THE EFFECT OF MODELING ON THE CREATIVE FLUENCY OF IMPULSIVE AND REFLECTIVE KINDERGARTEN CHILDREN

A THESIS

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BY

NANCY ANN PACE BURRIS, B.S.

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CHAPTER I

INTRODUCTION

Purpose of the Study

Research has focused a great amount of attention on the general area of cognitive development in children. But at present, research is quite limited in the specific areas of developing divergent thinking at the kindergarten level and on the relationship of divergent thinking to cognitive tempo. Current teaching practice ranges from a restrictive attitude, e.g., "color neatly inside the lines" to the uninhibiting attitude, e.g., "draw anything you want." Neither of these practices is likely to develop divergent thinking skills. Therefore, the purpose of this study was to determine if modeling will increase divergent thinking at the kindergarten level and if divergent thinking has a relationship to cognitive tempo.

Many authors offer support for the idea that education should include developing creative thinking abilities, that is, divergent thinking skills, in order to equip children to cope with the future.

Torrance (1970), who has made extensive studies in the field of creativity, says that "the various mental

functions, especially those involved in productive thinking, are like skills and thus require opportunity for guided practice in order to develop to any high degree."

> Good teachers have felt their responsibility to contribute to the intellectual development of their pupils, whatever the subject matter. When we look upon the pupil's intellect as being an original collection of distinguishable skills, each with certain properties, we are in a good position to decide what kinds of exercise are needed to develop these skills (Guilford 1960).

Piaget claims, "The principal goal of education is to create men who are capable of doing new things, not simply of repeating what other generations have done--men who are creative, inventive, and discoverers." (Pulaski 1971)

Lowenfeld and Brittain (1970) indicate that:

> Creativity is becoming of vital concern to many people: we need to understand the process involved in developing the creative thinking abilities of children. There is no doubt that this area will be of increasing concern in the future as society turns toward the unknown, and schools will of necessity have to teach not only what is known but also teach toward what we do not know.

Another student of creativity, de Mille (1967), takes a similar position when he says:

> Good judgment, originality, fluency and flexibility of thought, the ability to redefine situations or see their implications--such qualities are prized in human society. In everyday life they reap rewards of wealth, responsibility or prestige. In times of peril, they may determine who will survive and who will not. Teaching these abilities should be a major purpose of education.

Modeling, or offering an example to follow, is one of the most widespread teaching techniques. Bandura and Walters (1964) state that models not only serve to accelerate the learning process, but that "in many languages the word for teach is the same as the word for show, and the synonymity is literal." They distinguish three possible effects of exposure to a model:

> (1) a modeling effect, involving the transmission of precisely imitative response patterns not previously present in the observer's repertory;
> (2) an inhibitory or disinhibitory effect, reflected in an increase or decrease in the frequency, latency, or intensity of previously acquired observer responses that are more or less similar to those exhibited by the model; and
> (3) a possible eliciting effect, in which the observation of a model's responses serves as a cue for "releasing" similar observer responses that are neither entirely novel nor inhibited as a result of prior learning.

Further, Davis, Alexander and Yelon (1974) state, "The student is more likely to acquire a new behavior if he is presented with a model performance to watch and imitate." Thomas (1973) asserts that problem solving and information processing may be taught by modeling.

Torrance (1974) appears to consider creative thinking as one kind of problem solving when he defines creativity as:

> a process of becoming sensitive to problems, deficiencies, gaps in knowledge, missing elements, disharmonies, and so on; identifying the difficulty; searching for solutions, making guesses, or formulating hypotheses about the deficiencies: testing

> and retesting these hypotheses and possibly modifying and retesting them; and finally communicating the results.

He also asserts that problem-solving may be called creative to the extent that the product of the thinking has novelty and value, or is unconventional, or requires high motivation and persistence, or the problem as initially posed was vague and undefined, so that part of the task was to formulate the problem itself.

Guilford (1967a) links creative thinking with divergent production when he describes creative activity in terms of fluent production of items of information, flexibility in items of information and elaboration upon what is given.

> Although creative performance is dependent upon a richly stocked memory store, which in turn depends upon previously achieved cognitions and the fixation and retention of those cognitions, it is more critically dependent upon the operation of divergent production and the product of transformation (Guilford and Hoepfner 1971).

Divergent production can be considered a type of open-ended problem solving and Kagan (1969) suggests that one of the differences in quality of problem solving among children is the degree to which the child reflects over the adequacy of a solution hypothesis.

Reflective and impulsive are dimensions of cognitive tempo. "Children who respond slowly and make relatively few errors are classified as 'reflective,' while those who

respond quickly and make many errors are classified as 'impulsive'" (Sigel, Kirasic and Kilburg 1973).

Wright (1974) suspects that impulsives may be more fluent and expressive than reflectives in divergent thinking tasks. Torrance (1974) seems to suggest that reflectives would prove superior on such tasks.

Consequently, this study was designed to examine whether modeling will increase divergent thinking at the kindergarten level and if divergent thinking has a relationship to cognitive tempo, that is, reflectivity or impulsivity.

Null Hypotheses

A. There will be no significant difference between the creative fluency mean scores of modeled and non-modeled groups.

B. There will be no significant difference between creative fluency mean scores for the impulsive and reflective groups.

C. There will be no significant interaction between modeled/non-modeled and impulsive/reflective variables.

Limitations

1. The available pool of subjects consisted of two intact kindergarten sections.

2. The study was limited to the fluent production aspect of creativity.

3. The acceptable level of significance used was $p < .05$.

Statistical Procedure

Analysis of variance two-way design with unweighted means was done on an IBM 36050 computer using the ST013 program.

CHAPTER II

RELATED RESEARCH

Research on learning through modeling by young children has been conducted in the areas of language and linguistics, aggression, sex-role behavior, values and attitudes (Thomas 1973). This review will be limited to a review of research on the acquisition of various concepts and skills, because acquiring divergent production skills is most closely related to this area of investigation.

Denney (1972a) attempted to extend the principle of observational learning to hypothesis-seeking and constraint-seeking conceptual strategies in boys aged six, eight, and ten years. He found that six-year-olds show no significant change of behavior after viewing the video model, but eight-year-olds, who seem to be in a transitional stage, did show significant changes, which suggests his findings may rest on developmental differences.

In another study using second grade boys it was found that both the conceptual style (analytic versus relational) and cognitive tempo (reflective versus impulsive) were changed after viewing models in matching and sorting

tasks and that these effects generalized to independent tasks (Denney 1972b).

Rosenthal, Alford and Rasp (1972) found second graders were able to perform and then generalize classification tasks after viewing a model and that visual observation produced more results than viewing with low-verbal coding. Rosenthal and Zimmerman (1972a) used models with four types of instruction (implicit, explicit, pattern and mapping) to third graders on value questions. Pure modeling with implicit instructions produced as much increase in the behavior as any other combination, although in later generalizations there were not significant differences between the styles. Rosenthal and Zimmerman (1972b) trained first graders and four-year-olds in multidimensional conservation tasks by use of a model. They also found a nonconserving model reduced initially conserving children's scores.

Alford and Rosenthal (1973) showed both live-modeling and target-product modeling enabled second grade children to acquire a classification concept, then transfer the concept to new materials. Bandura and Kupers (1964) found children more often match the patterns of adult models than peer models.

These research studies support that modeling can teach convergent production in young children.

In the only research located on the effect of modeling on divergent production in children, Zimmerman and Dialessi (1973) report that viewing a video-taped model of high fluency significantly increased fifth graders fluency and flexibility on a parallel verbal task, but that increased model flexibility produced significant decreases in observer fluency and flexibility. They concluded:

> . . . it appears teachers can increase both the number and diversity of creative ideas generated by their children by exposing them to a highly fluent live or simulated model (presented by film or videotape).

Frederickson and Evans (1972) found that quantity models increase quantity response in the ability to formulate hypotheses and quality models increase quality response. Harris and Fisher (1973) report that modeling can increase flexibility in problem-solving. Both of these studies of divergent production were conducted with college students.

Torrance et al. (1967) report an entire program to prevent loss of imaginativeness and creativeness at the kindergarten level, but the teaching methods are not clearly reported. He does state that the experimental group outperformed the control on six of eight measures tested by the Torrance Tests of Creative Thinking, Mother Goose Problem Tests and the Starkweather Tests of Originality. The

experimental group scored higher than the control on the remaining two measures.

Ward (1966) has tested creativity and impulsivity in kindergarten children and reports intercorrelation of divergent thinking procedures in fluency and uniqueness. He also found significant intercorrelations of impulsive latencies during various tests, but the correlations between creativity and impulsivity showed high creative and low I.Q. were highly impulsive; high I.Q. and low creative were highly reflective; but the most reflective were high I.Q. and high creative.

Ault (1973) suggests impulsivity indicates a less mature cognitive strategy in her studies of children in grades one, three and five, but Mann (1973) states that reflective children six to eight years old took significantly longer than impulsives to decide between choice alternatives, but found no significant difference in the quality of the decisions. Sigel, Kirasic and Kilburg (1973) have tested pre-school children on a forced-choice recognition memory task and found reflectives make more correct choices. Perhaps the effects of cognitive tempo on performance may vary according to the type of task. Debus (1970) reports that observation of a reflective model's behavior can increase the latency of response in impulsives.

CHAPTER III

METHOD

Subjects and Experimenters

Two intact kindergarten sections from an elementary school in Denton, Texas were used. The sample consisted of twenty students, seven males and thirteen females, in the morning section and twenty-four students, nine males and fifteen females, in the afternoon section. The classes included Anglo-Americans, Blacks, and Mexican-Americans of both lower and middle socio-economic backgrounds.

The female investigator administered the Kansas Reflection-Impulsivity Scale for Preschoolers (KRISP) Form A (Wright 1971) and the Torrance Test of Creative Thinking (TTCT) Figural Form B (Torrance 1968), and served as the model on the TTCT; a male graduate student assisted with proctoring during the TTCT. The investigator had visited in these classes on previous occasions.

Instruments

The KRISP is an individually administered test designed to identify those children between the ages of three and eight years who are unusually reflective or

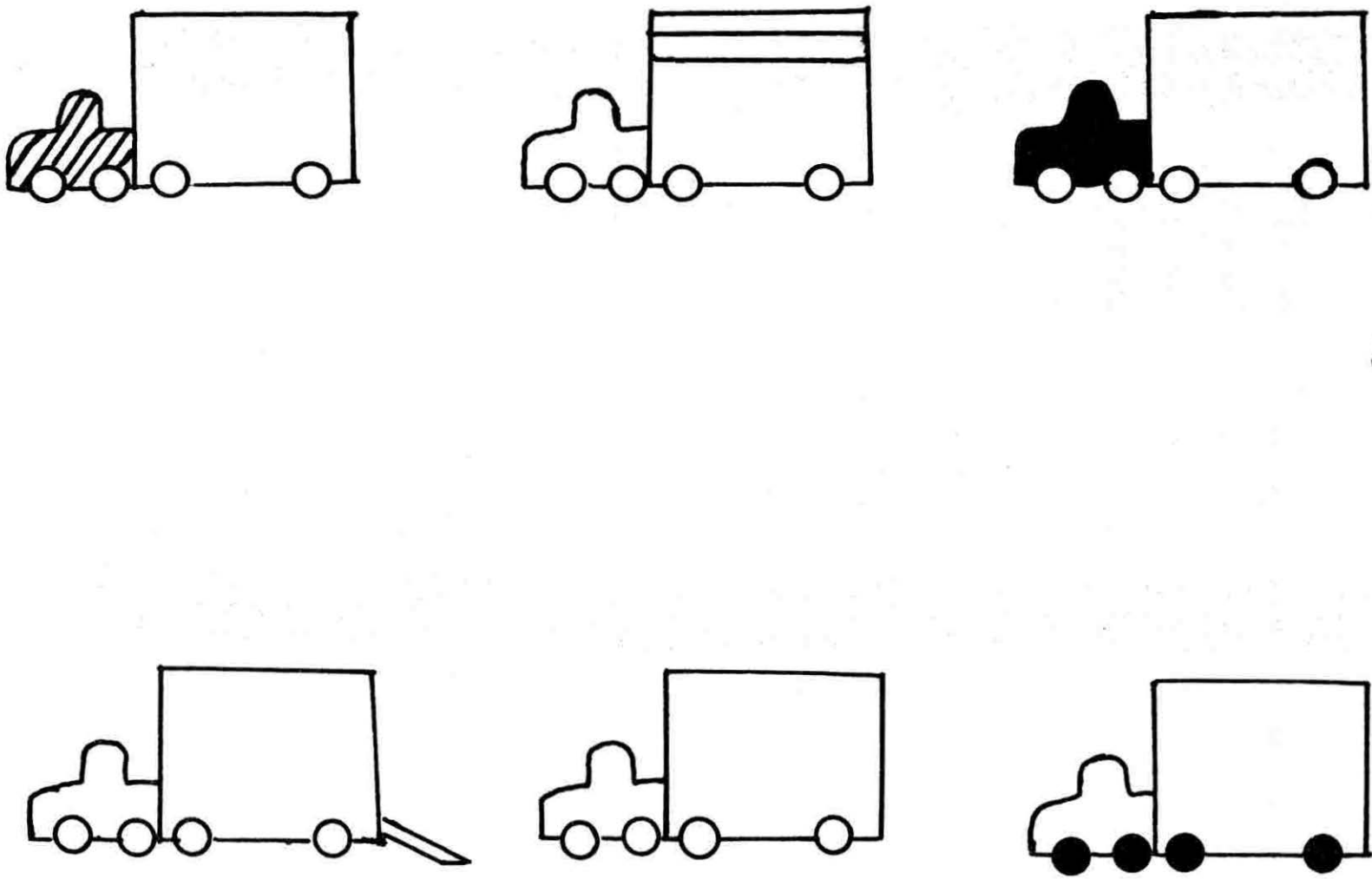
impulsive in their cognitive tempo. This test has been developed by John C. Wright in connection with the Central Midwestern Regional Education Laboratories (CEMREL) and the Kansas Center for Research in Early Childhood Education, University of Kansas. The KRISP is patterned after Jerome Kagan's Matching Familiar Figures test and is designed for use with younger children. The researcher was granted permission to use this test in a personal letter from Dr. Wright dated October 8, 1974.

There are two comparable forms of the KRISP, each consisting of five practice items followed by ten test items. (The practice items for the two forms are identical.) Each item is a match-to-sample problem requiring the child to find in an array of similar figures that one which is an exact copy of the standard stimulus appearing above the array. The child's total errors and mean time to first response on the ten test items are recorded as his score. Figure 1 is a KRISP item.

The negative relationship (Wright undated) of speed and accuracy for most subjects allows the diagnosis of reflective or impulsive, for there appears to be an axis of reflection-impulsivity along which children can be ordered, an axis which accounts for the major portion of speed and accuracy variance on tasks where the two are negatively

FIGURE 1

KRISP ITEM



correlated, less variance when they are uncorrelated and very little variance when they are positively correlated.

The norms are based on administration of the test to more than 800 preschoolers throughout the United States and six foreign countries.

The two equivalent forms of KRISP show fairly good agreement in time and error scores and very good agreements in assignment of children to the four quadrants of the speed-accuracy scatterplots.

Retest reliability is also highly satisfactory, but there is a practice effect which shows up as a sharply reduced error and slightly increased time to respond on the second administration, regardless of which form was used first.

> Over longer intervals (c. one year) girls show high stability of relative scores from age three on. Boys, however, do not appear to stabilize until four or five years of age. By stability, of course, we mean relative standing within a short-term longitudinal sample, since each group shows an age-related trend toward sharply decreasing errors and slightly increasing times (Wright 1974).

The KRISP Form A was administered to each subject individually using a stop watch. Mean time and total errors were computed for each subject. This raw data is converted into standard scores by using the population mean and standard deviation on mean time and errors for children of

the same sex and age. The numerical impulsivity score is calculated by the formula:

$$I = \frac{z_E - z_T}{2}$$

where z_E is the child's errors minus mean errors all divided by SD errors and where z_T is child's time minus mean time all divided by SD time. The resulting I-score ranges from plus 2 to minus 2 such that large positive scores are the most impulsive, large negative scores are the most reflective, and every child has a score.

Scores were then ranked from plus to minus and control and experimental groups were formed on a matched-pair basis. A computational error in the rankings was discovered later, but the statistical analysis of both sets of rankings showed no significant interaction between the independent variable of modeling and non-modeling and the moderating variable of impulsive or reflective.

The Torrance Test of Creative Thinking, Figural Form B (Torrance 1968) was used as the criterion test. The reviews in The Seventh Mental Measurements Yearbook, Volume I (Buros 1972) suggest that the reliability and validity of these tests are suitable for research purposes. The norm group is multi-racial and multi-ethnic and representative of the mid-range of most school populations.

This test included a Picture Construction Activity where the subject created a picture in which a colored paper with an adhesive backing in a jelly-bean shape is an integral part, a ten item Incomplete Figure Activity in which a partial picture was completed by adding lines, and a Repeated Figures Activity of 40 circles where the subject was to create as many different pictures as possible using a circle as an integral part.

Form B was chosen because it tests a wider range of abilities. The Incomplete Figures Activity elicits the creative tendency to bring structure and completeness to whatever is incomplete, while the closed figure circles require the ability to disrupt or destroy an already complete form.

Only the fluency scores (the number of ideas produced) were used in this study.

Testing Procedure

The TTCT were administered to each group on the same day. The testing required approximately forty-five minutes for each group. In the morning section the experimental group was tested first in their usual classroom setting while the control group was on the playground with the teacher. The experimental group was tested first because it included

a child who was not to go outside that day and would have to be in the classroom throughout the testing.

Subjects were given the test booklets with their names already printed on the front page and a sharpened pencil. The usual instructions were read up to the point of opening the booklets. Then the following modeling procedure was used:

> Open the first page of your booklet (Form B), then please put your hands in your lap. (Experimenter held Form A booklet open to the comparable page.) Below is a piece of colored paper. Think of a picture or an object which you can draw with this piece of paper as a part. On the back of these shapes you will find a thin layer of paper that can be peeled away. Look. With this shape I could make an egg, or a basket of eggs, or a hole in a tree where squirrels might live. (Placed shape on page as "egg" was said, then after "tree" is mentioned used a pencil to draw an outline of a tree around the shape. This gave the idea span from no points for originality to five points for the highest type. This was primarily a warm-up activity for the other tests which do score fluency.)
>
> Now you can stick your colored shape wherever you want it to make the picture you have in mind. Stick yours on the next page where you want it and press down on it. Then add lines with your pencil to make your picture. (E added a leaf to a limb.)
>
> Try to think of a picture that no one else will think of. Keep adding new ideas to your first idea to make it tell as interesting and exciting story as you can.
>
> When you have completed your picture, think up a name or title for it. Make your title as clever and unusual as possible. Use it to help you tell your story. (E and assistant wrote down the titles as the pictures were completed.)
>
> Go ahead with your picture, making it different from anyone else's and making it tell as complete and as interesting a story as possible. You will have ten minutes. (A stop watch was used and at the end

of ten minutes time was called and the group asked to turn to page four, Activity 2, then to please place their hands in their laps.)

The modeling procedure used for Activity 2, Picture Completion, was as follows:

(E held Form A open to page four.) By adding lines to the incomplete figures on this and the next page, you can draw some interesting objects or pictures. (E drew a simple bird form.)

Again, try to think of some picture or object that no one else will think of. (E added lines to sketch a car.

These forms covered the idea span for originality from zero to two points, the range on this section.)

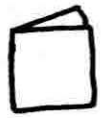
Try to make it tell as complete and as interesting a story as you can by adding to and building up your first idea. Make up an interesting title for each of your drawings and ask one of us to write it at the bottom of each block for you.

All right, go ahead. You will have ten minutes. (The stop watch was begun and at the end of ten minutes time was called. E and assistant added titles to pictures where necessary.)

(The pupils were asked to turn to page six, Activity 3.)

For Activity 3, Circles, the following modeling procedure was used:

(E held up Form A booklet open at page six.) See how many objects or pictures you can make from the circles below on your page and the next page. The circles should be the main part of whatever you make. With pencil add lines to the circles to complete your pictures. (E added lines to the Form A, which uses parallel lines, to make a book.)



You can place marks inside the circles, outside the circles, or both inside and outside the circles--wherever you want to, in order to make your picture. Try to think of things that no one else will think of. (E added lines to the next set to make a crown.

Thus, the idea span from zero to two points in the scoring had been modeled.) Make as many different pictures or objects as you can and put as many ideas as you can in each one. Make them tell as complete and interesting a story as you can. You may ask one of us to write names or titles in the spaces provided.

All right, go ahead. You have ten minutes. (The stop watch was set and after ten minutes time was called, any needed titles were added, and booklets collected.)

The experimental group was taken to the playground by E and the control group (Group I) brought back into the classroom. The child from Group II who remained in the room played quietly in the book corner.

The control group was given the test in accordance with the instructions in the Directions Manual (Torrance 1968).

The same procedures were used with the afternoon section, with the exception that the control group (Group I) was tested first and the experimental group tested afterwards.

These tests were scored by the E in accordance with the Scoring Guide. Reliability was checked using Torrance's

suggestion of rescoring the tests after a lapse of a week. A Pearson product moment correlation coefficient of over 98 percent was computed.

Analysis of Data

The hypotheses presented in an earlier section of this paper were tested statistically by the use of three two-way analyses of variance using the method of unweighted means, on an IBM 36050 computer using the ST013 program with an .05 level of significance.

CHAPTER IV

RESULTS

Three two-way analyses of variance with the method of unweighted means were used to assess the effects of modeling on the creative fluency of impulsive and reflective kindergarteners. Analysis of variance was done for the morning and the afternoon sections separately and for the two sections combined to test these hypotheses:

A. There will be no significant difference between the creative fluency mean scores of modeled and non-modeled groups.

B. There will be no significant difference between creative fluency mean scores for the impulsive and reflective groups.

C. There will be no significant interaction between modeled/non-modeled and impulsive/reflective variables.

In the morning section no significant difference was found in the creative fluency mean scores in modeled or non-modeled groups, nor any significant difference between impulsive and reflective children and no significant interaction between these variables as presented in Table 1. As

TABLE 1

MORNING SECTION

SUMMARY TABLE FOR TWO-DIMENSIONAL ANALYSIS OF VARIANCE

Source of Variation	df	MS	F
A. Modeled/Non-modeled	1	2.1600	0.0312
B. Impulsive/Reflective	1	40.5600	0.5858
AB. Interaction	1	34.5600	0.4992
error within	16	69.2344	

a result of these findings all three null hypotheses for the morning section were accepted.

In the afternoon section a significant difference was found in the creative fluency mean scores between the modeled and non-modeled groups. ($F = 4.3894$, $df = 1,20$ $p < .05$) No significant difference was found between creative fluency mean scores of impulsives and reflectives, nor was there any significant interaction between the two groups as presented in Table 2. Consequently, the null hypothesis A for the afternoon section was rejected, but the null hypotheses B and C were accepted.

TABLE 2

AFTERNOON SECTION

SUMMARY TABLE FOR TWO-DIMENSIONAL ANALYSIS OF VARIANCE

Source of Variation	df	MS	F
A. Modeled/Non-modeled	1	110.1569	4.3894*
B. Impulsive/Reflective	1	5.6471	0.2250
AB. Interaction	1	0.0000	0.0000
error within	20	25.0958	

*$p < .05$

When the two sections were combined for analysis of variance no significant difference was found between modeled and non-modeled group's creative fluency mean scores, nor between impulsive's and reflective's mean scores. No significant interaction was found between the two variables as presented in Table 3: therefore, the null hypotheses for hypotheses A, B, and C were accepted.

TABLE 3

COMBINED SECTIONS

SUMMARY TABLE FOR TWO-DIMENSIONAL ANALYSIS OF VARIANCE

Source of Variation	df	MS	F
A. Modeled/Non-modeled	1	65.4864	1.5299
B. Impulsive/Reflective	1	24.2857	0.5674
AB. Interaction	1	40.6650	0.9501
error within	40	42.8030	

CHAPTER V

INTERPRETATION

In all three sections, morning, afternoon and combined, the creative fluency mean scores for the modeled groups exceed those of the non-modeled groups, but only in the afternoon does this difference reach statistical significance. Table 4 shows mean scores and standard deviations for all the cells in the study.

The norm for kindergarten fluency scores on the TTCT Figural Form B is a mean of 13.6 with a SD of 4.4. The combined section non-modeled group had a comparable score of 13.5, which showed the control group closely matched to the national norm, although the SD of 7.2 for the study group reflects the wide range of scores, 0 to 31.

The mean score of the combined modeled group is 16.09, SD 5.73, which exceeds the norm mean and the non-modeled mean, but does not reach statistical significance.

In the morning group the impulsive cells show a different trend than the rest of the data. In this instance the non-modeled mean score is higher than the modeled. This is probably explained by a 31 score in the non-modeled cell and a score of 0 in the modeled. The

TABLE 4

TORRANCE TEST OF CREATIVE THINKING FIGURAL FORM B
MEAN SCORES AND STANDARD DEVIATIONS

	Modeled	Non-modeled
Morning section		
Impulsives	N = 8 M = 14.25 SD = 7.92	N = 6 M = 16.5 SD = 8.64
Reflectives	N = 2 M = 14.00 SD = 2.83	N = 4 M = 10.25 SD = 9.78
Totals	M = 14.20 SD = 7.05	M = 14.00 SD = 9.15
Afternoon section		
Impulsives	N = 6 M = 18.17 SD = 1.47	N = 4 M = 13.75 SD = 7.37
Reflectives	N = 6 M = 17.17 SD = 5.71	N = 8 M = 12.75 SD = 4.86
Totals	M = 17.67 SD = 4.01	M = 13.08 SD = 5.48
Combined sections		
Impulsives	N = 14 M = 15.93 SD = 6.22	N = 10 M = 15.40 SD = 7.85
Reflectives	N = 8 M = 16.38 SD = 5.15	N = 12 M = 11.92 SD = 6.53
Totals	M = 16.09 SD = 5.73	M = 13.50 SD = 7.20

reflective cells reveal the modeled group mean is 3.75 points higher than the impulsive mean.

The afternoon section records higher mean scores for both the impulsive and reflective modeled groups, each being 4.42 points higher than their respective non-modeled cells, and this is statistically significant.

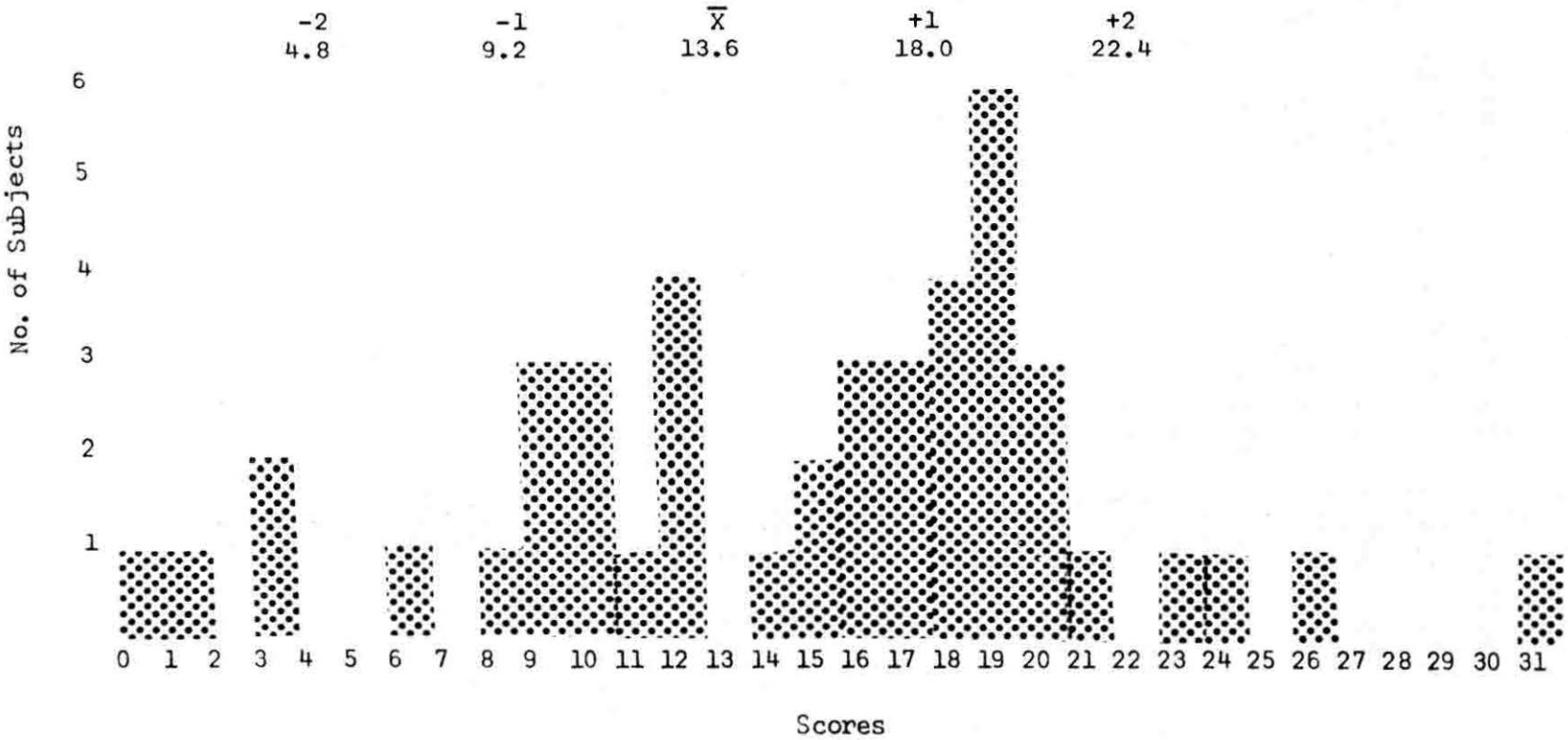
Figure 2 shows a comparison of the combined group and the norm distribution of scores. The group under study has more scores at both the high and low ends than would normally be expected and is negatively skewed.

The highest score in the study was a 31 and apparently it would have been high in Torrance's norm group also. There were three other scores in this study above 22.4, which would be the +2 SD on the norm scale, and all three of these were achieved under modeled conditions.

A factor that may explain the larger than expected numbers of extremely low scores, those below 4, is I.Q., but that factor was not controlled in this study due to the fact that I.Q. and creativity have not shown high correlations in children (Wallach and Kogan 1965) in the normal range of 90-120. However, I.Q. may be an intervening variable in this study since kindergarten students with I.Q. levels which require special classroom treatment are not designated until the end of the kindergarten year in this school district.

FIGURE 2

COMPARISON OF COMBINED SECTION SCORES AND NORM STANDARD DEVIATIONS ON TORRANCE TEST OF CREATIVE THINKING



The difference in median age of the sections is four months, with morning section being the younger. The age differential may be a reason the morning modeled group did not achieve as high a mean as the afternoon, but the developmental patterns in kindergarteners are so varied it would take in-depth studies to determine whether the four months differential between 68.5 months and 72.5 months shows itself in the maturing of divergent thinking skills.

The morning section does show a heavier proportion of impulsives to reflectives, 70 percent/30 percent, when compared to the afternoon section ratio of approximately 40 percent/60 percent for impulsives to reflectives. This suggests maturity may be a factor. KRISP scores are normed by age groups and the older the group the lower the mean time and error scores.

The morning group lost two students who transferred out of the class during the time between the administration of the KRISP and the TTCT. One student was lost from the modeled and one from the non-modeled group, thus the groups remained of equal size, which would not effect the experimental design.

Although the differences in creative fluency mean scores do not reach statistical significance in each instance, the modeled groups, except for the morning impulsive cells, achieved higher scores than the non-modeled. This

trend is substantiated by the statistical significance at the $p < .05$ level found for the afternoon group, which suggests that modeling can foster divergent thinking skills in kindergarten children.

There are no consistent findings for a relationship between creative fluency and impulsivity or reflectivity in this study, although the impulsives in both the morning and afternoon sections have a slightly higher creative fluency mean score. The combined section shows a higher mean score for impulsives in the non-modeled group, but the reflectives score higher in the modeled group and none of these differences are statistically significant. Wright (1974) said,

> Among children I suspect that fluency and expressiveness are more characteristic of impulsives than of reflectives as seen perhaps in divergent thinking tasks such as Guilford's unusual uses or the various creativity measures employed by Getzels and Jackson, Wallach and Kogan, and even Torrance.

Torrance (1974) suggests that the subject usually has to control his tensions and delay gratification of the impulse to closure to avoid completing the incomplete figures the easiest way possible, which implies a reflective response.

This study does not confirm either Wright's or Torrance's expectations. No signification interaction was found between the factor of modeling and non-modeling and the variable of impulsive or reflective. Perhaps, like I.Q., in the normal range, there is no significant correlation between the traits of creativity and impulsive or reflective.

CHAPTER VI

SUMMARY AND CONCLUSION

A model's influence on the creative fluency of 44 children classed as impulsive or reflective by the Kansas Reflection-Impulsivity Scale (KRISP) (Wright 1971) from two intact kindergarten sections was studied in a post-test only experimental design with a control group and experimental group in each section utilizing the Torrance Tests of Creative Thinking Figural Form B as the criterion test. Analysis of variance using a two-way unweighted means method found that modeling increased the creative fluency mean scores in both sections, with a significant ($F = 4.3894$, $df = 1,20$, $p < .05$) difference in one section. No significant difference was found in the creative fluency mean scores of impulsive or reflective kindergarteners, nor was there any significant interaction between the two factors.

This result is rather encouraging from a pedagogical point of view. Although additional research is needed on how to foster divergent thinking at an early age, it appears that modeling can increase the number of ideas generated by children exposed to a live model. It suggests that creative

thinking abilities do appear in the pre-school years, are susceptible to development through educational experiences, and that teachers need to be sensitive to the influence their behavior, or that of other persons in the room, has in determining the creative climate of the classroom.

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