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ABSTRACT

Parents differing along a concreteness-abstractness dimension of conceptual development, as defined by the model of Harvey, Hunt, and Schroder, described their attitudes and practices regarding their children's home play environment. This was done using structured questionnaires. Potential creativity of the 3- and 4-year-old children themselves was measured by indicators of complexity and variety of performance on a laboratory play task. Parents' questionnaire responses were analyzed in terms of the complexity, novelty, autonomy, and exploratiVeness of the home play environment. Parents' levels of conceptual development were than compared on the questionnaire responses and the children's performance scores. The results for fathers showed no significant differences. The results for mothers indicated that more abstract mothers had more positive attitudes toward and were more likely than more concrete mothers to provide complex, novel, autonomous, and explorative play situations for their children. The children of more abstract mothers also showed more complex and varied behavior on the preformance task. These results were unrelated to differences among parents on certain demographic variables--age, income, education, and occupational prestige. The results were discussed in terms of the roles of parental conceptual development and the home play environment in affecting potential creativity. (Author)

PARENTAL CONCEPTUAL SYSTEMS, HOME PLAY ENVIRONMENT, AND POTENTIAL CREATIVITY IN CHILDREN[1]

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Taylor (1964) has identified three main areas around which research on creativity can be organized: Early psychological indicators or predictors that identify people with creative potential, environmental factors such as education and training programs that affect the development of creative potential, and criteria for determining creative products or performance.

The present study investigated the relations among three broadly defined variables that belong to the first two areas and that have been dealt with separately in previous research. These variables are (a) characteristics of parents as these relate to potential creativity in the child, (b) characteristics of the training environment, and (c) characteristics of a person's cognitive or conceptual system, some of which are believed to be indicative of potential creativity.

Along with Lowenfeld (1959) we distinguished between actual and potential creativity. We assumed that cognitive structure and functioning that is complex, flexible, abstract, open to new experience, and integrated as opposed to compartmentalized is a necessary but not sufficient condition for creative performance. In other words, having this kind of cognitive or conceptual system does not mean that the person is or will be creative.

Actual creative production also depends on other personality and situational influences at particular points in time. The kind of conceptual system that one develops through socialization and education, however, is an important determinant of whether one will be creative given that other conditions are optimum. In fact, calling upon previous research in a variety of areas, one could almost argue effectively that a person's conceptual system, as we have outlined it and will define more precisely later, is the most important prerequisite for potential creativity. The literature is still a bit too ragged, however, to defend such a strong thesis adequately. Accordingly, in this study we merely sought further evidence about the relation between two variables that have been proposed as determinants of the child's conceptual development and thus his potential creativity.

Specifically, we investigated the relation between parents' own levels of conceptual development along the dimensions outlined previously and the nature of their children's home play environment in terms of similar dimensions of complexity, flexibility, etc. We then considered the relation of these two variables in turn to some behavioral indicators of more complex conceptual development in the children themselves.

Parents' own level of conceptual development was considered important for two reasons. First, to the extent that it gets expressed in various ways, the parent thereby serves as a direct model for the child's conceptual development. Second, the parents' conceptual development limits and conditions the kind of environment and experiences that they can provide for the child. The child's home play environment, including parents' attitudes and actions regarding it, is important simply because young

children spend the larger part of their waking hours engaging in what we call play; the play environment thus serves not only as a point of interaction between parent and child, but also provides a large set of experiences which help to shape the child's conceptual system.

We hypothesized that parents' whose conceptual systems were more abstract and complex would have positive attitudes toward complex, varied, novel, and explorative play situations and objects and would report that they provided or permitted their child to have such experiences. Parents were not asked to report on these characteristics directly, but were asked about specific play conditions and objects, the investigators then inferred the above characteristics from these reports. We also hypothesized that the children of more complex, abstract parents would show greater conceptual complexity, and presumably potential creativity, as indicated by several behavioral measures obtained from an experimentally controlled play "task". The two hypotheses combined link together the three variables of concern -- parental conceptual systems (PCS), home play environment (HPE), and potential creativity of children.

Parental characteristics and children's play environments in relation to cognitive complexity and creativity have been studied by other researchers (e.g., Getzels & Jackson, 1962; Dreyer & Wells, 1966; Weisberg & Springer, 1961; Greenacre, 1959; Sutton-Smith, 1967). To our knowledge, however, previous work has not empirically studied the relation between PCS and HPE nor the two's relation to behavioral indicators of children's conceptual complexity. We also recognize that the construct potential creativity is an inference on our part and is not demonstrated directly by our measures, at least not

with traditional measures of creativity. But readers who are familiar with the research and theory in creativity will recognize that the characteristics we are dealing with have been attributed to creative people and proposed as essential elements in creative performance.

METHOD

Subjects

Seventy-two 3 and 4 year old children enrolled in a nursery school program at Children's Research Center, University of Illinois participated in the study. There were 119 parents of these children who also participated (some parents were unable to provide data and there were single-parent families).

Measuring Parental Conceptual Systems

Parents' levels of conceptual development were determined using the model and measurement techniques of Harvey, Hunt and Schroder (1961). Both parents were tested simultaneously in the home by one of the investigators; each parent filled out the This-I-Believe (TIB) booklet, in which the respondent gives his open-ended replies to ten concept referents, each of which is preceded by the statement, "This I believe about . . ." The two parents, working simultaneously but independently, were timed by the investigator and given two minutes to state their beliefs about each referent. All but one of the concept referents were those used previously by Harvey et al. (1961). The one exception was "This I believe about student protests".

Briefly, Harvey et al. (1961) proposed four stages of conceptual development that represent nodal points on a continuum of concreteness -- abstractness in one's conceptual structure and functioning. This continuum

incorporates several properties of conceptual structure and function that distinguish more concrete from more abstract individuals (e.g., differentiated-undifferentiated, openness-closedness, compartmentalized-interrelated, centrality-peripherality). Stage I individuals represent the concrete pole of the continuum and tend to be authoritarian, closed-minded, undifferentiated, and compartmentalized in their conceptual functioning. Stage IV persons represent the abstract pole and are highly differentiated, open to input from outside their belief system, yet optimum in centrality and integrated in their conceptual functioning. For more detailed descriptions of the four systems see Harvey et al. (1961) and Harvey (1963).

Each parent was categorized into one of the four systems by each of four judges who independently read the TIB protocols using criteria described by Harvey (1963). Using the reliability criterion of three or all four judges agreeing on a classification, 79 parents were accepted for the data analysis sample.

Describing the Home Play Environment

Two questionnaires given to parents were used for this purpose. One questionnaire, administered to both parents, asked about their opinions and attitudes regarding various play situations, types of toys, rights of children in play, relations among children and parents in play, etc. We tried to formulate questions such that the alternative answers would reflect variation in attitudes towards such characteristics as autonomy of the child, openness to new play experiences, variation of play objects and experiences, and explorative uses of play.

The other questionnaire asked for factual descriptions of the child's

home play. Here too we tried to formulate questions that would reveal such characteristics as complexity, variety, and exploration in play. Since we were asking for fairly straightforward descriptions of the child's play, we reasoned that the parent who was in closest contact with the child most of the time could give us the most reliable information. We therefore gave this second questionnaire only to the mother.

Measuring Behavioral Complexity in the Children

As we noted earlier, other personality and situational factors in addition to cognitive abstractness and potential creativity will affect creative action. For example, experience, knowledge, and attitudes with respect to tasks or materials will also affect what one is able to do with them. In trying to obtain behavioral indicators of the children's potential creativity, we wanted to reduce the influence of such factors. We therefore observed the children's performance on a "play task" that was relatively novel and required only fundamental motor and perceptual skills.

Each child was presented with 54 geometric figures that were cut from two-inch squares of paperboard. The 54 figures were arranged in a 6 x 9 matrix array on a 16 x 24 inch stimulus board that was covered with white felt and bordered with one-half inch wide, half-round molding to produce a picture-frame effect. The six rows of the matrix of figures corresponded to six colors of the cutout figures -- blue, red, orange, purple, black, and green going from top to bottom. The nine columns corresponded to nine shapes that differed in complexity as defined by the number of inflection points in the figure (see Vanderplas and Garvin, 1959). The nine shapes used were 3-point (equilateral triangle), 3-point (obtuse triangle), then 4, 6, 8, 12, 16, 20, and 24 inflection points. The children

were randomly assigned to two groups, in one of which the array of shapes increased in complexity from left to right on the stimulus board. In the other group complexity decreased from left to right.

Each child was brought individually to a quiet testing room and placed in the opening formed by placing two quarter-round tables with their inner arcs opposite one another. On one quarter-round table was the stimulus board with the array of figures. On the opposite table (initially behind the child) was an identical board that was empty. The child was asked to make anything he wanted on the empty response board by taking figures, one at a time, from the stimulus board. Pretesting on non-experimental children showed that a time limit of two minutes for this task allowed most children to use approximately one-fourth to three-fourths, but not all, of the figures; use of all the figures by many children would have invalidated some of our measures.

The special arrangement of tables and boards served two purposes. First, it helped to overcome artifactual position and proximity effects that could have resulted from placing stimulus and response boards beside one another. Second, it required the child to exercise some choice since he had to turn and face each board in order to choose and place figures.

An observer behind a one-way mirror recorded the sequence of choices made by each child. Then a color slide was taken of each child's response board when the task was completed. From these two sources of data several measures of complexity and variety in each child's behavior were derived: (1) Number of different shapes used. This was a score with possible range from zero to 9 indicating how many of the nine columns of figures the child selected from.

(2) Number of different colors used. Similar to (1) except indicating number of rows and a possible range from zero to 6.

(3) Total number of figures used. Possible range of zero to 54.

These three indexes were mainly exploratory, although it was guessed that the conceptually complex child might use more of the figures and more of the columns and rows in choosing figures. Some of the remaining measures can be more easily visualized if one imagines each child having a 6 x 9 matrix of data with entries of 1 or 0 (1 if he used that figure, 0 if he did not).

(4) Relative complexity of choices. This was the sum of the choices of the three lowest complexity figures minus the sum for the three highest.

(5) Mean number of inflection points in figures used. This was a weighted mean obtained by multiplying the number of inflection points in a given type of shape times the number of figures of that shape used, summing over all figures and dividing by total number of figures used.

Measures (4) and (5) are different indexes of basically the same phenomenon -- the degree of complexity of the figures chosen by the child. (4) would be expected to give a sharper differentiation among subjects because it includes only the extreme selections.

(6) Relative variation in choice of color. This measured the degree to which the child distributed his choices over all colors, at one extreme, in contrast to choosing only one color at the other extreme. The actual measure was the standard deviation of the row marginals of the child's data matrix, divided by the mean number of figures used per row (i.e., the coefficient of variation of the row marginals).

(7) Relative variation in choice of shape. This measured the distribution of choices over all shapes. The measure was obtained like that in (6) by finding the coefficient of variation of column marginals.

(8) Combined variation in color and shape. This was similar to (6) and (7) but represented that portion of the total variation in a child's choice pattern that could not be attributed to either color or shape alone. The present measure, therefore, indicated the interaciton of shape and color in the child's data matrix. The actual measure was a coefficient of variation using the square root of the interaction mean square of the child's data matrix, divided by the total mean.

Variables (6), (7) and (8) were all obtained by computing an analysis of variance on each child's data matrix. Coefficients of variation rather than variances or standard deviations were used to eliminate differences in scores due simply to greater number of choices, even though patterns of choices were the same. (E.g., 1, 1, 1, 2, 2, 2, and 2, 2, 2, 4, 4, 4, would have the same coefficient of variation but different standard deviations.) We assumed that potentially creative children would show greater variation in use of color or shape, either directly or in combination. Thus, we hypothesized that the children of more abstract parents would show <u>lower</u> scores on (6) and (7) and higher scores on (8).

(9) Sequential variation in choices. We guessed that conceptual abstractness might be related, not only to final choice patterns, but to the sequences of choices by which final patterns were arrived at. We might guess, for example, that an extremely concretistic child would approach our task in a rigid manner, perhaps by choosing systematically across columns, down rows,

or all of one color first, etc. We developed a crude measure of this possibility by tracing an imaginary line on the child's stimulus board, connecting his choices of figures in the sequence in which he made them. We then simply counted the number of bends or inflection points in this line. The child who follows a systematic pattern across columns or down rows, regardless of his starting point in the matrix, would get a low score. The present measure is probably relatively weak, since one can imagine a sequence of choices that has flexibility disguised within an apparent orderly sequence shown by the measure. We assumed, however, that our scoring procedure would at least separate the extremes of a flexibility-rigidity continuum.

Data Analysis

The four stages of parental conceptual development were compared with answers to the home play environment questionnaires by chi square analyses. These analyses were done separately for fathers' and mothers' stages of conceptual development. We also intended to investigate father-mother combinations of conceptual stages. But there were not enough combinations with sufficiently large N's for statistical analysis.

The four stages of conceptual development, for fathers and mothers separately, were compared on children's performance on the complexity board task by analysis of variance.

On the home play environment questionnaires multiple alternative answers were available to the respondent for most questions. Most of the questions were designed, however, so that one alternative represented autonomy, openness, flexibility, or complexity, etc., whereas all the others were assumed to represent the absence of the characteristic in question.

In treating the data we then collapsed all these other alternatives into one category which we compared to the (in some cases two) alternative(s) representing presence of the characteristic. Using this procedure we hoped to partly eliminate social desirability response sets from parents' answers, since the "desirable" answer was not always so clear. As an example, consider the following question from the opinion questionnaire:

Boys should be discouraged from playing with girls' toys and games.

a. Only when the child is playing by himself or with other boys.
b. Only when the child seems to play with girls' toys to excess or more than he plays with boys' toys.
c. Always
d. Never
e. Only when there is no adult male or father in the household.

On this question we compared the frequency of "Never" responses to the frequency for all others combined.

RESULTS

Fathers' Conceptual Development, Home Play Environment, and Children's Performance

The results for fathers' conceptual development can be easily summarized. The majority of variables from both the HPE questionnaire and the children's performance task revealed no significant differences among the four stages of conceptual development. Considering the number of significance tests that we made, the few cases where measures did show "significant" differences could easily be attributed to sampling variability. The outcome was quite different for mothers, however.

Mothers' Conceptual Development and Home Play Environment

There were 45 mothers whose stage of conceptual development could be reliably classified, who had complete data, and whose children had complete performance data. All subsequent results are based on this sample. Also, none of these mothers were classified as Stage 2 by Harvey's (1963) criteria (the stage where conceptual development is structured around anti-authoritarian, rebellious, yet relatively concretistic positions). In fact, only three fathers were classified as Stage 2. This lack of Stage 2 parents is not readily explained. It might be due to the ties that many of the parents had with academia. Or it might be simply that there are few Stage 2's in a population of married, mostly middle-class people with children. In any case, our results are based on 13, 15, and 17 mothers in Stages 1, 3, and 4 respectively. Our descriptive statistics will show the results for all three stages, but chi square tests were made by pooling the Stage 3 and 4 cases and comparing them to Stage 1. This was done because an inspection of the data showed that Stage 3 cases were very similar to the 4's, and both were quite different from the Stage 1's. This procedure also made it possible to use chi square in some instances where low expected frequencies would have otherwise precluded it. The pooling of 3's and 4's is also consistent with our emphasis on a concreteness-abstractness continuum rather than qualitative differences among stages. Given the absence of Stage 2's, the pooled data gives a sharp contrast between relatively abstract and concrete parents.

Table 1 shows the results for the opinion questionnaire on the home play environment. The results are consistent with our hypothesis that more abstract mothers would have more positive attitudes toward autonomy and flexibility in their children's play in contrast to the more rigid, rule oriented

attitudes of the more concrete Stage 1 mothers. Many of the results are also consistent with Harvey's et al. (1961) concept of a continuum of concreteness-abstractness, in that the percentages for Stage 3 mothers are intermediate to those for Stages 1 and 4. It is also clear that the Stage 3's are more similar to the 4's than they are to the 1's, which is also consistent with the model.

Insert Table 1 about here

As Table 2 shows, the more abstract mothers also reported actual conditions of play in the home which, when considered in total, give a picture of a play environment that is more complex, varied, open to new experience, and autonomous than that found in the homes of Stage 1 mothers. Again, the results for Stage 3 mothers are often intermediate to those for Stages 1 and 4. Although not shown in Table 2, we also found that the mean number of toys owned by the children increased from Stage 1 to Stage 4 parents. Each mother was given nine major categories of toys (e.g., wheel toys, table game toys, etc.) plus a long list of miscellaneous toys. The mother listed under each category the toys presently owned and checked off those on the miscellaneous list. For each child we simply counted the number of toys presently owned. The means for number of toys presently owned were 39.0, 44.3, and 47.3 for Stage 1, 3, and 4 mothers respectively. The differences are not statistically significant, although the Stage 4's are significantly higher than the Stage 1's. The trend, at any rate, is consistent with the rest of the data and with our expectation that more abstract parents would provide a greater number of play experiences

for their children.

Insert Table 2 about here

One result in Table 2 that was somewhat puzzling at first and seemed inconsistent with the results on number of toys was the greater tendency for Stage 1 mothers to report their children having their own record players. This might make sense, however, when we consider that a record player is a more "adult" piece of equipment. And Stage 1 mothers are less likely to allow their children to use adult items. In this case, anyway, the Stage 1 parents seem to be saying to the child, "We have our things and you have yours," whereas the Stage 3 and especially 4 parents are more egalitarian.

In summary, the results for the HPE questionnaires lend support to our hypothesis that conceptually more abstract parents provide their children with play environments that are more complex, varied, autonomous, and open to new experiences. The remaining question is whether the children of more abstract parents behave in a way that can be regarded as more complex and potentially creative.

Mothers' Conceptual Development and Children's Performance on the Complexity Board Task

Table 3 shows the mean performance indexes for the children of Stage 1, 3, and 4 mothers. The three stages differed on all but one of the indexes (number 2) in ways that were consistent with our hypothesis. But only two measures, relative complexity and sequential variation, showed significant differences. Both of these are important, however, showing that the children

of more complex mothers not only completed the task using a more complex set of figures but also arrived at this final set through a more complex and varied choice sequence: Stage 1 through 4 showed an increasing tendency to shift to a different column and row of the stimulus board from choice N to choice N + 1.

Insert Table 3 about here

Demographic Variables and Parental Conceptual Systems

Is parental conceptual development a necessary construct for understanding the differences we have found in attitudes, home play environment, and complexity of children's behavior? Are there perhaps simpler or at least more familiar variables that could explain these differences, variables such as intelligence, educational achievement, socioeconomic class, or age? It might be that our more abstract parents are simply younger, better educated, or more intelligent. As in any ex post facto research, it was impossible to test all the alternative hypotheses. But we did consider some of the more obvious ones.

The Stage 1, 3, and 4 mothers did not differ in age, educational level, income (of husband), or social class (as indicated by husband's level of occupational prestige). Neither did they differ on husband's age or educational level. We also made the same comparisons on Stage 1, 3, and 4 fathers, and again no significant differences were found. Not only were there no significant differences for mothers or fathers, there were not even discernible trends in favor of any group. We did not have parents'

intelligence scores, but since intelligence is probably related to some combination of the above variables, we would not expect the groups to differ in intelligence either. This would be consistent with previous work which indicates that intelligence is not related to the kind of cognitive functioning that is needed for creative production (except in the sense that a minimum amount is needed in order to function at all).

It appears, then, that our original hypothesis regarding conceptual differences along a concreteness-abstractness continuum is still tenable. This is not to say, of course, that other explanatory variables will not be found nor that our model cannot be improved upon. It is merely to say that our hypothesis has been pitted against several plausible alternatives and has not been found wanting.

DISCUSSION

The results indicate that mothers classified as more abstract by Harvey's (1963) criteria were more likely to have positive attitudes toward flexible, autonomous, and complex play experiences for their children and were more likely to report that such experiences are provided in the home. The children of such mothers were more likely to display complex and varied choice behaviors on a performance task.

It is not entirely clear why similar differences were not found for fathers' conceptual systems. One possibility is that three and four year old children are in closer contact with the mother and she has greater responsibility for thinking and making decisions about the child's play. So her attitudes and actions are more likely to result in effects on the child.

We think our results for mothers are consistent with the following broad theoretical statement: Parents who are more abstract in their conceptual structure and functioning are better able to provide their children with play environments that promote in the children thinking and behavior that is potentially creative.

Two critical issues raised by this statement are (a) Does the environment in question need to involve play-related experiences (which leads to an even deeper issue -- what is play and what is non-play)? (b) Is potential creativity really indicated by the kinds of behaviors we observed? The answer to the first question is probably "no", although what we recognize as play settings and experiences are so pervasive in the lives of young children that they almost certainly serve as mediators of conceptual development. Whether the concept of play itself is necessary is an entirely different matter that we cannot deal with here (see Berlyne, 1969). The answer to the second question cannot be definite either. The performance of the children of more abstract mothers on the complexity board task, however, appears to be highly analogous to the kinds of behaviors required in creative production: A high tolerance (if not preference) for incongruous, unusual, novel, and complex elements, and choice and decision patterns that are varied and thus more likely to encounter and deal with critical elements of a problem (Taylor & Holland, 1964). The real answer, of course, is more research using ultimate criteria to see whether such children, given similar situations in which performance is observed, eventually produce in ways that we judge to be more creative.

The general picture that emerges from our questionnaire data is a more egalitarian, less restrictive, and varied play environment in the homes of more abstract mothers. This picture is consistent with that obtained by Getzels and Jackson (1961), Weisberg and Springer (1961), Dreyer and Wells (1966), Maw and Maw (1966) and others that have studied family environments and creativity. The performance results for the children are also consistent with those in similar studies of complexity-simplicity in relation to creativity (Barron, 1953; Taylor and Eisenman, 1964). Such consistency of findings supports our contention that the present relationships involve potential creativity.

Perhaps the most significant result here is that children's potential creativity has been related to an apparently stable personality characteristic of parents; this has not been so clearly established in other studies of home environments and creativity. Parents' conceptual systems probably govern not only their attitudes toward but also their abilities to provide relevant home atmospheres for their children. The upshot is that high and low potential creativity, to the extent they are controlled by early experiences, will tend to "run" in families. And formal education, as it is currently practiced, might be either too late or too powerless to reverse the impact of the early environment on potential creativity.

This study dealt only with certain broad aspects of the early play environment and parental characteristics. There is a need for increased research into the specifics of early play attributes and equipment and parental characteristics that might foster creative potential. Also, we might take a hint from Bronfenbrenner's (1961) review of child-rearing practices

and ask whether there are optimum levels of the kinds of parental characteristics and play attributes suggested by this and other investigations. For example, the child who experiences such attributes in extreme form might indeed show high creative potential. The same child, however, might lack the ability to develop the initiative, sustained motivation, and focussed attention to specific tasks which are often required in order to be creative in many endeavors. Such singularity of purpose might require some of the attributes that are presumably conditioned by the Stage 1, concretistic environment described by Harvey et al. (1961). The answer to these and other problems must await further research.

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Footnotes

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Table 1

Percentage of Mothers Responding to Keyed Alternatives on the Home Play Environment Opinion Questionnaire

Question	Critical Response	N=13 Stage 1	N=15 Stage 3	N=17 Stage 4	Chi Square	p
When should children be allowed to take their toys apart?	Whenever they want to	46.2	53.6	59.0	0.51	N.S.
When should a child watch television?	Whenever he wants to	38.5	60.3	59.0	2.18	N.S.
Children should obey the old rule "to be seen and not heard".	Never	7.7	46.9	59.0	7.95	.01
Boys should be discouraged from playing with girls' toys and games	Never	15.4	53.6	64.9	7.19	.01
Girls should be discouraged from playing with boys' toys and games	Never	15.4	46.9	76.7	8.21	.01
A child should share his toys with other children	Whenever he wants to	46.2	73.7	94.4	6.91	.01
Adults should play with their children	When equally convenient and agreeable to P & C	53.9	73.7	88.5	3.76	.06
Parents should buy their child a toy	Whenever he sincerely desires a toy	23.1	13.3	23.5	< 1	N.S.
Wrestling or rough housing should be done	Only outdoors or in designated areas	61.6	20.1	23.6	7.78	.01

Table 1 Continued

Question	Critical Response	N=13 Stage 1	N=15 Stage 3	N=17 Stage 4	Chi Square	p
How should parents react to a child using toy in wrong way enjoyably?	Stop child and teach correct way	53.9	26.8	23.6	4.16	.05
Children should check with parents before trading their playthings	Completely agree or agree with some exceptions, reservations	84.6	86.7	76.4	< 1	N.S.
Children should be allowed to play anywhere in the house as long as their health, safety not endangered.	Completely agree or agree with some exceptions, reservations	61.6	73.7	76.4	< 1	N.S.
Children's play should mainly be things that teach them useful ideas and skills	Completely agree or agree with some exceptions, reservations	53.9	53.6	52.9	< 1	N.S.
Main purpose of child's play should be to have fun	Completely agree or agree with some exceptions, reservations	84.6	93.4	70.6	< 1	N.S.

Table 2

Percentage of Mothers Responding to Keyed Alternatives on the Home Play Environment Factual Questionnaire

Question	Critical Response	N=13 Stage 1	N=15 Stage 3	N=17 Stage 4	Chi Square	p
Where in the home is your child allowed to play?	Anywhere, anytime throughout house	7.7	26.8	29.5	*	.15
Does child have own record player?	Yes	62.2	46.9	35.4	3.03	.10
Does child sing or dance along with music?	Yes	69.2	100.0	94.4	7.15	.01
Is child allowed to use adult items and equipment in the home?	Yes	61.6	87.1	94.4	5.35	.05
How often does child use non-commercial playthings (cardboard, rope, cans, boards, etc.)?	Occasionally or Frequently	53.9	80.4	88.5	4.67	.05
How often has parent made or helped make playthings for child's use?	Occasionally or Frequently	23.1	53.6	53.1	3.38	.08
Under what conditions are playthings made in the home?	Parent provides only advice, help, instruction	69.3	87.1	94.4	3.22	.08
How often does child use toy or plaything for something for which it was not designed?	Occasionally or Frequently	46.2	53.6	64.9	< 1	N.S

Table 2 Continued

Question	Critical Response	N=13 Stage 1	N=15 Stage 3	N=17 Stage 4	Chi Square	p
On the average, how often do you play with your child?	Once or Several times a day	61.6	80.4	76.7	1.30	N.S.
How often do you teach child new games or different ways to play old ones?	Occasionally or Frequently	77.0	100.0	94.4	*	.07
How often do you play with child according to rules or games devised by him?	Occasionally or Frequently	69.2	93.8	100.0	7.15	.01
On a given occasion of play with child, how long does play session last?	Half an hour or more	23.1	53.6	53.1	3.38	.08

* Probability calculated by Fisher Exact Test

Table 3

Mean Performance Scores of the Children of MOthers

Differing in Conceptual Development

Variable	N=13 Stage 1 Mothers	N=15 Stage 3 Mothers	N=17 Stage 4 Mothers	F	P
(1) Number of Different Shapes Used	6.4	6.8	7.8	1.53	N.S.
(2) Number of Different Colors Used	5.6	4.7	5.1	1.39	N.S.
(3) Total Number of Figures Used	19.7	23.5	27.0	1.24	N.S.
(4) Relative Complexity (no. of 3, 3, 4 pt - No. of 16, 20, 24 pt)	5.7	-2.3	-3.4	4.77	.01
(5) Mean Number of Inflection Points	6.7	9.2	8.2	2.28	.10
(6) Relative Variation in Choice of Color	.38	.24	.16	1.21	N.S.
(7) Relative Variation in Choice of Shape	.38	.42	.27	.55	N.S.
(8) Relative Variation in Color and Shape	.94	1.07	1.27	.24	N.S.
(9) Sequential Variation in Choices	7.3	9.4	13.2	3.82	.04