart and Leland found a tendency for boys to make concrete designs more frequently than girls, but they noted that these and other sex differences become less at adolescence. A summary of sex differences which they found in eighth grade American children was given in their study as follows:

1. Flowers are represented by girls proportionately ten times as often as by boys.
2. A proportionately greater number of girls depicted "human beings" and only the female sex constructed "children."
3. Airplanes are the dominant masculine choice.
4. Houses by themselves are made proportionately by three times as many boys as girls; other buildings by a slightly larger percentage of boys; but houses as parts of scenes, only by girls.
5. Abstract designs are depicted equally by both sexes but with the following difference: almost twice as many boys as girls made edge patterns while a slightly higher proportion of girls made centered patterns.
(Stewart and Leland, 1957, p. 77)

Walker (1957) showed substantial differences in the patterns of 6-, 8- and 10-year-old school children. He also noted definite differences between boys and girls on Mosaic patterns at all three ages. Walker observed that:

> Boys made more representational designs than did girls, who made more abstract patterns. Also boys were more concerned with fitting together of pieces; they made more compact designs, chose more of the shapes which fit together easily. (Walker, 1957, p. 77)

sizable differences between the two. Lowenfeld summarized the differences in Mosaics made by a typical normal group of American and English children as follows:

1. A large number of designs occur, in the American patterns, in which the pieces are grouped together in a way that is 'compact' in that the pieces all stick to each other--but in which no recognizable 'patterns' emerges.
2. The absence of certain patterns that are standard in Europe and almost invariably turn up in children's mosaics, for example elaboration of fundamental patterns, particularly designs based upon the 8-pointed star of diamond shapes, and so on.
3. The occurrence of a large number of designs (such as 'edge' and 'corner') that occur with us mainly or wholly with disturbed children.
(Lowenfeld, 1954, p. 288)

Lowenfeld goes on to state that when the American patterns have form they are quite different from what is made by European children and they have great positive value and interest. Lowenfeld acknowledges the fact that Americans have very different views from Europeans as to the stage of development children reach at different ages so she questions how this sort of collection (i.e., some very good patterns and then a large number of edge, shapeless ones, and very small patterns) compares with America's 12-year-olds. She wonders if it is possible that the children who make shapeless patterns will later produce organized ones.

On the other hand, she points out the fact that it may be possible that there is a great difference in the education and general habits of

American and European children respectively in their Kindergarten and lower grades in regard to pattern making.

> ...For example in Kindergarten and Nursery School over here, all children make 'patterns': everyone is interested in 'patterns' and children enjoy doing them. Any normal European child would therefore be conscious of some measure of failure if it handed in formless 'patterns' of the kind referred to above--but apparently the American child feels differently. If this is so, what is the base? (Lowenfeld, 1954, p. 288)

Lowenfeld feels that the significance of the problem lies in the fact that if a European child does not make a pattern, since it is normal for him to do so, it could be an important factor in estimating his intelligence and character structure. On the other hand, if not making a pattern is normal for the American child, Lowenfeld wonders how one is to discover the distinction between the neurotic and the normal child in America. She considers the main difference between European and American patterns to be this "pattern without recurring form" which is so common in American Mosaic products and so absent in the European. The fact that Americans make predominantly representational designs and Europeans predominantly symmetric, accurate, patterned, abstract designs is a second outstanding difference according to Lowenfeld (1954).

Lowenfeld explains,

> Americans appear to bring an entirely new approach to the test in that they seem to have a concept of the shape and color of individual pieces as having a dynamic relation to each other:

> In the European attitude to the pieces, each piece used by the subject plays its part in the total structure of the pattern; it is a part of a whole; whereas in the American designed slab, the tendency is for each piece to be felt as an entity expressing a particular relationship to its immediate neighbor and not necessarily having a relation to the pattern as a whole. (Lowenfeld, 1954, p. 399)

Stewart and Leland (1952) made one of the most specific comparisons of cultural differences in their paper, "American versus English Mosaics." They compared English and American Mosaic designs of High School children between the ages of 13 and 18 years and concluded that significant differences existed between the two cultures.

> Our children made a strikingly smaller proportion of abstract symmetrical, balanced, conventional patterns and when our children do make this type of pattern, it is much more apt to show a color or piece variant which breaks its symmetrical perfection. From the earliest age our children make a much higher percentage of representational patterns. The third striking difference is that our children make a large percentage of patterns showing no coherent order. This is the type which has been considered in England to indicate mental or emotional disturbance. The significance with our children seems to be entirely different. Many of our most stable children make this pattern. (Stewart and Leland, 1952, p. 247)

A study was reported on the Mosaic patterns of Negroes in the community of Montserrat, British West Indies, by Abel and Metraux (1959). However, no other culture was used with which to compare the patterns and the incompleteness of the report in this area precluded further evaluation. Several other foreign studies were discovered, Flum (1951),

de Carvelho (1953), Chatterjee (1956), Katzenstein and Toledo (1958), and Garcia-Vicente (1960) which were not summarized here due to unavailability to the writer. Lowenfeld is currently doing some studies in England and it does appear that the Mosaic test is being used in other countries besides the United States and Great Britain. Some answers to the question of cultural differences may be forthcoming in the near future.

Intellectual evaluation

According to Dorken (1956, p. 166) "The relation of Mosaic test performance to measured intelligence is under considerable debate. While scattered relationships are reported by some authors, they are not generally agreed upon."

The actual measuring of intelligence with the Mosaic test has not been a primary research concern although several studies, including McCulloch and Girdner (1949), Shotwell and Lawrence (1951), and Carr (1957), have detailed the unique Mosaic responses of mentally retarded groups. A moderate positive correlation, however, between Mosaic design evaluations and mental ages was noted by McCulloch and Girdner.

McCulloch and Girdner demonstrated a general relation between increasing mental age and the complexity of pattern and excellence of design among mental defectives. They felt that one of the most notable

characteristics of Mosaics made by defective subjects was their simplicity. This could be primarily a function of developmental level and may show up in a representative sample of normal children with mental ages comparable to those of the defective group. However, they found it to be less common with the normal group that they tested than was the case with the defectives of comparable mental ages.

> The mosaics of the normals often had a number of components, such as parts of a scene organized into a meaningful whole. The defectives of the same developmental level more often made unitary figures. The well-organized mosaics of these defectives typically comprised a relatively few shapes (two or three) and a small number of pieces. The mosaics which contained more shapes and pieces were usually poorly organized. The mosaics of the normals, on the other hand, more frequently exhibited good organization when containing more shapes and pieces. (McCulloch and Girdner, 1949, p. 491)

McCulloch and Girdner also find a rather striking difference between the Mosaics of the normal group and those of defectives of the same level with respect to color arrangement. The Mosaics of both groups typically contained many colors; however, the Mosaics of defectives having many colors were relatively inferior in respect to color harmony. The Mosaics of the normal children, on the other hand, showed much better color harmony. It was stated by McCulloch and Girdner (1949, p. 491) that, "The occurrence of blocks or continuous rows of a color, as a balanced portion of the whole mosaic was common in the mosaics of normals, but rare in the mosaics of defectives."

As a check upon the apparent relationship between mental age and over all goodness of Mosaics, an attempt was made by one of the authors to sort Mosaics into mental age groups and a correlation was obtained between this scoring and mental age. The result was taken as confirmatory evidence of an association between mental age and some distinguishable aspects of the Mosaics (McCulloch and Girdner, 1949).

Reiman (1950) reported that although the mental defectives elaborate designs were not well organized, her group did not construct simple designs more frequently than might be expected of other types of subjects. She concluded that mentally defective subjects could be reliably distinguished from the rest only in regard to their nonrepresentational content and lack of success in organization.

Dorken (1952) states that there is frequent recurrence of the same pattern among mental defectives, although those on the lowest intelligence levels cannot achieve even these elementary patterns, but rather make scattered, incoherent, and fragmentary Mosaics. He also states defectives frequently make concrete patterns at all ages, though the titles they assign to their Mosaics usually did not bear any apparent resemblance to the products.

Woolf (1953) and Robertson (1957) concluded that the Mosaic test is not an accurate measure of intellectual abilities.

Ames and Ilg (1962, p. 27) state that "probably the most clear-cut usefulness of the Mosaic, in designating intelligence, that has thus far been demonstrated is its effectiveness in distinguishing defective from normal subjects."

Ames and Ilg conclude that:

> ...with our own subjects, though children of lower intelligence, in general, made simpler, less elaborate, and less 'successful' patterns then did those of higher intelligence, usually the Mosaic seemed to reveal more clearly the developmental level rather than the level of intelligence. (Ames and Ilg, 1962, p. 29)

Reliability and validity

The question of the reliability of any projective test is open to considerable discussion and the Mosaic test is no exception. Because of the dynamic nature of measured personality attributes on a day-to-day basis, it is difficult if not impossible to determine the reliability of a projective test (Kilburn, 1963).

Literature on both the reliability and the validity of the Mosaic test is relatively scant. Diamond and Schmale (1944) found that upon retesting subjects under varied conditions a remarkable consistency of behavior and of the basic elements of the Mosaic were observed, therefore suggesting that the Mosaic test possessed a reliability adequate for clinical usage. Lowenfeld states:

> The characteristic pattern of any particular individual has been described as like a 'gestalt' which retains its essential form although all of its constituent parts may be altered--much as handwriting does. To test this fact, certain experiments were made to find the type of pattern that would be made with a set of geometrically interrelated pieces shaped differently from the standard pieces. For instance, hexagonal pieces were used. It was found that the general form of the pattern produced by any individual was the same as that made by him with the standard pieces. (Lowenfeld, 1949, p. 550)

Ames and Ilg state:

> Lowenfeld believes that the patterns made from time to time by the individual will vary in specific details, such as the exact pieces used, but will retain the fundamental interrelationships among formal aspects of the pattern. Changes which do occur, she believes, represent actual changes in the individual's personality. (Ames and Ilg, 1962, p. 20)

In an experimental analysis, Himmelweit and Eysenck (1946) support Lowenfeld's (1949) empirical criterion. After a test--retest procedure with fifty male neurotics, they reported significant positive correlations of .646 and .590 between the number of colors used respectively. A tendency for the same outlay to be selected and for the same pattern to recur was also noted (Dorken, 1952). Hood and Williams (1949) also indicated some general similarity between initial and repeated Mosaic designs for groups tested. However, Lowenfeld (1954) has indicated that quantitative assessment of the Mosaic is irrelevant and that Himmelweit and Hood-Williams relied on simple empirical observation rather than attempting any statistical measure of reliability.

The Mosaic test was administered along with a large battery of tests to 30 mentally retarded girls, 6 to 24 years of age, before and after 7 months of glutamic acid therapy (Reiman, 1950). The mean I. Q. increased significantly from 69 to 76. Reiman reports:

> Very little change is found and the only reliable improvements are in increase in representational productions and in symmetry of form and color. When the two designs of each girl were analyzed side by side, form showed both gains and losses in the second of the pair; five were exactly the same; nine actually showed some regression and twelve were better. It can be inferred that what modification has taken place is in the direction of greater freedom of functioning, but the major conclusion must be that the mosaic test is much less susceptible to therapeutic agents than are other mental measurements. (Reiman, 1950, p. 611)

Walker's (1957) findings as to reliability are based on a group of 300 children selected as representative of the United States urban population on the basis of paternal occupation. He utilized 50 boys and 50 girls each at 6, 8 and 10 years, administering the Mosaic test twice in immediate succession, finding that the scorer's reliability was generally satisfactory. Therefore, it seems safe at this time to conclude that the question of the reliability of the Mosaic test has not been adequately determined.

The number of studies on the validity of the test are also somewhat limited. According to Kerr (1939, p. 233) this is partly due to the fact that many of the leading users of the test believe that "ordinary statistical

methods are of little value for estimation of the validity of this type of clinical test where personality is viewed as a whole."

Lowenfeld (1954, p. 549) feels that it is valueless to count such simple design characteristics as number of pieces and that "any quantitative assessment...is irrelevant."

A few studies of validity have been undertaken, however, with slightly positive results. Kerr (1939), Himmelweit and Eysenck (1945), and Walker (1957), have studied a weak approximation of predictive validity for the Mosaic test, each having had independent judges match, without previous contact information, personality character sketches and Mosaic designs. Better than chance successes were noted in all three studies. Predictive validity, however, is usually concerned with how accurately present test results actually reveal later behavior. Therefore these studies were actually a variation of concurrent validity, a weaker validation method. Concurrent validity of the Mosaic test as indicated by Reiman (1950) and Levin (1956) show marked differences between criterion groups, usually normals and various types of psychotics, neurotics or mental retards. This concurrent validity is also substantiated by the studies reported in the next section on the diagnosis of deviant behavior in which differences are noted between deviant groups and normal groups.

Horne (1955 and 1960) reported two attempts to discover some aspects of construct validity of the Mosaic test. He noted the significant effects of different instructions and pretest pattern copying on later Mosaic designs in the first study. This study showed that set can be a critical variable in Mosaic design productions. In the second study, Horne noted no significant differences in pattern between groups using only black and white pieces at first and later using pieces of all colors. Color is evidently not a significant variable involved in producing Mosaic designs.

The Mosaic test appears to be capable of noting definite differences among selected criteria groups, and these differences appear to have a relationship to the character and personality of the group members. However, no substantiation or refutation of Lowenfeld's concept of the test as a measure of functional ability and personality is yet available due to the fact that the construct validity of the test has not been subjected to any known systematic study. Also, there is little, if any, evidence which exists for the predictive validity of the test. No study has involved an extensive retest program after a relatively long time span in spite of the concurrent validity indicated by differences between deviant behavior groups (Kilburn, 1963).

Ames and Ilg (1962) noted age changes over a sixteen-year span,

but it was not the purpose of their study to check the consistency of individual designs over a long time span. Therefore it appears that the validity of the Mosaic test, like the reliability, is still not adequately substantiated.

Diagnosis of deviant behavior

The Mosaic test has been noted for its apparent utility in deviant behavior diagnosis ever since its development. Wertham (1939) noted its use in diagnosing organic brain disease. Later, Wertham and Golden (1941) and Wertham (1950) presented evidence of a large group of specific Mosaic patterns which aided in determining various types of neuroses, psychoses and organic brain diseases. Both men felt that it was possible to distinguish two kinds of lesion by means of the Mosaic test.

> Wertham describes a 'cortical pattern' wherein these patients express their cortical defect in an inability to achieve a good configuration; there is a dismemberment and dissolution of the Gestalt ... The 'subcortical pattern', according to Wertham, is characterized by 'stonebound' designs. At the expense of an inner plan the patient follows the impetus inherent in the shape and color of the pieces put down so that the whole response becomes reduced to a more mechanical or automatic level. (Ames and Ilg, 1962, p. 31)

Other studies by Diamond and Schmale (1944), Colm (1948), McCulloch and Girdner (1949), Reiman (1950), Zueker (1950), Shotwell and

Lawrence (1951), Maher (1954), Rioch (1954), Brody (1955), Carr (1957), Robinson (1959) and Pelz, Pike and Ames (1962) all developed various aspects of differential behavior diagnosis using the Mosaic test. Ames and Ilg (1962, p. 31) state: "One of the most clear-cut reports on the diagnostic value of the Mosaic test in cases of brain injury in children is that of Colm." Colm states:

> Projections in designs which indicate organic brain damage are: simple additive placement, side by side; additive placement, using one color only; lining up tiles of the same shape or same color or both; piling up similar tiles on the tray; repeating a primitive design in shape and color. All brain damaged children are overdependent on immediate external stimuli, and have difficulty in formulating and carrying through a plan for a design. But the degree of their dependence on outside stimuli differs according to whether they work in a stimulus bound fashion merely by adding similar tiles, or whether they can only line up or pile up similar piles. Their dependency on stimuli and lack of planful thinking has different degrees according to their dependency on one, two or three factors--size, shape, color.
>
> In the designs there are as many possibilities of showing the characteristic brain injury changes as there are brain injured children. Yet all projections somehow show in different degrees the three 'organic factors' mentioned before: bondage to stimuli, loss in ability to shift, and repetitiveness, all of which are different aspects of the child's impairment in generalized thinking. (Colm, 1948, pp. 229, 230)

The Mosaic test is without a doubt a valid tool for the clinical determination of specific types of behavior disorders. However, an integration of the signs or description of the significant Mosaic designs is needed

so that the present high level of knowledge in diagnostic uses of the test can be readily available to even the casual user, since most of the above studies used differing evaluative methods to arrive at their similar conclusions. The early work by Wertham supplemented by later studies has well substantiated the test as a diagnostic indicator although Lowenfeld did not intend it to be used as such (Kilburn, 1963).

Summary

The areas presented in this paper have been discussed in earlier reviews of the Mosaic test by Dorken (1952 and 1956), Walker (1957), and Ames and Ilg (1962) without any very specific conclusions. A reserved positive attitude toward the Mosaic test seems to be expressed at this time.

In a review of the test for the Fifth Mental Measurements Yearbook, Adcock states:

> As a clinical tool it has very important possibilities. Used in conjunction with interview and analytic techniques, it might be very fruitful, but it might be a very dangerous instrument in the hands of the unskilled and without the insight of the trained analyst. (Adcock, 1959, pp. 147-148)

Adcock further states:

> Some of the difficulty in the application of this test arises from the fact that it has been developed largely in a clinical setting with little opportunity or incentive to carry out careful statistical investigations. Systematic experimentation might reveal some useful information with regard to person-

> ality variables involved or, at least, throw some light on factors of a non-personality type which influence the test and which need to be allowed for interpretation. (Adcock, 1959, p. 148)

It was concluded by Johnson (1957) after reviewing the literature on the Lowenfeld Mosaic Test, that it provides a measure of the functioning cognitive and emotional processes in a concrete situation. He also felt that the test could not be reliable nor easily interpreted due to transcient processes dominant during the testing process.

Lowenfeld has described her Mosaic test as giving evidence of the way in which the individual performs, or meets life situations (Lowenfeld, 1954). Colm (1948, p. 232) makes a similar distinction, noting that "the mosaic provides a greater opportunity to observe in a quick and direct way, the personality in spontaneous action."

The Mosaic test, like any projective technique, has a double task. It presumably indicates the developmental level at which a child is performing, while at the same time it gives clues as to personality structure. In the first six years of live, the Mosaic, whatever it may tell about individuality, seems clearly to show developmental status (Ames, 1963).

In summary, it seems that the Lowenfeld Mosaic Test is a well constructed, easily administered projective personality measure which gives clear-cut evidence, in the first years of life, as to developmental

level and as to intelligence. However, no precise, systematic, easily interpreted, scoring system either qualitative or quantitative has yet been devised. The test results have limited actual utility or value as a result of these scoring, classifying and evaluating problems. Furthermore, no really conclusive statement can be made about the constancy of the test or the specific variables included in the test as the problems of reliability and validity have not been adequately studied.

The major lack of positive psychometric backing for the Mosaic test is a definite deterrent to its use in other than research studies at present (Kilburn, 1963). However, it seems to have merit as a clinical aid in the differential diagnosis of deviant behavior in spite of the weak psychometric foundations of the test. The bulk of the previous studies, however vague, still conclusively indicate positive diagnostic results with the test. Certainly more research on diagnosis aimed at a clear, objective scoring system, such as is already present with the Rorschach or Thermatic Apperception Test is needed (Kilburn, 1963).

In a study conducted by Ames (1963) an attempt was made to determine the extent to which the Lowenfeld Mosaic Test is useful in predicting school readiness in children from kindergarten through fourth grade. Also, the extent to which Mosaic test results correlate with findings from developmental and visual tests and with teachers' evaluations of readiness. Results suggest that the Mosaic test is

useful in supplementing other tests in predicting school readiness.

Another area of apparent use for the Mosaic test is as a measure of development and maturation. The value and utility of the Mosaic test in measuring cognitive and emotional developmental levels in children has clearly been shown by Ames and Ilg's (1962) monumental study. More year-by-year studies are needed in other areas where the Mosaic test seems to have a useful function (Kilburn, 1963).

Review of the Deprived Child

Brunner points out that:

> Literature in the field of child development is replete with data which indicate that the preschool years constitute a critical period of life in which there is interpenetration of environmental experience and psychological development acting to fashion personality and to determine the extent to which potential can be realized. (Brunner, 1967, p. 145)

A young child's self-concept begins to form as he interacts with his environment; the pattern and content of his language develop, attitudes toward learning take shape, skills in social processes evolve, and concepts begin to form which enable him to interpret and organize his environment. While the early years of life are critical for all children, they are particularly crucial for children who live amid economic, social and educational impoverishment where experience is restricted and development likely to be retarded. Developmental retardation has far-

reaching implications, so it seems important to delineate some of the major aspects and conditions of life in depressed areas and to consider the possible effects of these features upon the development of the young child.

Background of the deprived child

A major feature of the urban depressed area is crowding. Hunt (1966, p. 55) suggests that crowding may prove to be an advantage to the child during his first year of life, since it may "serve to provide such wide variations of visual and auditory inputs that it will facilitate development." As the child grows older, crowding tends to interfere with development. The noises which commonly arise in overcrowded quarters may interfere with attention to positive reinforcements that the child might receive. Situations may be created by noise which cause the child to develop "a tuning-out" process and to acquire learned inattention. Therefore, a child with adequate sensory apparatus may fail to develop adequate ability in auditory discrimination (Brunner, 1967). Deutsch (1964, p. 282) suggests that the optimum time for learning in the area of auditory discrimination "must be before the age at which children enter the first grade." Crowding may also place restraints upon effort to explore the environment, to seek information or to pursue individual interests.

According to Brunner (1967) the subsistence existence imposed by poverty upon members of marginal groups tends to limit the quality and variety of experiences available to young children. It is impossible to experience a wide variety of objects as poverty reduces the number of things available. "What is not seen is not named, nor is its function identified and understood" (Brunner, 1967, p. 146). Some children do not have the clothing to go outside so they spend much of their early lives in the small, crowded space that is the family living area. There are few, if any, reading materials available; and therefore, the possibilities of acquiring vicarious experiences as a method of extending knowledge and enjoyment are reduced. Trips outside the community rarely occur because there is no money to finance them; so life is perceived to be as it exists within the immediate environment (Brunner, 1967). Hunt states that:

> ...the more new things a child has seen and the more he has heard, the more things he is interested in seeing and in hearing. Moreover, the more variation in reality with which he has coped, the greater is his capacity for coping. (Hunt, 1961, pp. 258-259)

Parents tired from long hours of hard work away from home, faced with work responsibilities in the home, and burdened with the problems which come from poverty, have little time to spend with their children. Communication tends to be brief, to the point, and frequently restricted to

situations demanding direction or correction. Adults are not readily available to listen to children or to engage in conversation with them. The ability to communicate commonly becomes retarded since language cannot develop in an interpersonal vacuum.

Brunner (1967) points out that impairment of language development results also from lack of opportunity to learn through feedback. Adults fail to assist children in learning to pronounce words accurately or to organize speech to convey meaning clearly. The child learns to speak the language he hears, and he imitates the dialect and speech patterns prevalent in his environment. Bernstein, an English sociologist, has concluded, in the words of Deutsch (1966, p. 88), that "the lower class tends to use informal language and mainly to convey concrete needs and immediate consequences, while the middle-class usage tends to be more formal and to emphasize the relating of concepts."

John and Goldstein state:

> It appears that children who receive insufficient verbal stimulation in early childhood develop deficiencies not only in overt verbal skills but also in verbal mediational behavior.... While the child uses his slowly developing communicative skills...he is...organizing his perceptual and social worlds through language. (John and Goldstein, 1964, p. 273)

It is important to note, however, that the young underprivileged child is not nonverbal. He can use a wide variety of words precisely, although many of these words are not words upon which a high premium

is placed in school (Brunner, 1967). Frequently, his language is most expressive and conveys his ideas more colorfully than correct language might convey them.

The home in which the underprivileged child grows up may be besieged with problems and may be broken by death, divorce, or desertion; but the family situation may be one in which healthy emotional development is fostered. Riessman notes that the family may be an extended family:

> ...with many children and...many parents or parent substitutes....The large extended family provides a small world in which one is accepted and safe....Time and energy, rather than money, are the chief resources provided....The family is seen as a major source of strength in a difficult, unstable world. (Riessman, 1962, pp. 36-37)

Children spend much more time in each other's company than they do with adults since both parents may be busy working to support the family or one of them may be missing from the home. Jealousy and competitiveness are engendered in the children since they learn early to share, to care for younger children, and to help themselves. However, self-concern and individualism are discouraged, for the major interest is the family group (Brunner, 1967).

The controls used in lower class families tend to narrow the child's choices of response to conforming passivity or active resistance. Discipline is usually status-oriented, authoritarian, and often physical,

making few allowances for the child's feelings or intent (Hess, 1964; Ausubel, 1963; Reissman, 1962).

Learning is important in the lower-class home but it fails to understand or appreciate the kind of learning that might be labeled "intellectual", such as learning to enjoy poetry and classical music, or learning to debate a current issue. Brunner (1967) states that education is considered good if it has practical implications, if it enables the individual to provide for his needs and to function more effectively in the world he knows. Hess' research (1964) seems to indicate that the child's orientation toward school, his patterns of responding, and his ways of relating to the authority of the school are the result of the kinds of relationships and the ways of communicating that have previously developed between the child and his mother.

Characteristics of the deprived child

In spite of crowding and multiple problems of the home life of the young child, it may instill in him a sense of security, loyalty to his family, the ability to share, cooperativeness, and a sense of responsibility (Brunner, 1967). These positive traits are valuable personality components and are strengths which the child brings to each new experience. There is little encouragement in the home, however, for self-concern on the part of the child or for the development of his

personal interests. Curiosity and explorative traits are seldom fostered. The young child may be more comfortable with other children than with adults as most of his relationships are likely to be with siblings and peers. Adults may be perceived as those who control and provide for certain needs (Brunner, 1967).

Keller (1963) found that urban slum children had little sustained contact with adults, little shared activity within the family, and few organized conversations.

The literature supports teachers' observations that the underprivileged child is apt to exhibit greater independence of adults than his middle class counterpart. While exaggerated independence as a means of keeping the self intact may develop among children from any socioeconomic level, premature independence is more likely to characterize the disadvantaged child. Early withdrawal of parental support and protection is typically a subcultural expectation among lower class white and Negro families (Ausubel, 1963) whose children depend more upon each other than upon their parents (Reissman, 1962). Hanson and Pemberton (1965) note that lack of separation anxiety and seeming independence are characteristic of children attending their therapeutic day care center. However, instead of a strength, they feel this kind of independence actually reveals a crippling handicap; namely, the absence of any strong emotional tie with an adult which would provide the foundation

for other positive interpersonal relationships.

As has already been indicated, the young child may possess adequate sensory apparatus and yet lack ability to discriminate either through visual or auditory channels.

Concepts related to many aspects of the child's environment are often incomplete or inaccurate due to his often severely limited and poor quality experiences.

The child may be able to use a wide variety of words in a most expressive manner if he is given the opportunity. Brunner states:

> However, his language development may be arrested or retarded as a result of the paucity of his experiences, of his exposure to dialects and speech patterns which prevail in the environment, of his failure to receive a type of feedback which makes for speech correction and improvement, and of the influence of vague and indefinite language used by those with whom he communicates. (Brunner, 1967, p. 150)

John and Goldstein (1964, p. 274) stress the relationship between language and conceptual thinking when they state, "Language is a socially-conditioned relationship between the child's internal and external worlds. Once able to use words as mediators, the child can effectively change his own social and material reality."

Physical strength will most likely be highly respected and aggression is often a typical reaction to problems that develop as the preschool child interacts with others in the environment as aggression is often used to

defend one's self or to gain one's point (Brunner, 1967).

The deficits may far outnumber the strengths fostered by the pre-school-age child's impoverished environment. The child can function adequately in spite of these deficits in his home environment where he is dealing with the familiar, where he receives support, and where his patterns of response are approved. However, in a new environment insurmountable barriers may result for the child from the deficits that have accumulated. This can result in further retardation. For many of the young children from low socio-economic groups, the first really new environment is encountered when he enters school (Brunner, 1967). Deutsch notes the significance of the entrance into the new school environment and suggests a preventive measure to insure more successful participation in the school milieu. He states:

> It is the transitional years from the preschool period through the elementary school years that the child is first subject to the influence and requirements of the broader culture. It is then that two environments are always present for him: the home environment and the school environment. But it is also in these transitional (and especially in the pre-transitional) years that the young organism is most malleable. Thus, that is the point at which efforts might best be initiated to provide a third--an intervention--environment to aid in the reconciliation of the first two. Such reconciliation is required, because especially for the child from a disadvantaged background, there are wide discrepancies between the home and school milieus. In the intervention environment, prevention and remedial measures can be applied to eliminate or overcome the negative effects of the discontinuities. (Deutsch, 1966, p. 38)

Deutsch indicates an appropriate time for this intervention period in the following statement:

> ...at about three or four years of age there is a period which would roughly coincide with the early part of what Piaget calls the "preoperational stage." It is then that the child is going through the later stages of early socialization; that he is required to focus his attention and monitor auditory and visual stimuli; and that he learn through language to handle simple symbolic representations... It is here, at this early age, that we can postulate that compensation for prior deprivation can most meaningfully be introduced. And, most important, there is considerably less that has to be compensated for at this age than exists when, as a far more complex and at least somewhat less plastic organism, the child gets to the first grade. (Deutsch, 1966, p. 84)

Bruner (1961, p. 202) emphasizes the urgency of early intervention for children from impoverished environments when he points out that early deprivation robs "the organism of the opportunity of constructing models of the environment, and it also prevents the development of efficient strategies for evaluating information."

It has been the concern of educators for a long time that success in the regular school program is lacking on the part of children from impoverished environments. Large numbers of these children seem to regress, rather than progress, academically as they attempt to cope with learning tasks in the school in spite of a wide variety of enrichment and remediation programs. Great hope is offered for children from deprived environments and to the American society by

the theory of early intervention presented by Deutsch, Bruner, and others (Brunner, 1967). Planned educational experiences for three- and four-year-olds from impoverished environments are being made available throughout the United States for the purpose of providing the compensation offered by the theory of early intervention. Many cities are now conducting compensatory preschool educational programs in the form of Head Start.

Head Start Child Development Programs

Project Head Start is a federal program for educationally deprived children designed to provide cultural and intellectual stimulation for preschool children from disadvantaged backgrounds (Gaebler, 1966). The purpose of Head Start is adequately stated by Sargent Shriver in his introductory remarks for the Office of Economic Opportunity pamphlet:

> Poverty's children are its most innocent, most helpless victims. But they are also more easily removed from its clutches. By meeting their need for attention and affection, by tending to medical needs that drain their energy, by opening their minds to the world of knowledge, we can set them on the road to successful lives. We can break the vicious cycle that would turn them into poverty's parents. (Sargent Shriver, p. 5)

Local programs which serve areas with a high rate of poverty are able to procure federal assistance for Head Start. Poverty in a community and its degree can be measured by the proportion of a

community's families on welfare, the number of families with incomes, and by the extent of persistent unemployment and underemployment (Office of Economic Opportunity pamphlet, p. 13).

The number of people in a household must be considered when classifying a family as impoverished. The following chart gives income levels and household sizes to be used in helping to measure the number of families which are impoverished. A family can generally be considered impoverished if its income is no more than that listed.

Non-Farm Households		Farm Households	
Persons	Family Income	Persons	Family Income
1	$1,500	1	$1,050
2	2,000	2	1,400
3	2,500	3	1,750
4	3,000	4	2,100
5	3,500	5	2,450
6	4,000	6	2,800
Over 6--add $500 for each additional person		Over 6--add $350 for each additional person	

(Office of Economic Opportunity pamphlet, p. 13)

As long as the Head Start program is primarily reaching the poor within the neighborhood, the level of family income need not be a specific requirement for admission to a Head Start Center.

> For group activities it is essential that at least 90% of the children taking part be poor. So that the group can be representative of a broader cross-section of the community or the neighborhood, it is permissible to include children--up to 10% of the class--from homes which are more pros-

> perous. Children learn not only from teachers, but from each other as well. Children from different backgrounds may serve as 'pacesetters' for children of limited opportunity. However, where special services are being provided to individual children--medical treatment, for example--these services should be given only to the poor. (Office of Economic Opportunity Pamphlet, p. 13)

The school must become, to use Hess' (1964) term, a "resocializing institution." This is nothing to do with lack of acceptance of other cultures, for cultural pluralism should be the hallmark of the school (Foster, 1966). As explained by the Educational Policies Committee of the National Education Association,

> The problem of the disadvantaged arises because their cultures are not compatible with modern life.... The requirement is not for conformity but for compatibility. ...To give all people a fair chance to meet the challenges of life is both practicable and American. (Educational Policies Committee of the National Education Association, p. 11)

In commenting upon the goals of a program for disadvantaged children, Deutsch states:

> To stimulate in young children the skills that underlie school performance and which, according to both research findings and practical school experience, are evidently not stimulated by disadvantaged backgrounds and poor environments. Middle-class homes have a so-called 'hidden curriculum' that typically does an effective job of preparing middle-class children to enter school. This doesn't happen in lower-class impoverished homes.... A major purpose of preschool programs is to compensate the children from impoverished backgrounds for these lacks (as compared with middle-class children) so that they will be able to profit

> from what the school has to offer....A broader goal is to help each child to realize more fully his own productive potential, both for his own good and for the good of society. (Deutsch, 1965, p. 51)

Projective techniques used with the deprived child

Little research was encountered which compared responses of the disadvantaged and advantaged children on projective techniques. There is one recent study in the literature (Downing, 1965) that compares teen-age Negro and white Rorschach responses, but none that compares responses on the Lowenfeld Mosaic except one study conducted by Ames and August (1966). In this study, comparison of the Mosaic responses of Negro and white elementary school children revealed that those of the five- and six-year-old Negro were considerably less mature than those of the same-age white child. However, the discrepancy in performance decreased at later ages.

Summary

Although not new to the United States, the education of children from disadvantaged areas has recently become a matter of national concern. The differences between the educational attainment of children from white-collar families and children from blue-collar families continues to widen. Ausubel (1964), Hunt (1965), and Deutsch (1964) conclude that disadvantaged children are inadequately

prepared to perform well in an academic environment and need preschool enrichment programs.

At present, the term "cultural deprivation" is used as the frame of reference for explaining academic failure among disadvantaged pupils. Riessman (1962) explains the nature or cultural deprivation as those aspects of middle-class culture--such as education, books, formal language--from which these groups have not benefited.

Project Head Start is a federal program designed to provide cultural and intellectual stimulation for preschool children from disadvantaged backgrounds. The background from which this child comes has been delineated as has some prevalent characteristics of the child.

The research in the area of projective techniques on the disadvantaged child are meager. The area is wide open for much valuable research.

PROCEDURE

Administering the Lowenfeld Mosaic Test

The Lowenfeld Mosaic Test was administered to 10 male and 10 female Head Start preschool children at the Pingree School in Ogden, Utah, and to 10 male and 10 female nursery school children at the Utah State University Child Development Laboratory, Logan, Utah. Children from the Pingree School were selected because of availability, because they met the criteria necessary to participate in a Head Start program, and through suggestion and recommendation of the Ogden City School Board of Education. Children from the Utah State University Child Development Laboratory were selected because of location proximity of subjects for the researcher and because such subjects met the standards of advantaged children coming from a professional education area. Sample size was limited by the number of Head Start children enrolled in the Pingree School and by the ability to match ages of both groups. The Head Start sample consisted of nine Negroes, eight Spanish Americans, and three children who were of a Negro-Spanish American mixture. The Utah State University sample consisted of 20 Caucasians.

The ages of the girls ranged from 4 years 6 months to 5 years

5 months with a mean age of 5 years. The ages of the boys ranged from 4 years 8 months to 5 years 4 months with a mean age of 4 years 7 months. The test was administered to each person individually following the instructions of Ames (1962) which were modified to suit the age of the child. The Head Start children were tested in a corner of the school's basement which had a folding partition around it. As this was located near the stairway and in the hall, students were often passing by for recess and lunch. The Utah State University children were tested in the library of the nursery school. The door was locked during testing so there were no disturbances. Testing for the Head Start group took three days which were spread out over a weeks time. This was arranged for the examiner's convenience of traveling to Ogden during available free time. The testing was concentrated in the morning as this was when the children were in school. Testing for the Utah State University children took place two weeks later utilizing three days for completion.

The Lowenfeld Mosaic Test consists of a box of 456 plastic pieces, one-sixteenth of an inch thick. These pieces come in five different shapes: square, and diamond; and equilateral, right-angled, isosceles, and scalene triangles; and in six different colors: black, green, yellow, red, white, and blue.

The working surface on which patterns are to be made is a sheet of white paper that covers the surface of a rectangular wooden tray which has a raised rim on three sides. The side placed nearest the subject has no rim. The standard size of this working surface is 10 1/4" x 10 3/8".

The subject was seated before a table on which, directly in front of him, was placed the tray covered with a piece of white paper. The open Mosaic box containing the Mosaic chips was at the subject's left. Examiner said, "I have something for you to do and it is fun. Here is a box of pieces, all different colors and all different shapes. I want you to make something that you feel good about with some of the pieces on this piece of paper, anything you like. But first I am going to show you all the different kinds." (If the subject started to reach for one of the pieces, the examiner held her hand over the box, covering the pieces as she demonstrated.) One piece of each kind was then demonstrated by the examiner--equilateral triangle, square, isosceles triangle, diamond, and scalene triangle, who then commented, "This comes in all these different colors" (showing). As she held up the squares, she said, "And this, too, comes in all the different colors," and so on for each piece. The examiner referred to the second half of the box, away from the child after demonstrating

and commenting on each shape: "And here are extra ones in case you need more." (The box is divided into two halves, each containing 228 pieces.) "Now I want you to take some of these pieces out of the box and put them onto the paper and make something, anything you like. You may take as long or as short a time as you like. You may make a big thing or a little thing. And you may use a lot of pieces or just a few. When you are finished, I want you to tell me. You may start now." If the subject hesitated, the examiner encouraged him with, "Which one are you going to start with?" It was seldom necessary to use further encouragement.

The examiner recorded as much detail as possible as the child worked, both as to what the child did and as to what he said. If the subject asked what the examiner was writing, the examiner replied, "I'm just writing down what pieces you use." The examiner avoided leading comments such as guessing what the child was making, though she did respond in a friendly way to any comments addressed to her. If the child asked for pieces not available, such as round pieces or brown pieces, the examiner merely indicated that those pieces were not available.

When the subject was finished, the examiner said, "Now tell me about what you have made." This was stated in a friendly and interested manner; not in a perplexed way.

Unless the subject worked for more than 20 minutes, he was permitted to take as long as he chose. Subjects of a research study (as in the present instance) are routinely stopped at the end of 20 minutes if they should still be working (Ames and Ilg, 1962).

Recording of Test Responses

After the child had finished and had left, the examiner traced around each Mosaic chip which the subject had placed on the board, indicating its color. The recorded design was then colored with crayons. In cases where all the pieces were dumped or the design was difficult to duplicate due to piling of pieces on top of each other, colored slide photographs were taken. This is one of the many advantages of the Mosaic test--there is available for later analysis an almost exact replica of the child's own product.

Procedures for Scoring Test Responses

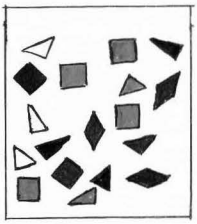
The designs were analyzed as to all formal properties of each response--type of structure, form, color, symmetry, naming, and content. This was done quantitatively and qualitatively using the Ames and Ilg (1962) scoring criteria. Quantitatively this procedure includes the number of pieces, colors and shapes used in each design pattern. Time taken to complete a design was an additional quantitative

classification. Quantitative scoring also includes a comparison of Ames and Ilg's (1962) criteria for the age groups of four and five years. These criteria were based on the normal child with average mental ability. Ames and Ilg's scoring criteria include: non-representational without pattern, nonrepresentational with pattern, representational, and mixed representational-nonrepresentational. Objective scoring as to the type of design was conducted by matching responses of the examiner and another person who had previously worked with the Mosaic test. This allowed for validity in categorizing the responses.

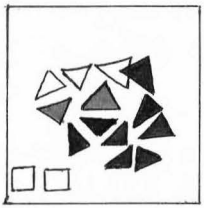
The nonrepresentational designs as diagramed in Figure 1 include: just drop or pile, scatter singly, prefundamental, slab and over-all. The two designs, just drop or pile and scatter singly, are self-explanatory.

The prefundamental design is made up of any simple combination of two or three pieces, usually of the same type, in combinations approaching but not reaching the so-called fundamentals. Typical prefundamentals include two squares side by side, two large triangles base to base, three large triangles in a half circle, two scalenes side by side with their sides touching in a wing formation, two small triangles placed together to form a square, and two scalenes with their long sides together to form a rectangle (Ames and Ilg, 1962).

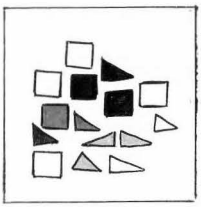
Just drop or pile



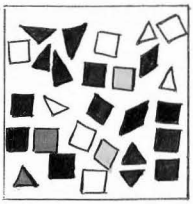
Scatter singly



Prefundamental



Slab



Over-all

Figure 1. Nonrepresentational without pattern (scoring patterns of Ames and Ilg, 1962) (Kranz, 1964, p. 48)

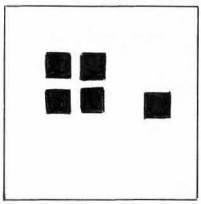
In the slab design, a compact figure is formed by placing a number of pieces of difference shapes one against another. There is no overall meaningful pattern or design which can be recognized. Primarily, the figure is free in the tray (unattached to the rim) (Ames and Ilg, 1962).

The overall design includes designs covering all or a large part of the tray without any apparent leading idea which are spaced, compact, or intermediate (Ames and Ilg, 1962).

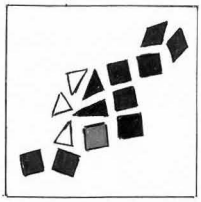
The nonrepresentational with pattern designs as diagramed in Figure 2 include: fundamental designs, central designs, designs along the rim, designs of tray filling, and separate designs.

The fundamental type of design, according to Lowenfeld (1954), are the simplest patterns that can be made with each piece. All pieces in the pattern are of the same shape.

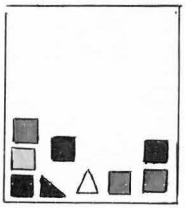
Central designs are those designs which are beyond the fundamental stage and contain patterns which combine pieces of several different shapes or those which combine pieces of a single shape in a manner more complex than a mere fundamental. These designs may be asymmetrical, or symmetrical with two corresponding halves or with four corresponding quadrants and they may be spaced, compact or intermediate (Ames and Ilg, 1962).



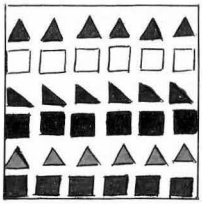
Fundamental



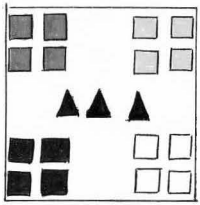
Central designs



Design along rim



Fills tray



Separate designs

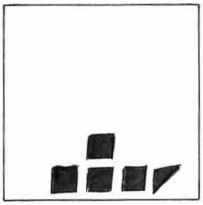
Figure 2. Nonrepresentational with pattern (scoring patterns of Ames and Ilg, 1962) (Kranz, 1964, p. 50)

The design along the rim of the tray may follow the entire rim of the tray as a frame, may form a narrow pattern along the length of the edge, or may follow only a short distance of the rim. Also classified here are patterns constructed in a corner of the tray (Ames and Ilg, 1962).

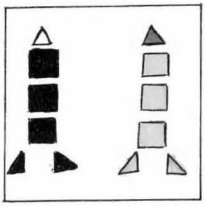
Included in the classification, pattern filling the tray, are all patterned designs which, rather than concentrating in the center or clinging to the rim, incorporate the whole area of the tray. The placement of pieces in a patterned or systematic fashion over the tray surface is the simplest type of overall design. The design may be compact or spaced (Ames and Ilg, 1962).

Separate designs consist merely of several separate patterned designs. The difference between this and the category just described is that the several designs which make it up do not fill the whole tray (Ames and Ilg, 1962).

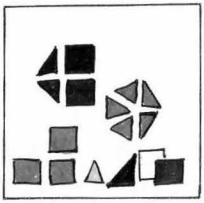
Representational designs as diagramed in Figure 3 include two types, object and scene. Object designs are by far the most frequent form of representational design at ages two through five. The design may consist of one or several objects, usually placed at or near the center of the tray. The design is unrelated to other objects or to any surrounding medium and is complete in itself (Ames and Ilg, 1962).



Representational-Object



Representational-Scene



Mixed, Representational and Nonrepresentational

Figure 3. Representational and Mixed, representational and nonrepresentational (scoring patterns of Ames and Ilg, 1962) (Kranz, 1964, p. 52)

Scene designs, represent not just a single object but depict a fairly complex scene containing many different objects, all related to each other spatially and conceptually (Ames and Ilg, 1962).

Mixed, representational and nonrepresentational designs are diagramed in Figure 3. This type of design pattern is self-explanatory. Many times a series of separate designs will include one representational object or a design resembling a nonrepresentational design having a central figure which represents some object.

Comparison of Test Responses

The designs from this study were divided into groups based on the subjects' chronological age and sex. They were also divided with respect to background--disadvantaged as opposed to advantaged. Both the Head Start and Utah State University groups' responses were tabulated on a percentage frequency diagram composed of the Ames and Ilg (1962) scoring criteria at age levels four and five. These results were compared with the percentage frequency of occurrence of the Ames and Ilg (1962) sample. The Head Start group was then contrasted with the Utah State University group for sameness and/or differences of responses.

Qualitative Scoring Responses

Each individual design made by the children was discussed as to its uniqueness. The similarities and differences within each type of quantitative design (nonrepresentational without pattern, nonrepresentational with pattern, representational, and mixed nonrepresentational and representational) are also mentioned. And, finally, an overview of the total patterns made by the Head Start and Utah State University samples are discussed.

FINDINGS

The data has been analyzed as to all formal properties of each response--type of structure, form, color, symmetry, naming, content, number of pieces used, and timing, and will be presented in such a fashion. The present results give the findings on age changes and developmental levels in the Mosaic product at ages four and five with boys and girls responses given separately. A descriptive analysis was presented as the type of data and small n did not lend themselves to statistical analysis. This data has been arrived at in two ways--quantitatively and qualitatively. In the quantitative analysis means have often been determined and the various formal properties of the Mosaic products have been discussed; such as the form level and actual shapes used at the different ages, the use of color and the actual colors used, the level of naming and the actual content of products, and such other factors as the number of pieces used, timing, symmetry of the product, and general attractiveness of the product. In the qualitative evaluation particular emphasis was given to productions which seem to bear out or illustrate kinds of behavior which earlier investigations have indicated to be characteristic of certain ages (Gesell and Ilg, 1946, 1956, and Ames et al., 1952, 1959).

Quantitative Four-Year-Old Female Scoring Comparisons

Type of design

Table 1 indicates that the most prevalent type of design made by the four-year-old females of the Head Start sample was the non-representational design (five girls). Among these, prefundamental was the leading subclass with two of this type of design having been made. Table 2 indicates that the most prevalent type of design made by the four-year-old females of the Utah State University sample was the nonrepresentational with pattern design and nonrepresentational without pattern design (two of each). Among these, design along rim was the leading subclass with two of this type design having been made. Table 3 indicates that the most prevalent type of design made by the females of the Ames and Ilg study was the representational design (18 girls). Among these, object was the leading subclass with 18 responses. Table 4 shows a comparison of the responses made by the Head Start sample, the Utah State University sample and the Ames and Ilg sample in the form of percentages and frequencies of each response.

Table 1. Type of design responses of the Head Start sample at the four-year level

Pattern	Female	Male
A. Nonrepresentational without pattern		
1. Just drop or pile	1	1
2. Scatter singly	1	1
3. Prefundamental	2	0
4. Slab	0	0
5. Over-all	1	0
Total	5	2
B. Nonrepresentational with pattern		
1. Fundamental	0	0
2. Central design	0	0
3. Design along rim	0	0
4. Fills tray	0	0
5. Separate designs	0	0
Total	0	0
C. Representational		
1. Object	0	2
2. Scene	0	0
Total	0	2
D. Mixed, representational and nonrepresentational	0	1
Total	0	1

Table 2. Type of design responses of the Utah State University sample at the four-year level

Pattern	Female	Male
A. Nonrepresentational without pattern		
1. Just drop or pile	0	0
2. Scatter singly	0	0
3. Prefundamental	1	0
4. Slab	0	0
5. Over-all	1	0
Total	2	0
B. Nonrepresentational with pattern		
1. Fundamental	0	1
2. Central design	0	1
3. Design along rim	2	1
4. Fills tray	0	0
5. Separate designs	0	0
Total	2	3
C. Representational		
1. Object	1	2
2. Scene	0	0
Total	1	2
D. Mixed, representational and nonrepresentational	0	0
Total	0	0

Table 3. Type of design responses of the Ames and Ilg study at the four-year level (Ames and Ilg, 1962, p. 102)

Pattern	Female	Male
A. Nonrepresentational without pattern		
1. Just drop or pile	1	2
2. Scatter singly	5	6
3. Prefundamental	7	4
4. Slab	1	2
5. Over-all	0	0
Total	14	14
B. Nonrepresentational with pattern		
1. Fundamental	3	4
2. Central design	11	6
3. Design along rim	1	2
4. Fills tray	1	1
5. Separate designs	0	0
Total	16	13
C. Representational		
1. Object	18	20
2. Scene	0	3
Total	18	23
D. Mixed, representational and nonrepresentational	2	0
Total	2	0

Table 4. Comparison of quantitative scoring responses between Head Start, Utah State University and Ames and Ilg samples by percentage and frequency of each response (four-year-olds)

Pattern	Female						Male					
	H.S. (N=5)		U.S.U. (N=5)		Ames & Ilg (N=50)		H.S. (N=5)		U.S.U. (N=5)		Ames & Ilg (N=50)	
	%	#	%	#	%	#	%	#	%	#	%	#
Nonrepresentational without pattern	100	5	40	2	28	14	40	2	0	0	28	14
Nonrepresentational with pattern	0	0	40	2	32	16	0	0	60	3	26	13
Representational	0	0	20	1	36	18	40	2	40	2	46	23
Mixed, representational and nonrepresentational	0	0	0	0	4	2	20	1	0	0	0	0

Table 4. Continued

Pattern	Total - Both Sexes					
	H.S. (N=10)		U.S.U. (N=10)		Ames & Ilg (N=100)	
	%	#	%	#	%	#
Nonrepresentational without pattern	70	7	20	2	28	28
Nonrepresentational with pattern	0	0	50	5	29	29
Representational	20	2	30	3	41	41
Mixed, representational and nonrepresentational	10	1	0	0	2	2

Form

Form has been classified into various levels by Ames and Ilg (1962) following the classification determined by Walker (1957). Nonrepresentational designs are classified in six categories as follows. Each product is scored in only one category, the highest one in which any part of it may fall.

1. Incoherent, formless. Pieces are placed on the board with no apparent shape or structure in mind.

2. Islands, even small islands, of form. Any simple combination of two pieces, usually of the same type, which are apparently intended by the child. These may be called prefundamentals.

3. Intermediate: spaced-unspaced. More than islands of form, there should be definite structured areas. The total product is scored here if a total structure includes one reasonably good form but other quite shapeless areas.

4. Slabs. Essentially a single pattern in which a number of pieces are placed either closely or loosely in juxtaposition to each other, without the creation of an over-all symmetric shape.

5. Good form. What the subject is trying to make is evident and he is nearly successful, but one or more pieces are wrong. Lowenfeld calls this "unsuccessful."

6. Successful form. Entirely correct.

Representational patterns are classified in four major categories as follows:

1. Very simple form. Very small types and also larger designs with only a simple level of patterning. Single, small, one- to four- or five-piece figures.

2. Simple-popular form. The majority of single representational forms fall into this class. Often have an adequate but uninspired quality and generally lack strong individuality. Some simple scenes fall into this grouping.

3. Apt or complex form. Individualistic treatment of a popular form, or successfully handled complexity of form.

4. Clever or ingenious form. Designs at this level show originality, ingenuity, and often real artistic merit.

Among the nonrepresentational patterns of the Head Start sample, Ames and Ilg's incoherent or formless category prevails. There were no representational patterns in the Head Start sample. Nonrepresentational patterns of the Utah State University sample were too scattered to be classified. One representational pattern was made by a subject in the Utah State University sample. Among the nonrepresentational patterns of the Ames and Ilg study, the spaced and unspaced category prevails. Among representational patterns, Ames and Ilg feel the form was too vague to be classified.

Shape

Table 5 indicates that the most popular of the shapes used in the Head Start sample was the scalene triangle, which was used 82 times (35 percent of all pieces used). The equilateral triangle was second in popularity being used 42 times (19 percent of all pieces used). In the Utah State University sample, as shown in Table 6, the scalene triangle was the most popular shape; it was used 45 times (33 percent of all pieces used). The diamond was second in popularity having been used 28 times (20 percent of all pieces used). In the Ames and Ilg sample the equilateral triangle (27 percent of all pieces used) was the most popular shape. The scalene triangle (23 percent of all pieces used) was second in popularity. The total number of pieces of each shape used was not stated.

Color

Following Walker (1957), Ames and Ilg (1962) have outlined five stages of possible use of color: (1) no evident color pattern; (2) partial use of color--no relation to form, or consistent with form; (3) one color only; (4) full color pattern repeating form; and (5) color pattern adds significance to form.

Table 5 indicates that blue was the most popular color used in

Table 5. Color and shape responses of the female Head Start sample (four-year-olds)

Colors	Shapes					Total
	Diamonds	Equilateral triangles	Squares	Right isosceles triangles	Scalene triangles	
Red	1	1	6	1	11	20
Blue	22	11	3	17	13	66
Black	5	3	5	4	10	27
Green	3	17	18	1	26	65
Yellow	1	9	5	8	10	33
White	8	1	4	0	12	25
Total	40	42	41	31	82	236
Total tiles of each shape in set:	96	72	48	96	144	456

Total number of colors used: 236

Total number of shapes used: 236

Table 6. Color and shape responses of the female Utah State University sample (four-year-olds)

Colors	Shapes					Total
	Diamonds	Equilateral triangles	Squares	Right isosceles triangles	Scalene triangles	
Red	0	0	1	0	7	8
Blue	22	2	3	14	6	47
Black	3	1	2	7	0	13
Green	3	14	9	4	18	48
Yellow	0	0	4	0	12	16
White	0	0	3	0	2	5
Total	28	17	22	25	45	137
Total tiles of each shape in set:	96	72	48	96	144	456

Total number of colors used: 137

Total number of shapes used: 137

the Head Start sample (66 times or 28 percent of all the colors used). Green was second in popularity, used 65 times (27 percent of all the colors used). In analyzing the color combinations, it was found that only one girl used three or fewer colors. There was no evident color pattern for the nonrepresentational and representational designs. Table 6 indicates that green was the most popular color of the Utah State University sample having been used 48 times (35 percent of all the colors used). Blue was a close second in popularity and was used 47 times (34 percent of all the colors used). Three girls used three or fewer colors as far as color combinations were concerned. There was no evident color pattern among nonrepresentational and representational designs. In the Ames and Ilg study, blue was the most prevalent color (24 percent of all the colors used). In analyzing the combinations of color, Ames and Ilg report that only eight girls used three or fewer colors out of a total of 50. The level of color used for both nonrepresentational and representational designs again indicated no evident color pattern.

Naming

The naming of products has been classified both as to manner of naming and as to the actual products named. Items 1 through 6, in the classification of manner of naming, give evidence of increasing

maturity: (1) unnamed, (2) color naming, (3) pieces scattered, each piece named, (4) pieces scattered, whole product named, (5) several pieces grouped, though inaccurately, and named, (6) same, product slightly resembling object named. The classifications of naming (7) through (11) do not represent different stages of maturity but indicate different kinds of responses. They include: (7) object resembling object named, (8) several objects named, (9) design named design, (10) mere description (star, decoration, or abstract), and (11) scene so named (Ames and Ilg, 1962).

In the Head Start sample two of the five individuals could name the design they had made. Items named were a circle and a Christmas tree. In the Utah State University sample four of the five girls could name their design. Items named were: a T.V., a drum, a rug, a building, a horse, and a kite. Most of the individuals in the Ames and Ilg (1962, p.103) study (16) did not name the design that they had made. "As to actual things named, house leads (eight girls), design comes next (seven), and then comes merry-go-round or windmill (three)."

Number of pieces

The total number of pieces used in the Head Start sample of females was 236, with the average number of pieces per child at

47.20. This number was unusually high due to one girl who dumped many pieces, 125, which is characterized by a tendency to just grab for the various tiles without any apparent forethought and dump them on the tray indiscriminately. The average number of pieces per child would have been 25.25 had this girl been excluded. In the Utah State University sample the total number of pieces used was 137, with the average of 27.40 pieces per child. In the Ames and Ilg sample the total number of pieces used was not presented. The average number of pieces used per child was 26.72.

Timing

The subjects of this study were permitted to use as much time as they needed to complete their design as long as they did not exceed 20 minutes. Subjects of a research study (as in the present case) are routinely stopped at the end of 20 minutes if they should still be working. The longest time taken by an individual in the Head Start sample was 14 minutes and 3 seconds and the shortest time was 1 minute and 30 seconds. The mean was 7 minutes and 17 seconds. In the Utah State University sample the longest time utilized was 20 minutes and the shortest time was 54 seconds. The mean was 7 minutes and 27 seconds. In the Ames and Ilg study the subjects were stopped, if necessary, at the end of 20 minutes. The longest

time and the shortest time to complete a design was not stated. The mean time was 7 minutes and 56 seconds.

Symmetry

All products which show symmetry or an approximation to symmetry were checked both as to symmetry of placement on the paper and as to symmetry of the construct itself.

Ames and Ilg found that the products made by four-year-olds were too scattered and irregular to make analysis for symmetry practical. The same results were found in the present study.

Quantitative Four-Year-Old Male Scoring Comparisons

Type of design

The most prevalent type of design made by the males of the Head Start study was divided between nonrepresentational without pattern (2) and representational (2). Among these, object (2) was the leading subclass. In the Utah State University sample, the most prevalent type of design made was nonrepresentational with pattern (3). Representational designs were made by two boys. Among these, object (2) was the leading subclass. The most prevalent type of design made by the males of the Ames and Ilg study

was the representational design (23). Among these, object (2) was the leading subclass.

Form

Among nonrepresentational patterns, form was too vague to be classified in the Head Start sample. Good form was the leading subclass in the representational designs (two). Form was too vague to be classified among nonrepresentational with pattern for the Utah State University sample. However, good form (two) was the leading subclass of the representational designs. In the Ames and Ilg study, the incoherent or formless category and the spaced-unspaced category were equal in popularity among the nonrepresentational patterns. Among representational patterns, Ames and Ilg felt that the form of their designs was too vague to be classified.

Shape

As to the specific shapes used in the Head Start sample, Table 7 indicates that the scalene triangle was the most popular shape, it was used 144 times (69 percent of all pieces used). The diamond and right isosceles triangle were tied for second place with 96 of each being used (46 percent of all pieces). In the Utah State University sample, as indicated in Table 8, the squares were the most

Table 7. Color and shape responses of the male Head Start sample (four-year-olds)

Colors	Shapes					Total
	Diamonds	Equilateral triangles	Squares	Right isosceles triangles	Scalene triangles	
Red	9	0	3	8	12	32
Blue	14	5	4	14	3	40
Black	10	0	4	9	0	23
Green	9	7	15	1	18	50
Yellow	8	0	4	8	12	32
White	9	0	4	8	11	32
Total	59	12	34	48	56	209
Total tiles of each shape in set:	96	72	48	96	144	456

Total number of colors used: 209

Total number of shapes used: 209

Table 8. Color and shape responses of the male Utah State University sample (four-year-olds)

Colors	Shapes					Total
	Diamonds	Equilateral triangles	Squares	Right isosceles triangles	Scalene triangles	
Red	0	0	5	0	0	5
Blue	6	1	11	0	1	19
Black	0	0	5	1	0	6
Green	0	7	15	0	5	27
Yellow	0	0	5	0	0	5
White	1	0	4	0	0	5
Total	7	8	45	1	6	67
Total tiles of each shape in set:	96	72	48	96	144	456

Total number of colors used: 67

Total number of shapes used: 67

popular shape having been used 45 times (67 percent of all pieces used). The equilateral triangle was second in popularity having been used 8 times (12 percent of all pieces used). In the Ames and Ilg study, the equilateral triangle (34 percent of all pieces used) was the most popular shape. The scalene triangle (24 percent of all pieces used) was second in popularity. The total number of pieces of each shape used was not given.

Color

Table 7 indicates that green was the most popular color used by the Head Start sample (50 times or 24 percent of all colors used). Blue was second with 40 pieces (19 percent of all colors used). As to color combinations, only one boy used three or fewer colors. There was no evident color pattern among nonrepresentational and representational designs. In the Utah State University sample, Table 8, green prevailed as the favorite color. It was used 27 times (40 percent of all colors used). Blue was second with 19 pieces used (28 percent). Two boys used three or fewer colors. No evident color pattern for the nonrepresentational and representational designs seemed to be present. In the Ames and Ilg study, blue was the most prevalent color (29 percent of all pieces used), and green and black were tied for second in popularity

(16 percent of each). As to color combinations, twelve boys used only three or fewer colors. There was no evident color pattern for the nonrepresentational and representational designs.

Naming

In the Head Start sample, four of the five individuals could name the design they had made. Items named were: a house, a rocket, a Christmas tree, and a horsey house. Three of the five boys in the Utah State University sample could name the design they had produced. The names they assigned were: a funny man, a sea-gull, and a man in Africa. In the Ames and Ilg study, most of the individuals (21) did not name the design they had made. "As to actual things made, house and boat lead (5 each), then building other than house (3) and merry-go-round or windmill (3)." (Ames and Ilg, 1962, p. 103)

Number of pieces

In the Head Start sample, the total number of pieces used was 209 with the average number of pieces being 41.80 per child. This number was unusually high due to the dumping of pieces by one boy. The total number of pieces used in the Utah State University sample was 67 with the average 13.40 pieces per child. In the Ames and

Ilg sample, the total number of pieces used was not presented. The average number of pieces used per child was 24.42.

Timing

The longest time taken by a Head Start male was 20 minutes. The shortest time was 52 seconds. The mean was 9 minutes and 11 seconds. The longest time taken by an individual in the Utah State University sample was 20 minutes and the shortest time was 1 minute and 30 seconds. The mean was 5 minutes and 45 seconds. In the Ames and Ilg study, the longest and shortest time to complete a design was not given. The mean time was 7 minutes and 13 seconds.

Symmetry

Ames and Ilg (1962, p. 103) state, "As with girls, the products of boys are too scattered and irregular to make analysis for symmetry practical." The same results were found in this study.

Qualitative Scoring Comparisons

The majority (seven) of the Head Start children made nonrepresentational designs without pattern. Merely dropping pieces onto the paper, or scattering pieces singly, was most prevalent (four children), two made prefundamentals and one made an over-all design. The

products may appear to be more selective than the process would warrant since many either took up handfuls of pieces or took pieces up one-by-one and then put them down on the board. Little clumps or clusters of pieces often consisted of pieces all the same shape or all the same color. The arrangement in the box resulted in several pieces being chosen in series. The majority did tend to have some extra piece or pieces along with their clusters, however. The males possessed a more mature sense of patterning than the females as their designs were more representational while all of the females' designs were nonrepresentational. There was not much difference in the number of pieces used between male and female, 209 to 236, respectively.

The most popular tile varied among the males and females of the Head Start sample, with the males favoring diamonds and the females favoring scalene triangles. The second most popular tile also varied, with the males favoring scalene triangles and the females favoring equilateral triangles. The least popular tile used by the female sample was the right isosceles triangle and the male sample's least favorite tile was the equilateral triangle. Green appears to be the favorite color of the males while blue is used more often by the females. The reverse is true of second preference as the males preferred blue while

the females preferred green. The least popular color used by the female sample was white (25) with black following a close second (27). The least popular color used by the male sample was black (23).

The males of the Head Start sample seemed to show greater concentration in constructing their patterns than the females. This was exemplified by a greater average time period in constructing their designs. The males also showed more mature design patterning.

Two girls were quite verbal while working, often talking to the examiner. Only one boy spoke to the examiner. The remaining seven children did not talk at any time during the process other than to designate that they were finished. Only four children could name their design. One boy had difficulty with the directions apparently not understanding what was expected of him. One of the girls had a similar problem so the directions were repeated and after a while the two subjects proceeded with their designs.

The majority (five) of the designs made by the Utah State University sample were nonrepresentational with pattern. Designs along the rim were the most prevalent. In the majority there was considerable selectivity as to the pieces which were put down together. Little clumps or clusters were often present which consisted of pieces all the same shape or all the same color. Three of the children made

representational designs with objects being made. Often the total page was not good form with color repeating form, but there were many islands of correct color and form. Even when not totally accurate, most clumps of pieces were rather neat and somewhat planned. The males seemed to possess a more mature sense of patterning as their designs all contained pattern of some kind while two of the females were still at the nonrepresentational without pattern level. The females utilized considerably more pieces than the males, 137 to 67 respectively. Perhaps the selectivity of the pieces and the small number used by the males explains the more mature designs.

The most popular tile varied among the males and females of the Utah State University sample, with the males favoring squares and the females favoring scalene triangles. The second most popular tile also varied, with the males favoring equilateral triangles and the females favoring diamonds. The least used tile by the female sample was the equilateral triangle and the right isosceles triangle was least used by the male sample. Both males and females preferred green as their most popular color and blue was the second choice of both. White was the least popular color for the girls whereas white, red and yellow were tied for the least popular color for the boys.

The females of the Utah State University sample seemed to show greater concentration in constructing their designs than the males. This was exemplified by a greater average time period spent in construction of their designs.

All of the boys in the Utah State University sample were quite verbal, four of them going into an elaborate discussion of what they were making before the examiner had even asked them. The girls were not verbal, with only one of them speaking to the examiner during the testing period. The other four girls spoke only to describe their design. Three of the girls finished quite quickly, however, so this may have caused the lack of verbal communication. These children had no difficulty with the directions given by the examiner.

Ames and Ilg report their qualitative results quite briefly. They concluded that the design patterns of the four-year-old had improved in maturity over the patterns of the three-year-old. It was noticed that at the four-year-old level there were less designs of mere dropping, piling on the tray or scattering pieces singly. The designs were of the nonrepresentational with pattern classification more often than the nonrepresentational without pattern type.

The four-year-old age group showed greater selectivity with color and shape than the previous age group. The various tiles were now

put together in greater representational patterns. This group also displayed sporadic good use of color and form but on the whole most clumps of pieces were rather neat and possessed something of planning. Many of the designs made by the four-year-old age group were given names although most of the names did not resemble the things that were made.

The leading form used was the large triangle and blue was the leading color, with red second, although many used all colors. There were fewer pieces used than at the three-year-old level. Instead of covering every bit of the paper, the products were drawn away from the edge, unless the edge was treated in an effort at an actual border or frame.

Ames and Ilg feel that some of the designs made by this four-year-old age group may give an indication of what their products may be at a later age.

Quantitative Five-Year-Old Female Scoring Comparisons

Type of design

One notes in Table 9 that the most prevalent type of design made by the five-year-old females of the Head Start sample was the non-representational design (three girls). Among these, scatter singly,

Table 9. Type of design responses of the Head Start sample at the five-year level

Pattern	Female	Male
A. Nonrepresentational without pattern		
1. Just drop or pile	0	1
2. Scatter singly	1	1
3. Prefundamental	1	0
4. Slab	0	0
5. Over-all	1	0
Total	3	2
B. Nonrepresentational with pattern		
1. Fundamental	0	0
2. Central design	0	0
3. Design along rim	1	0
4. Fills tray	1	0
5. Separate designs	0	0
Total	2	0
C. Representational		
1. Object	0	2
2. Scene	0	1
Total	0	3
D. Mixed, representational and nonrepresentational	0	0
Total	0	0

prefundamental, and over-all subclasses were utilized. Table 10 indicates that the most prevalent type of design made by the five-year-old females of the Utah State University sample was divided between nonrepresentational without pattern (two girls) and non-representational with pattern (two girls). Among these, slab, over-all central design, and design along rim subclasses were utilized. Table 11 shows that the most prevalent type of design made by the females of the Ames and Ilg study was the representational design (25 girls). Of these, the largest number (22) made objects. Table 12 shows a comparison of the responses made by the Head Start sample, the Utah State University sample and the Ames and Ilg sample in the form of percentages and frequencies of each response.

Form

Among nonrepresentational designs of the Head Start sample, form was too vague to be classified. The same was true of the non-representational with pattern designs. There was no representational patterns in the Head Start sample. Nonrepresentational patterns of the Utah State University sample were too scattered to be classified. One representational pattern was made by a Utah State University child. Among nonrepresentational patterns of the Ames and Ilg study, the

Table 10. Type of design responses of the Utah State University sample at the five-year level

Pattern	Female	Male
A. Nonrepresentational without pattern		
1. Just drop or pile	0	0
2. Scatter singly	0	0
3. Prefundamental	0	0
4. Slab	1	0
5. Over-all	1	0
Total	2	0
B. Nonrepresentational with pattern		
1. Fundamental	0	0
2. Central design	1	0
3. Design along rim	1	1
4. Fills tray	0	0
5. Separate designs	0	0
Total	2	1
C. Representational		
1. Object	1	2
2. Scene	0	0
Total	1	2
D. Mixed, representational and nonrepresentational	0	2
Total	0	2

Table 11. Type of design responses of the Ames and Ilg study at the five-year level (Ames and Ilg, 1962, p. 108)

Pattern	Female	Male
A. Nonrepresentational without pattern		
1. Just drop or pile	0	0
2. Scatter singly	1	0
3. Prefundamental	0	0
4. Slab	5	4
5. Over-all	1	0
Total	7	4
B. Nonrepresentational with pattern		
1. Fundamental	0	0
2. Central design	9	6
3. Design along rim	1	3
4. Fills tray	3	1
5. Separate designs	3	2
Total	16	12
C. Representational		
1. Object	22	29
2. Scene	3	5
Total	25	34
D. Mixed, representational and nonrepresentational	2	0
Total	2	0

Table 12. Comparison of quantitative scoring responses between Head Start, Utah State University and Ames and Ilg samples by percentage and frequency of each response (five-year-olds)

Pattern	Female						Male					
	H.S. (N=5)		U.S.U. (N=5)		Ames & Ilg (N=50)		H.S. (N=5)		U.S.U. (N=5)		Ames & Ilg (N=50)	
	%	#	%	#	%	#	%	#	%	#	%	#
Nonrepresentational without pattern	60	3	40	2	14	7	40	2	0	0	8	4
Nonrepresentational with pattern	40	2	40	2	32	16	0	0	20	1	24	12
Representational	0	0	0	0	50	25	60	3	40	2	68	34
Mixed, representational and nonrepresentational	0	0	0	0	4	2	0	0	40	2	0	0

Table 12. Continued

Pattern	Total - Both Sexes					
	H.S. (N=10)		U.S.U. (N=10)		Ames & Ilg (N=100)	
	%	#	%	#	%	#
Nonrepresentational without pattern	50	5	20	2	11	11
Nonrepresentational with pattern	20	2	30	3	28	28
Representational	30	3	30	3	59	59
Mixed, representational and nonrepresentational	0	0	20	2	2	2

intermediate spaced-unspaced category prevails. Among representational patterns, form was too vague to be classified.

Shape

Table 13 indicates that the most popular of the shapes used in the Head Start female sample was the right isosceles triangle, which was used 78 times (32 percent of all pieces used). The square was second in popularity being used 61 times (25 percent of all pieces used). In the Utah State University sample, as indicated in Table 14, the square was the most popular shape and it was used 89 times (41 percent of all pieces used). The scalene triangle was second in popularity having been utilized 56 times (26 percent of all pieces used). In the Ames and Ilg sample, squares and equilateral triangles tied for first place, each with 25 percent of all pieces used. The total number of pieces of each shape used was not stated.

Color

Table 13 indicates that blue was the most popular color used in the Head Start sample (77 times or 31 percent of all colors used). Green was second in popularity having been used 43 times (17 percent of all colors used). In analyzing the color combinations, it was found that two girls used only three or fewer colors. The most popular

Table 13. Color and shape responses of the female Head Start sample (five-year-olds)

Colors	Shapes					Total
	Diamonds	Equilateral triangles	Square	Right isosceles triangles	Scalene triangles	
Red	8	6	7	8	3	32
Blue	15	9	11	32	10	77
Black	6	7	6	22	1	42
Green	0	15	16	2	10	43
Yellow	0	9	14	4	1	28
White	2	5	7	10	1	25
Total	31	51	61	78	26	247
Total tiles of each shape in set:	96	72	48	96	144	456

Total number of colors used: 247

Total number of shapes used: 247

Table 14. Color and shape responses of the female Utah State University sample (five-year-olds)

Colors	Shapes					Total
	Diamonds	Equilateral triangles	Squares	Right isosceles triangles	Scalene triangles	
Red	5	4	17	0	5	31
Blue	8	10	12	8	8	46
Black	5	5	9	2	2	23
Green	4	6	23	4	26	63
Yellow	5	0	14	2	9	30
White	4	1	14	0	6	25
Total	31	26	89	16	56	218
Total tiles of each shape in set:	96	72	48	96	144	456

Total number of colors used: 218

Total number of shapes used: 218

level for the use of color was partial use of color, no relation to form (three subjects), but two girls still had no evident color pattern. Table 14 shows that green was the most popular color of the Utah State University sample having been used 63 times (29 percent of all the colors used). Blue was second in popularity having been used 46 times (21 percent of all colors used). All of the girls used more than three colors. The most popular level for the use of color was partial use of color with no relation to form (four girls), but one girl still had no evident color pattern. In the Ames and Ilg study, blue was the most prevalent color (35 percent of all pieces used). As to combinations of colors, 13 girls used only three or fewer colors. Among nonrepresentational products, the most popular level for the use of color was that of partial use of color with no relation to form (10), but nine girls were still at the no evident color pattern level. Among representational products, the largest number of girls (11) were at the level of partial use of color consistent with form.

Naming

In the Head Start sample, two of the five girls could name the design they had made. One girl named hers "trees" and the other named hers "a catalogue." In the Utah State University sample all of the girls named their design. Names given were: a funny old man, a

circle, a design, a drum, and a great big kite. All but three of the girls in the Ames and Ilg study named their design. "As to the actual things named, design led (14), house came next (11), and other building came next (8). Scenes were named by three, and three named merry-go-round and windmill." (Ames and Ilg, 1962, pp. 78, 109)

Number of pieces

The total number of pieces used in the Head Start sample was 247, with the average number of pieces being 49.90 per child. In the Utah State University sample, the total number of pieces used was 218, with the average of 43.60 pieces per child. In the Ames and Ilg study, the girls used fewer pieces at five years than at four. The total number of pieces used was not presented but the mean dropped from 26.72 to 21.22.

Timing

The longest time taken by a girl in the Head Start sample was 20 minutes and the shortest time was 58 seconds. The mean was 11 minutes and 19 seconds. In the Utah State University sample, the longest time utilized was 20 minutes and the shortest time was 3 minutes and 9 seconds. The mean was 14 minutes and 1 second. In the Ames and Ilg study, the longest time and the shortest time to

complete a design was not stated. Timing was shorter than at four years of age, however. The mean dropped from 7 minutes and 56 seconds to 6 minutes and 24 seconds.

Symmetry

Four of the Head Start girls placed their products symmetrically on the paper and four made symmetric products. Three of the Utah State University girls placed their products symmetrically on the paper and three made symmetric products. In the Ames and Ilg study, only seven girls placed their products symmetrically on the paper (out of 50) and only 12 made symmetric products.

Quantitative Five-Year-Old Male Scoring Comparisons

Type of design

The most prevalent type of design made by the males of the Head Start study was representational (three). Among these, object (two) was the leading subclass. In the Utah State University sample, the most prevalent type of design made was divided between representational (two) and mixed, representational and nonrepresentational (two). Among these, object was the leading subclass (two). The most prevalent type of design made by the males of the Ames and Ilg study was the representational (34). Of these, the largest number (29) made objects.

Form

Among nonrepresentational designs made by the Head Start sample, the category of incoherent and formless prevails. Good form was the leading subclass in the representational designs (two). Among the nonrepresentational designs of the Utah State University sample, the slab level is utilized. Among representational products, good form was the leading subclass. In the Ames and Ilg study, the intermediate spaced-unspaced level prevails among nonrepresentational designs. Among representational designs, the majority fall at the incoherent, formless level.

Shape

As to the specific shapes used in the Head Start sample, Table 15 indicates that the square was the most popular. It was used 93 times (69 percent of all pieces used). There was a three-way tie for second place among the diamond, equilateral triangle and scalene triangle, each being used 12 times (9 percent of all pieces used). In the Utah State University sample, as indicated in Table 16, the scalene triangle was the most popular shape having been used 79 times (29 percent). The right isosceles triangle was a close second being used 72 times (27 percent of all pieces used). In the Ames and Ilg study, the largest number (34 percent of all pieces used) were squares, and the next most

Table 15. Color and shape responses of the male Head Start sample (five-year-olds)

Colors	Shapes					Total
	Diamonds	Equilateral triangles	Squares	Right isosceles triangles	Scalene triangles	
Red	0	1	16	0	0	17
Blue	11	2	21	6	8	48
Black	0	2	17	0	0	19
Green	1	7	21	0	4	33
Yellow	0	0	9	0	0	9
White	0	0	9	0	0	9
Total	12	12	93	6	12	135
Total tiles of each shape in set:	96	72	48	96	144	456

Total number of colors used: 135

Total number of shapes used: 135

Table 16. Color and shape responses of the male Utah State University sample (five-year-olds)

Colors	Shapes					Total
	Diamonds	Equilateral triangles	Squares	Right isosceles triangles	Scalene triangles	
Red	2	0	4	8	12	26
Blue	22	12	13	14	1	62
Black	18	13	15	25	30	101
Green	0	1	11	9	13	34
Yellow	0	0	4	8	12	24
White	0	0	5	8	11	24
Total	42	26	52	72	79	271
Total tiles of each shape in set:	96	72	48	96	144	456

Total number of colors used: 271

Total number of shapes used: 271

popular were the equilateral triangles (20 percent of all pieces used).

Color

It is evident from Table 15 that blue was the most popular color used (48 times) by the Head Start sample (36 percent of all colors used). Green was second having been used 33 times (24 percent of all colors used). As to color combinations, two boys used three or fewer colors. The most popular level for the use of color was that of no evident color pattern (three boys) but two had partial use of color with no relation to form, or consistent with form. In the Utah State University sample, Table 16, black prevailed as the favorite color. This may not be entirely indicative of the whole sample as one boy used only black (76) pieces. If this was taken into consideration, blue would prevail as the favorite color (62 pieces or 23 percent of all pieces used). Green would be in second place with 34 pieces being used (13 percent of all pieces). Three boys used three or fewer colors, one of them using only black pieces. There was no evident color pattern in three of the designs, while one had partial use of color with no relation to form, or consistent with form and one used one color only. In the Ames and Ilg study, blue was the most prevalent color (37 percent of all pieces used and red came second (15 percent).

As to combinations of colors, 15 boys used only three or fewer colors, one using only blue. Among nonrepresentational designs, the largest number of boys (15) were at the level of partial use of color consistent with form. Among representational products, the largest number (12) were also at this level.

Naming

In the Head Start sample, all of the boys could name the design they had made. The names consisted of: a bathroom, a big large one; four houses; a house; two houses; a diamond; a tree; a gun; and a T.V.; and one child named the shape of the pieces he had used. Three of the five boys in the Utah State University sample could name the design they had produced. Items named were: a puzzle, a house, and two rockets. One commented that it was hard to make but could not name his design and the other one wanted to make a farm but did not have enough of the pieces that he needed so did not name his design. In the Ames and Ilg study, all but five boys named their design. "As to the actual things named, house led (14), and airplane, rocket, and arrow came next (8). Five named animals, and four mentioned person, four mentioned building other than house, and four mentioned decoration or star." (Ames and Ilg, 1962, pp. 78, 109)

Number of pieces

The total number of pieces used in the Head Start sample was 135 with the average number of pieces being 27 per child. In the Utah State University sample, the total number of pieces used was 271, with the average of 54.20 pieces per child. In the Ames and Ilg study, boys used more pieces at five than at four years of age. The total number of pieces used was not presented but the mean rose from 24.42 to 28.40.

Timing

The longest time taken by an individual in the Head Start sample was 20 minutes and the shortest time was 4 minutes and 15 seconds. The mean was 10 minutes and 2 seconds. In the Utah State University sample, the longest time utilized was 18 minutes and 23 seconds and the shortest time was 2 minutes and 32 seconds. The mean was 7 minutes and 7 seconds. In the Ames and Ilg study, the longest time and the shortest time to complete a design was not stated. The products were built in a slightly shorter time than at four years. The mean dropped from 7 minutes 13 seconds to 6 minutes 47 seconds.

Symmetry

Two of the Head Start boys placed their products symmetrically

on the paper and also made symmetric products. One made a symmetric product and two contained no symmetry. Two of the Utah State University boys placed their products symmetrically on the paper and also made symmetric products. Three products contained no symmetry.

Qualitative Scoring Comparisons

There was a variety of response among the Head Start sample but half of the responses fell into the nonrepresentational without pattern category which was the least mature of the categories. Two children made nonrepresentational with pattern designs and three made representational designs. The leading subclass was that of object. Manipulation of pieces had not become sophisticated yet as many subjects (seven) were still merely combining shapes or colors which were alike. Only three children had begun experimentation with different types of combinations. In both design and object there were many in which squares or other shapes were lined up (seven). Nonrepresentational designs without pattern were still prevalent and the number of objects had remained the same. This would indicate that there had not been much improvement since age four.

Blue was the leading color for both males and females of the Head

Start sample with green running second for both. Squares were the leading form for the male and right isosceles triangles were the leading form for the female. The males used more pieces and the females used less pieces at age five than at age four.

The males of the Head Start sample seemed to show less concentration in the construction of their designs than did the females. This was exemplified by a greater average time period spent in construction by the females. The males, however, clearly showed more mature design patterning with three constructing representational patterns while none of the girls did so.

Five of the Head Start children were very interested in the different colors, naming them usually before the examiner did. Two of the girls said nothing throughout the testing period and they also could not name their design. The remaining three girls named the colors as well as their design, one being particularly verbal. One boy had difficulty with the directions and did not seem to understand what he was to do. The directions were repeated three times but he still had trouble and kept asking the examiner how the other boys and girls made their designs. All of the boys were able to name their design; this was the only verbal communication that one boy made, however. The five-year-olds in the Head Start group were much more verbal

than the four-year-olds with eight of them being able to verbally communicate with the examiner, one of which just named his design.

The majority of the designs made by the Utah State University sample were divided between nonrepresentational with pattern and representational, with the majority of these being objects. In both designs and objects there were many in which pieces, especially squares, were lined up (six). The number of representational and nonrepresentational patterns remained approximately the same indicating little, if any, improvement over age four. Manipulation of pieces was becoming sophisticated enough so that many subjects had gone beyond the mere combining of shapes or colors which were alike. Now there was the beginning of experimentation with different types of combinations. The males seemed to possess a more mature sense of patterning as their designs all contained pattern of some kind while two of the females were still at the nonrepresentational without pattern level. Both males and females used more pieces at age five than at age four with the boys using more than the girls at age five, 271 to 218 respectively.

Black was the leading color for the male Utah State University sample although one boy used only black pieces (76) and this may have slanted the outcome. Blue would be the next preferred color

for the males. Green was the leading color for the females followed by blue. Scalene triangles were the leading form for the males and squares were the leading form for the females.

The females of the Utah State University sample showed considerably more concentration in the construction of their designs than did the males. This was exemplified by almost twice as much average time spent in the construction period. The males, however, showed more mature design patterning with all of their designs containing pattern while two of the girls were still performing at the nonrepresentational without pattern level.

All but two of the Utah State University children were able to name their designs and all but three verbalized throughout the design making process. These children had no difficulty understanding the directions and began immediately after the examiner had finished giving them.

Ames and Ilg report their qualitative results quite briefly. They concluded that the design patterns of the five-year-old had improved in maturity over the patterns of the four-year-old. It was noticed that at the five-year-old level nonrepresentational designs without pattern were diminishing and objects were increasing. Small, compact, patterned designs or slabs became apparent.

As at four years of age, some structures which really resembled designs or fundamentals were named objects and were classified under this type of structure. Manipulation of pieces was becoming sophisticated among the five-year-olds so that many subjects had gone beyond the mere combining of shapes or colors which were alike. Different types of combinations were being experimented with. The process of performance seemed to be of primary interest in some children rather than the product. Ames and Ilg felt that this exploration and exploitation of different kinds of possible combinations (without too much interest in the product) may be the key to the small compact designs or objects (slabs) which occurred here for the first time.

SUMMARY AND CONCLUSIONS

Summary

The present study dealt with developmental age differences between a group of Head Start children and a group of preschool children attending the Utah State University Child Development Laboratory. The Lowenfeld Mosaic Test was used to make distinctions between the mature child whose developmental age was equal to his age in years and the immature child whose developmental age was below his age in years. Subjects for this study were 10 male and 10 female Head Start children and 10 male and 10 female Utah State University nursery school children. Each sample contained five males and five females at four years of age and five males and five females at five years of age. The results were compared to the four-year and five-year chronological age level of the Ames and Ilg (1962) scoring criteria.

Hypotheses

The first hypothesis stated that although behavior in response to the Mosaic test develops in the same way for both the disadvantaged children and the advantaged children, the products or Mosaic designs of the disadvantaged children will be less mature and develop more slowly.

The following statements support the hypothesis.

1. Type of design. Table 17 shows that behavior in response to the Mosaic test develops in roughly the same way for both groups of children--nonrepresentational products without pattern decrease with age, whereas more mature types of product (nonrepresentational with pattern and representational) increase. However, though products of disadvantaged children develop in the same direction as do those of advantaged children, they develop more slowly. That is, at both four and five years of age, products of disadvantaged subjects were clearly less mature than those of the advantaged group tested. Nonrepresentational products without pattern predominated in disadvantaged subjects at four years of age and occurred conspicuously at five years of age. Table 17 clearly indicates that the poorest, or most immature, Mosaic performance (a high predominance of nonrepresentational products without pattern) was given by the Head Start children, who made 70 percent of this most immature type of product at age four and 50 percent at age five.

2. Form. On the whole, the children of the Utah State University sample produced a higher quality of form within their designs than the Head Start children. In fact, 40 percent of the Head Start subjects at four years merely scattered the Mosaic chips onto the

Table 17. Comparison of pattern responses of Head Start and Utah State University samples at ages four and five by percentages of responses

Pattern	Four-Year-Olds		Five-Year-Olds	
	H.S. (N=10)	U.S.U. (N=10)	H.S. (N=10)	U.S.U. (N=10)
A. Nonrepresentational without pattern				
1. Just drop or pile	20	0	10	0
2. Scatter singly	20	0	20	0
3. Prefundamental	20	10	10	0
4. Slab	0	0	0	10
5. Over-all	10	10	10	10
Total	70	20	50	20
B. Nonrepresentational with pattern				
1. Fundamental	0	10	0	10
2. Central design	0	10	0	20
3. Design along rim	0	30	10	0
4. Fills tray	0	0	10	0
5. Separate designs	0	0	0	0
Total	0	50	20	30
C. Representational				
1. Object	20	30	20	30
2. Scene	0	0	10	0
Total	20	30	30	30
D. Mixed, representational and nonrepresentational	10	0	0	20
Total	10	0	0	20

paper, a behavior seldom seen in advantaged children after three years of age.

3. Naming. The naming of products has been classified both as to manner of naming and as to the actual products named. The Utah State University subjects gave more mature classifications and were more verbal than the Head Start subjects.

These were the only three categories which pertained to this hypothesis; therefore, it is fairly evident that the Utah State University children responded at a more mature level than the Head Start children.

The second hypothesis stated that the Mosaic designs produced by the males and females of the Head Start sample would be significantly different from the Mosaic designs constructed by the males and females of the Utah State University sample with reference to the quantitative and qualitative scoring criteria in the Ames and Ilg (1962) study.

The following statements support the hypothesis.

1. Type of design. The majority of the Utah State University sample produced a more mature type of design than the Head Start sample.

2. Form. On the whole, the children of the Utah State Uni-

versity sample produced a higher quality of form within their designs than the Head Start sample.

3. Naming. The Utah State University subjects gave more mature classifications and were more verbal than the Head Start subjects.

4. Number of pieces. The Utah State University children on the average used fewer total number of pieces than the Head Start children.

5. Symmetry. The products of the Utah State University sample were more symmetrical than those of the Head Start sample.

The following statements do not support the hypothesis.

1. Color. Green was the color used most by both four-year-old samples. Blue was the color used most by both five-year-old samples.

2. Timing. Although the difference was very slight, the mean time taken by the Head Start sample to complete their design was longer than the mean time taken by the Utah State University sample.

3. Shape. In both the Utah State University sample and the Head Start sample the square was the most prevalent shape used.

It is fairly evident that in the majority of scoring categories, especially those exemplifying maturity levels, the Utah State Uni-

versity children responded at a more mature level than the Head Start children. The differences between the groups, however, were not extreme and statistical analysis was not used because the small number of n and the distribution of the sample did not lend itself to it.

The third hypothesis stated that there would be a significant difference in maturity of design between all the males treatment of the Mosaic and all the females treatment or patterning of the Mosaic.

The following statements support the hypothesis.

1. Type of design. The majority of the males produced a more mature type of design than the females.

2. Form. On the whole, the males produced a higher quality of form within their designs than the females.

3. Naming. The males gave more mature classifications and were more verbal and imaginative than the females.

4. Number of pieces. The female subjects on the average used fewer total number of pieces than the male subjects.

5. Timing. The mean time taken by the females to complete their design was longer than the mean time taken by the males.

6. Symmetry. The products of the females were more symmetrical than those of the males.

The following statements do not support the hypothesis.

1. Color. Blue was the leading color for both males and females.

2. Shape. Squares were the most prevalent shape used by both males and females.

The above statements seem to substantiate the hypothesis as in almost every scoring category the males responded differently from the females. The distribution of the males and females seemed to be sufficiently different to warrant pointing this out. Although a significant difference was hypothesized, the data did not lend itself to statistical analysis as such.

Conclusions

In conclusion, then, it appears that after 30 years of rather limited usage, mostly in Great Britain and the United States, the Lowenfeld Mosaic Test still seems to be in the developmental stage of becoming a truly valuable personality and developmental status evaluator. Certainly it has many interesting possibilities for further development and refinement. It must also be pointed out that an account of the way in which the children of the Head Start sample and of the Utah State University sample used the Mosaic materials and of their resulting productions must at this time be given only at a level

of simple observation and description and must be considered very tentative. This is true, first, because of the small size of the samples; because of the eight months of previous educational experience of the Head Start sample as opposed to two to five months of educational experience of the Utah State University sample; and third, because of the lack of precision in characterizing some of the Mosaic productions, even though the Ames and Ilg (1962) scoring criteria were used.

The use of the Mosaic test with the Head Start sample and the Utah State University preschool sample as an indicator of developmental level was not as adequate as it could have been due to the small sample size of both age groups. It is a difficult task to attempt to identify age factors with such a small sample due to the fact that although strong and sometimes clearcut age forces are at work in influencing, even if in not alone determining, what the Mosaic product will be, it is also true that variations from any such basic scheme are often as numerous as adherences to it. Therefore, a larger sample should have been utilized to compensate for this; perhaps concentrating only on the Head Start child and using Ames and Ilg's (1962) sample for comparative purposes.

The Mosaic has proven extremely useful in clinical practice not

only in helping to interpret individuality in the normal child and in spotting marked personality deviations, but, even more so, in revealing developmental status. For instance, with older children a grossly immature Mosaic can help explain school failure. It is frequently a clue to overplacement in school. The Mosaic also provides an objective and valuable clue as to the child's developmental level when the question is one of school readiness, especially readiness for kindergarten and first grade. According to Ames and Ilg (1962), distinctions between two-, three-, four-, five-, and six-year-old childrens' Mosaics are easily made, and the Mosaic product can be very helpful in spotting the immature child whose developmental age is below his age in years. They feel that even a beginning worker with the Mosaic can easily make these distinctions.

Before the Lowenfeld Mosaic Test can become a valuable clinical instrument, the questions of reliability, construct and predictive validity will have to be adequately substantiated. This will mean further research and study so that consistent findings will be revealed and presented, although Ames and Ilg (1962) have done a great deal to pave the way. This would then enable the user of this projective measure to have a definite criterion with regard to reliability of the test. Also, there needs to be a specific, well validated, universal scoring

method developed so as to convert the basic design results into meaningful terms for the tester. When the above conditions have been met, the Lowenfeld Mosaic Test will have justly earned an important position in the areas of personality and developmental status analysis.

Discussion

In the testing situation, the Head Start group participated compliantly, with a high degree of interest, and were eager to go with the examiner. The majority of the children, perhaps all but one, seemed at ease in the testing situation. The writer feels that the one child may not have been as comfortable as the other children due to his seemingly apparent lack of verbal comprehension with relation to the directions given which resulted in a lack of understanding of the test situation.

The Head Start children seemed to express satisfaction with their results, which was most often shown through a smile or a nodding gesture. None of the group expressed dissatisfaction with his final achievement. As a group, the Head Start children usually started working immediately with the Mosaic pieces, some reaching for the pieces before the directions were completed. There were a few who

needed the directions repeated before they began. Once the design was well in progress, only three of the individuals of the group tried to alter them. All but six of the Head Start group, out of a total of 20, assigned a title to the completed Mosaic. During the test, four of the children expressed verbally what particular object was being represented. Eleven of the 20 children used no verbal expression during the testing situation.

In considering the completed Mosaics of the Head Start group, some of the design characteristics were as follows: (a) one of the most notable was their simplicity, such as the drop or pile design or the scattering of single pieces on the tray; (b) the majority of the designs (12 out of 20) were without pattern and only five out of 20 utilized well organized Mosaic patterns; (c) the Mosaics showing the most maturity typically comprised relatively few shapes and pieces; and (d) the Mosaics which contained more shapes and pieces were usually of the poorly organized variety.

The Mosaics of the Head Start children contained many colors (half of the Mosaics contained all six), although in several instances the designs contained few colors. The Mosaics having many colors were relatively inferior in respect to what may be called color harmony, as most of their designs were of the drop and pile variety.

In some of the most mature design patterns, numerous colors sometimes appeared but lacked in good effect in symmetrical placement.

Among all of the Head Start children's Mosaics examined, no two were found to be exactly alike or even sufficiently similar to offer difficulty in distinguishing between them, except in the drop or pile type of design. Most of the designs of this group were of the very simple or incoherent Mosaic variety. With increasing chronological age there was usually a trend toward a decrease of incoherent patterns and a slight increase toward more concrete patterns.

There was a tendency for the Head Start children to name the colors of the tiles. One of the children commented that their teacher had taught them the colors. It is the writer's opinion that the great interest placed upon the colors and shapes of the pieces (many children named the shapes also) could be related to the emphasis placed upon them in the classroom situation.

There was occasionally much noise close to the testing area due to its location. The only available place in the school building was a corner in the basement by the stairway. There was a partition which partially closed off the area but children would sometimes climb the

stairs and look over the top of the partition to see what was taking place in the testing area. Occasionally children would pass by on their way to recess or lunch. These disturbances did not seem to disrupt the subjects as they continued with their design displaying only mild interest in what was taking place around them. The writer feels that the occasional noise may be a very common part of these deprived children's background and that they are perhaps accustomed to tuning out extraneous noises. Therefore, the writer believes that the occasional disturbances did not affect the finished products of the subjects.

The Utah State University children as a group were not as enthusiastic as the Head Start children about the task although they participated compliantly and with interest. Some of the children were hesitant to come with the examiner and needed time to build up rapport with her before they would participate. In such cases the examiner would wait until a later date to test the child or else not use him at all. One of the children needed her teacher to come with her before she would participate. This was not found to be present with the Head Start group as they readily came with the examiner and many asked when it would be their turn to go. There seemed to be no great difference in the way the children were asked to go with

the examiner even though one of the Utah State University teachers made it sound as if a game were involved. This did not seem to make the children any more anxious to participate than when a Head Start teacher told her group that this "nice lady" had something for them to do. The response was more forthcoming and enthusiastic from the Head Start children, however.

The examiner spent a few days visiting in the Utah State University Child Development Laboratories before testing the children in order to build rapport with them. No such time was spent with the Head Start children and their first contact with the examiner was when they went with her to the testing area. The majority of the Utah State University children, perhaps all but two, seemed to be at ease in the testing situation. One of these children seemed blocked and had a difficult time making a design. His comments amounted to the fact that if he had a picture or something to copy he could produce an article that would please the examiner. The other child needed her teacher in the room with her and was very hesitant to begin. Another child tested but not utilized for this study as his age was not matched, dumped all of the pieces and walked out of the room after two minutes without verbalizing. These few examples may have interesting implications as the examiner has worked with these children in the Child

Development Laboratory and knows them. The emotional tensions displayed while creating their designs and in their final products could indicate that perhaps they are retarded in a way comparable to the deprived child but in a different facet. Perhaps pressures of an emotional nature are blocking these children.

The Utah State University children seemed to express satisfaction, for the most part, with their results. This was often displayed by a smile or a nodding gesture. None of the group expressed verbal dissatisfaction with his final achievement, although one boy had a difficult time producing anything and kept commenting that he had better work on it longer. Another boy apparently lost interest in his design when there were not enough pieces of the shape he wanted to use and so he terminated his product. As a group, the Utah State University children usually started working immediately with the Mosaic pieces; only a few needed prompting. Only one child needed the directions repeated. Once the design was well in progress only two of the individuals tried to alter them. All but five of the Utah State University group, out of a total of 20, assigned a title to the completed Mosaic. Seven of the children verbally expressed what particular object was being represented while constructing it; six with considerable elaboration, detail, and imagination. Five of the

20 children used no verbal expression during the testing situation, a considerably smaller number than the Head Start group (11).

Some of the design characteristics of the completed Mosaics of the Utah State University group were as follows: (a) the majority of the designs (16 out of 20) utilized pattern and most utilized well organized Mosaic patterns; (b) the Mosaics showing the most maturity typically comprised relatively few shapes and pieces although there was organization to each Mosaic design; (c) the Mosaics which contained more shapes and pieces were usually well organized and not of the drop or pile design or the scattering of single pieces on the tray; and (d) the designs were usually complex and representative of what had been designated.

The Mosaics of the Utah State University children contained many colors (seven out of 20 of the Mosaics contained all six), although in eight instances the designs contained few colors (three or less). Although for the majority of subjects the total product still cannot be classed as good color repeating form, there was considerable matching or contrasting of groups of two colors. Even though the total product may not be impressive as far as color use was concerned, there was evidence of considerable, somewhat effective, interest in and use of color. Partial use of color consistent with form seemed to be present in some instances.

None of the Utah State University children's Mosaics were found to be exactly alike under examination or even sufficiently similar to offer difficulty in distinguishing between them, although two designs, both of "funny old men," resembled each other. There seemed to be no great difference in patterning of the designs with increase of chronological age.

The tendency that was apparent with the Head Start children to name the colors was not present with the Utah State University sample. These children were more likely to mention their favorite color and begin their design with it not mentioning colors again. Shapes were rarely named by the Utah State University group either. It is the writer's opinion that the colors and shapes may be less interesting to this group as they have already become familiar with them and have accepted them. It was interesting to note that when the Utah State University children had finished their designs, the majority had a tendency to start replacing the pieces in the box. This rarely happened with the Head Start children. The writer feels that this may be attributed to the fact that picking up after oneself is stressed in the University nursery school and perhaps in the homes of these children. Another interesting phenomena which occurred happened after a child had finished her product and given it a name. Her mother was wait-

ing for her so she came in to see what her daughter had made. The mother commented on what it looked like to her and as they were leaving the child remarked that she had made Santa Claus and his bag (what her mother had expressed) rather than her original "funny old man." A similar incident happened with one other child. It was interesting to note that these were the only two children whose parent observed their finished design and both of them changed the categorization of their design to comply with their parent's perception of what it was.

Six very imaginative descriptions and background stories were given by the Utah State University children when naming and explaining their designs. This did not occur with the Head Start sample.

The room in which the Utah State University children worked was quiet and enclosed separately from the other rooms in the building. There were no interruptions other than an occasional truck going by outside (there were not windows to look out), sounds of children playing in the nearby outside play yard, and, when one child was in the room, an insect flying around. However, these children, for the most part, seemed very sensitive to any kind of noise and would often stop what they were doing and comment on what they had heard. They seemed to be much more easily distracted

than the Head Start group and there was much less disturbance in their testing room.

Suggestions for Further Studies

Not enough has been done with the Mosaic test and preschool children, particularly disadvantaged children. On the basis of the present investigation it is suggested that the following studies may be beneficial in studying developmental levels of preschool children.

1. Further studies similar to the present one need to be done utilizing a larger Head Start population and comparing it with Ames and Ilg's (1962) sample. In order to obtain more conclusive data, it would be beneficial to center on Head Start children of one age bracket so as to procure a better sampling distribution which would allow more concrete analysis to be conducted.

2. The Mosaic test has shown itself to be a useful instrument for distinguishing ready and nonready prospective kindergarten subjects and for grouping students once they have been accepted for kindergarten. Further studies in this area could be beneficial for predicting school readiness of disadvantaged children.

3. A similar study could be conducted testing each child twice, preferably at a four to six month interval. Relative progress of

development is an important thing to check and this could be one way of doing it.

4. Sex differences in response to the Mosaic have so far appeared to be slight and unreliable. Further studies could be done focusing on such differences.

5. Since there had been a considerable amount of time spent by the disadvantaged children in the Head Start program, a similar study could be conducted testing disadvantaged children at the beginning and at the end of the program (utilizing a control group) to see if there was any significant difference in performance other than that which would be expected due to age change. This may have implications as to the value of a compensatory program.

BIBLIOGRAPHY

Abel, Theodora M., and Rhonda Metraux. 1959. Sex differences in a Negro peasant community, Montserrat, B. W. I. Journal of Projective Techniques 23:127-133.

Adcock, C. J. 1959. In Oscar Buros (Ed.). Fifth Mental Measurements Yearbook. Gryphon Press, Highland Park, N. J.

Ames, Louise B., and Frances Ilg. 1962. Mosaic Patterns of American Children. Harper and Brothers, New York.

Ames, Louise B. 1963. Usefulness of the Lowenfeld Mosaic Test in predicting school readiness in kindergarten and primary school pupils. Journal of Genetic Psychology 103:75-91.

Ames, Louise B., and Judith August. 1966. Comparison of Mosaic response of Negro and white primary-school children. Journal of Genetic Psychology 109:123-129.

Ames, Louise B., and Frances Ilg. 1964. Age changes in children's Mosaic responses from five to ten years. Genetic Psychology Monographs 69:195-245.

Ames, Louise B., Frances L. Ilg, and Judith August. 1964. The Lowenfeld Mosaic Test: norms for five- to ten-year-old American public-school children and comparative study of three groups. Genetic Psychology Monographs 70:57-95.

Ausubel, D. P., and Pearl Ausubel. 1963. Ego development among segregated Negro children, p. 109-141. In A. Harry Passow (Ed.). Education in Depressed Areas. Teachers College, Columbia, University, New York.

Ausubel, D. P. How reversible are the cognitive and motivational effects of cultural deprivation? Implications for teaching the culturally deprived child. Urban Education 1:16-39.

Bloom, B. S. 1964. Stability and change in human characteristics. John Wiley and Sons, New York.

Brody, Claire M. N. A study of the personality of normal and schizophrenic adolescents using two projective tests: a differentiation of the basis of structural and behavioral rigidity using the Lowenfeld Mosaic and Rorscharch Tests. Ph.D. Dissertation. N.Y.U.

Bruner, J. S. 1961. The cognitive consequences of early sensory deprivation, p. 195-207. In Philip Solomon (Ed.). Sensory Deprivation. Harvard University Press, Cambridge, Massachusetts.

Brunner, Catherine. 1967. Preschool experiences for the disadvantaged. The Educationally Retarded and Disadvantaged, The Sixty-Sixth Yearbook of the National Society for the Study of Education 66:144-167.

Carr, Gwen L. 1957-58. Mosaic differences in non-institutionalized retarded children. American Journal of Mental Deficiency 62:908-911.

Colm, Hanna. 1948. The value of projective methods in the psychological examination of children: the Mosaic test in conjunction with the Rorscharch and Ginet tests. Journal of Projective Techniques 12:216-237.

Deutsch, Cynthia P. 1964. Auditory discrimination and learning: social factors. Papers from the Arden House Conference on Preschool Enrichment, Detroit: Merrill-Palmer Institute, July, 1964, p. 282.

Deutsch, M. 1965. Nursery education: The influence of social programing on early development, p. 145-153. In Joe L. Frost and Glenn R. Hawkes (Eds.). The Disadvantaged Child. Houghton Mifflin Company, Boston.

Deutsch, M. 1965. Facilitating development in the preschool child: Social and psychological perspectives, p. 73094. In Fred M. Hechinger (Ed.). Pre-School Education Today. Doubleday and Company, Garden City, New York. 82 p.

Deutsch, M. 1965. What we've learned about disadvantaged children. Nations Schools 75:50-51.

Diamond, Bernard L., and Herbert T. Schmale. 1944. The Mosaic test: and evaluation of its clinical application. American Journal of Orthopsychiatry 14:237-350.

Dorken, H., Jr. 1952. The Mosaic test: review. Journal of Projective Techniques 16:287-296.

Dorken, H., Jr. 1956. The Mosaic test: a second review. Journal of Projective Techniques 20:164-171.

Downing, G., R. W. Edgar, A. J. Harris, L. Kornberg, and H. F. Strom. 1965. The Preparation of Teachers for Schools in Culturally Deprived Neighborhoods (The Bridge Project). Queens College, Flushing, New York.

Foster, Florence P. 1965-66. Premature independence in preschools for the disadvantaged. Young Children 21:143-150.

Frost, J. L. and G. R. Hawkes. 1966. The Disadvantaged Child. Houghton Mifflin Company, Boston.

Gaebler, R. 1965-66. Project Head Start in Chicago: 1965. Journal of School Psychology 4:21-26.

Hanson, J. E. and Katheryn Pemberton. 1965. Day care: a therapeutic milieu. Child Welfare 44:149-155.

Hess, R. D. 1964. Maternal teaching styles and the socialization of educability. Paper prepared for the Symposium of the Socialization of Attitudes toward Learning in Urban Working Class Families, APA Meeting, Los Angeles, September 15, 1964.

Himmelweit, H. Trude, and H. J. Eysench. 1945. An experimental analysis of the Mosaic projection test. British Journal of Medical Psychology 20:238-294.

Hood-Williams, J. 1959. Repeated administration of the Lowenfeld Mosaic Test: an exploratory study. Journal of Social Research 10:37-46.

Horne, E. Porter, and William Bliss. 1955. The effect of set on Mosaic test performance. Journal of General Psychology 53:329-333.

Horne, E. Porter, and L. W. Bova, Jr. 1960. The effect of color on pattern stability in Mosaic productions. Journal of General Psychology 63:229-232.

Hunt, J. M. 1966. The psychological basis for using pre-school enrishment as an antidote for cultural deprivation, p. 25-73. In Fred M. Hechinger (Ed.). Pre-School Education Today. Doubleday and Company, New York.

John, Vera P. and L. S. Goldstein. 1964. The social context of language acquisition. Papers from the Arden House Conference on Pre-School Enrichment, Detroit: Merrill-Palmer Institute, July, 1964, p. 273.

Johnson, T. F. 1957. The function of the Mosaic test in clinical practice. Journal of General Psychology 56:51-58.

Keller, Suzanne. 1963. The social world of the urban slum child: some early findings. American Journal of Orthopsychiatry 33:823-831.

Kerr, Margaret. 1939. The validity of the Mosaic test. American Journal of Orthopsychiatry 9:232-236.

Kilburn, K. 1963. Lowenfeld Mosaic Test: a critical review. Unpublished Psychology 314 paper. Utah State University, Logan, Utah.

Kranz, P. L. 1964. Mosaic designs of children with Down's Syndrome. Masters Thesis. Utah State University.

Levin, M. L. 1956. Validation of the Lowenfeld Mosaic Test. Journal of Consulting Psychology 20:239-248.

Lowenfeld, Margaret. 1949. The Mosaic Test. American Journal of Orthopsychiatry 19:537-550.

Lowenfeld, Margaret. 1954. The Lowenfeld Mosaic Test. Newman Neame Ltd., London.

McCulloch, T. L., and John B. Girdner. 1949. Use of the Lowenfeld Mosaic Test with mental defectives. American Journal of Mental Deficiency 53:486-496.

Maher, Brendan, and Anthony Martin. 1954. Mosaic productions in Cerebro-Artheriosclerosis. Journal of Consulting Psychology 18:40-42.

Office of Economic Opportunity, Head Start child development programs, Washington, D.C.

Pelz, K., Frances Pike, and Louise B. Ames. 1962. A proposed battery of childhood tests for discriminating between different levels of intactness of function in elderly subjects. Journal of Genetic Psychology 100:23-40.

Reiman, M. Gertrude. 1950. The Mosaic Test: its applicability and validity. American Journal of Orthopsychiatry 20:600-615.

Riessman, F. 1962. The Culturally Deprived Child. Harper and Row, New York.

Rioch, Margaret J. 1954. The Mosaic test as a diagnostic technique and as an instrument for illustrating intellectual disorganization. Journal of Projective Techniques 18:89-94.

Robertson, M. H. 1957. Scoring intelligence on the Lowenfeld Mosaic Test. Journal of Consulting Psychology 21:418.

Robinson, Mary Evans. 1959. An investigation of the performance of brain-injured children on certain perceptual tasks. Ph.D. Dissertation, Purdue University.

Shotwell, Anna, and E. S. Lawrence. 1951. Mosaic patterns of institutionalized mental defectives. American Journal of Mental Deficiency 56:161-168.

Stewart, Ursula G., and Lorraine A. Leland. 1952. American versus English Mosaics. Journal of Projective Techniques 16:246-248.

Stewart, Ursula G., and Lorraine A. Leland. 1955. Lowenfeld Mosaics made by first grade children. Journal of Projective Techniques 19:62-66.

Stewart, Ursula G., and Lorraine A. Leland, and Edith Stricter. 1957. Mosaic patterns of Eighth Grade children. Journal of Projective Techniques 21:73-79.

Walker, Richard N. 1957. Children's Mosaic designs: a normative and validating study of the Lowenfeld Mosaic Test. Ph.D. Dissertation, University of Minnesota, Minneapolis.

Wertham, F. 1939. A new sign of organic brain disease. Transactions of the American Neurological Association 65:197.

Woolf, Henrietta, and Elaine Gerson. 1953. Some approaches to the problem of evaluation of mental ability with the Mosaic test. American Journal of Orthopsychiatry 23:732-739.

Zucker, Louise. 1950. The clinical significance of the Mosaic and Rorschach methods. American Journal of Psychotherapy 4:473-487.

Studies Not Available to Writer

Chatterjee, B. B. 1956. An experiment with the Mosaic Test on teachers under training. Educator 10:175-193.

de Carvelho, Lopo. 1953-54. Alguns Resultados da Aplicacao do Teste do Mosaico do Lowenfeld. Crianca Portuguesa 13:263-274.

Flum, Y. 1951-52. L'heker Mirham Nahashlaha mosaika. M. gamot 3:354-371.

Garcia-Vincente, J. 1960. Le Mosaic Lowenfeld Test parmi les noirs de l'Anglola. Revua de Psychologie Appliquee 10:77-91.

Katzenstein, Betti, and Amelia A. Toledo. 1958. Experiencias com o teste de mosaico do Margaret Lowenfeld. Revista de Psicologia Normal Brazil e Patol'ogica 4:95-115.

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