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Creativity and deviant set responding in third grade children

Elizabeth S. Waller

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CREATIVITY AND DEVIANT SET RESPONDING
IN THIRD GRADE CHILDREN

Elizabeth S. Waller

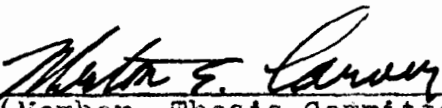
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CREATIVITY AND DEVIANT SET RESPONDING
IN THIRD GRADE CHILDREN

Elizabeth S. Waller

A thesis submitted in partial fulfillment of the requirements
for the degree of Master of Arts in Psychology in
the Graduate School of the University
of Richmond.

October, 1966

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To my parents

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Chapter I

INTRODUCTION

Psychological interest in the area of creativity was becoming evident around 1900 with several interesting studies, (Dearborn, 1898; Kirkpatrick, 1900; Colvin, 1902) which focused on individual differences in imaginative thinking. However, only since World War II and the extensive creativity studies of Guilford and others, have there been significant contributions in the identification and assessment of creative abilities. Although attempts to analyze and describe creative potential in recent years have resulted in better methodological studies, semantical problems still remain in defining adequately the term, "creativity," and in describing the creative personality. The relationship between creativity and intelligence, for example, is a controversial issue which has generated considerable research.

The necessity of creativity or creative ability in adequate personality functioning is a concept which has received recent emphasis. Torrance (1962) stressed the role of creative thinking in coping with problems and suggested that schizophrenics will exhibit excessively low functioning in this area. Hebeisen (1960) found that schizophrenic patients who were considered curable, showed excessive lack of imagination, inflexibility, and banal

thinking when given a battery of creativity tests. A similar view endorsed by Patrick (1955) was that "...overwhelming tension and breakdown result when creativity is stifled."

Emphasis on creative assessment techniques has led to the development of special programs in education and industry to foster and encourage creative potential. The fact that some of the variables involved in creative thinking can be increased significantly has been demonstrated in several educationally oriented studies. Britton found that sixth grade children showed significant gains on several variables, including fluency and flexibility, on the Minnesota Tests of Creative Thinking after four months of instructional creative exercises. Also, Cartledge (1963) reported that first graders benefited from training experiences with the Osborn Principles which included familiarity with addition, subtraction, and reversal concepts.

The idea of creativity as an extremely complex but measurable personality trait suggests that personality assessment devices other than creativity tests, per se, can reflect this variable. That is, the presence of high creative ability can influence a subject's responses on an unstructured personality test where the content effects are minimal. For example, the Perceptual Reaction Test (PRT) developed by Berg, Hunt, and Barnes (1949), has been used as an effective instrument to reflect deviant response sets or the tendency for a subject to respond in a biased manner from the modal group response. Berg (1955) has stated that highly creative people will show deviant response sets on the PRT; that is, the responses of creative

people will reveal a pattern which is different from that of a non-creative group. It will be of interest to determine if highly creative children tend to give deviant responses on the PRT.

Statement of the Problem- This study will be an investigation of the relationship between test scores of creativity, according to the Minnesota Tests of Creative Thinking (Torrance, 1960), and teacher ratings of creativity for third grade children. The hypothesis that highly creative individuals tend to give deviant response patterns on the PRT will also be tested.

Review of the Literature: Creativity Assessment in Children

Kirkpatrick (1900) used ink blots to study creativity and reported that children in the first three grades were more imaginative than those in grades four through six. Colvin's (1902) method of composition writing was also employed with the elementary school child and emphasized sense of humor, imagination, and perceptiveness. During the 1920's, drawings and ink blots provided most of the assessment data for young children. For example, Simpson (1922) used sets of dots arranged in squares as visual stimuli for drawings and scored responses for fluency, originality, and flexibility.

Observational methods provided another measure for assessing creative potential. Observational data from the creative play of children aged two to six reported by Andrews (1930) included the following types:

imitation, experimentation, transformation of objects, transformation of animals, acts of sympathy, dramatizations, imaginary playmates, fanciful explanations, fantastic stories, new

uses of stories, constructions, new games, extensions of language, appropriate quotations, leadership with plan, and aesthetic appreciation.

Markey (1935) also employed observational methods in a variety of game situations and tasks and concluded that no one test situation was a valid indication of a child's total creative ability. Andrews (1930) and Markey (1935) also reported low correlations between creativity and IQ measures, but McDowell and Howe (1941) reported finding a significant correlation between IQ scores and the degree of creative play with different materials, such as paints and blocks, in children two to four.

Grippen (1935) investigated artistic imagination in children three to seven by using their paintings and verbal expressions during this activity. Harmes' (1939) study of creativity in grades one through twelve involved the representation of words or actions by straight lines. Cook (1964) used the Lowenfeld Mosaic Test to distinguish creative and non-creative first, second, and third grade children. In previously cited studies (Cartledge, 1963; Britton) attempts were made to develop creative potential as measured by the Minnesota Tests of Creative Thinking.

While these early studies emphasized ink blots, drawings, and observational data as frequently used methods of creativity assessment in children, many of the variables investigated, such as imagination and originality are considered important today in understanding creativity. An interest in investigating the complex relationship between IQ measures and creativity data is also apparent in early creativity research.

Inconsistent results continue to be reported in the literature with regard to the IQ-creativity relationship. Torrance,

whose extensive studies with the Minnesota Tests of Creative Thinking will be discussed later, has insisted that IQ and creativity are not highly related at the elementary school level. Although he reported that IQ-creativity correlations differ according to grade and are usually higher for girls, most correlations are around .30 (Torrance, 1960, p. 218). In contrast, Wodtke (1964, p. 405) found that the Minnesota verbal test scores for fourth and fifth graders were significantly correlated (.27-.52) with Lorge-Thorndike IQ measures.

Creativity Assessment with Adolescents and Adults

When Dearborn (1898) used ink blots to study imagination in Harvard students and faculty, he reported that two "intellectual" students had poor "creativity" responses. Chassell (1916) at Northwestern University studied originality with a battery of tests which included Word Building, Analogies, Code Tests, and Novel Consequences. Boraas' (1922) list of creativity assessment methods emphasized verbal tasks which included Forming Rhymes, Sentence Completion, and Word Building activities.

Hargreaves (1927) studied fluency and originality using Ink Blots, Unfinished Pictures, Unfinished Stories, and Probable Situations. A different method was employed by Meier and McCloy (1939) who focused their creativity studies on art interpretation and appraisal in assessing imaginative ability.

Welch (1945) used verbal and non-verbal tasks which required the formulation of new combinations of lines or words from given stimuli. He found that non-verbal creativity test scores differentiated college students from art majors.

Barron (1958) at the University of California used the Barron-Welsh Figure Preference Test to differentiate creative and non-creative individuals. He found that the creatives preferred the asymmetrical, complex, chaotic designs, while the uncreatives preferred the simple, balanced, symmetrical designs.

The Remote Associates Test (RAT), developed by Mednick(1962), has been used to assess verbal creativity based on the theory of association. The RAT has predicted judged creativity in psychology graduate students and in architectural design students, but has shown limited predictive value with other groups.

Other devices have included Flanagan's (1958) multiple-choice creativity tests and Buckhart's (1961) Divergent Questions Test in which the subject asks questions about common objects. Thus, early studies of creativity with adults and adolescents stressed verbal methods and techniques.

More recently, however, Guilford's battery of verbal and non-verbal creativity tests, developed in the early fifties, has been most influential in the area of creativity assessment. In 1950, Guilford offered the following hypotheses as major components involved in creative thinking: sensitivity to problems, fluency, flexibility, ideational novelty(originality), ability to synthesize and to analyze, reorganization, and evaluation. He also commented on the possible significance of the "...span of ideational structure" concerning the degree of complexity an individual is able to handle or the number of interrelated ideas or relationships he can manipulate to succeed in a problem solving or creative activity.(Guilford, 1950, p. 454.)

Subsequently, Guilford developed forty-four tests, several measuring each hypothesized dimension or variable, and gave them to Air Force personnel.. Submitting these results to factor analysis, he found essentially that the tests did measure these concepts. These factors were also found to be significant in a study of artistic creativity by Lowenfeld (1958).

While Guilford (1957) has stressed fluency, flexibility, and originality as main dimensions involved in creative thinking, he has also emphasized the role of perceptual, motivational, and other unknown elements which contribute to the many varied patterns of creative behavior, through their interaction.

Getzels & Jackson (1958) at the University of Chicago, did a study with students in grades six through twelve in which they adapted four of Guilford's tests (Word Association, Uses for Things, Hidden Shapes, Fables) and employed one of their own, Make Up Problems. They investigated the relationship between IQ (Binet scores) and creativity by selecting two groups, matched for age and sex; one group consisted of those who ranked in the top 20% on creativity tests but scored lower than the top 20% on the IQ tests. The second group consisted of those who scored low on the creativity tests but scored in the top 20% on the IQ tests. Students with scores falling in both categories were eliminated from further investigation. Getzels & Jackson reported a difference of 23 points between the means of the high IQ and the high creative groups; they also found that the high IQ students were rated as more desirable by teachers.

The Minnesota Tests of Creative Thinking, developed by Torrance (1960) at the University of Minnesota, constitute

another battery of verbal and non-verbal tests adapted from Guilford's 1951 battery and were designed to assess creativity from the kindergarten through the graduate school level. Many verbal tasks were revised from Guilford's tests to be more appropriate with young children; other tasks were developed on the basis of reported subjective experiences of eminently creative individuals. However, unlike Guilford who attempted to construct "pure-factor" tests (Taylor, 1959), Torrance emphasized the idea that several creativity factors were engaged for each task.

The verbal battery, Form VA, which will be used in the present study, consists of six tasks which yield total fluency, flexibility, and originality scores. (Other factors assessed by these tasks will not be considered). Yamamoto (1964, p. 9-10), who has worked with Torrance in devising scoring techniques for the Minnesota Tests, has defined these three variables as follows: fluency-a measure of the number of non-repetitious ideas given by a subject; flexibility-a measure of the number of runs of ideas given by a subject which belong to inclusive categories, operations, or principles; and originality- a measure of the statistically infrequent response according to an appropriate sample population.

Descriptive reliability data for the Minnesota Tests are presented in the Appendix, Tables II-VI. The verbal battery is presented with the following directions:

I. Ask and Guess Tasks- The subject is shown a colored slide depicting a Mother Goose nursery rhyme (Ding Dong Bell)

and is instructed to a) ask questions about the picture which cannot be answered by looking at the picture, b) to make guesses about possible causes for the action in the picture, and c) to make guesses about possible consequences as a result of the action in the picture. Each of these three subtests measures the variables, flexibility and fluency.

II. Product Improvement- The subject is shown a colored slide of a dog and is asked to list the cleverest, most interesting, and most unusual ways to change the toy dog to make him more fun to play with. The variables measured are fluency, flexibility, and originality.

III. Unusual Uses- The subject is shown the same slide of the dog as before and is asked to list the cleverest, most interesting, and most unusual uses he can think of for this toy dog other than as a plaything. The measured variables are flexibility, fluency, and originality.

IV. Consequences- The subject is asked to list as many consequences as he can for each of three given improbable situations. This test measures fluency and flexibility.

Validation studies of the Minnesota Tests of Creative Thinking present promising results. The Bureau of Educational Research (1962), directed by Torrance at the University of Minnesota, found that industrial design students at Stout State College who were rated as creative and non-creative by their college faculty had significantly different total score means in favor of the creative group at the .05 level of significance for the following tests: Ask and Guess, Product Improvement, Unusual Uses, and two non-verbal tasks.

Another study conducted by the Bureau (1962) involved observations of group behavior of elementary school children. They found that those who gave the most explanations and demonstrations with scientific toys scored highest on creativity tests which included: Ask and Guess, Product Improvement, Consequences, and Unusual Uses.

Peer nominations among high school students revealed that responses to questions designed to tap the factors of fluency, flexibility, and inventiveness (originality) correlated highly and significantly with creativity tests which assessed these three factors.

At the elementary school level, third grade girls who scored highest on the creativity tests frequently received peer ratings for having "good ideas," while boys were rated as having silly or naughty ideas. In the fourth and fifth grades, both boys and girls who tested "creative" received only a moderate number of high ratings; however, at the sixth grade level, those chosen most often by peers as having "good ideas" got the highest scores.

Other validation studies employed teacher nominations at the elementary school level. Yamamoto (1964) conducted a study in which 569 fifth graders were divided into two groups by 19 teachers who rated them on fluency, flexibility, originality, and other variables. The creativity tests administered were Ask and Guess and the Test of Imagination (Product Improvement and Unusual Uses). He found that fluency successfully differentiated the children into two groups ($p < .001$) and that flexibility and originality were also significant ($p < .05$).

In a second study, Yamamoto (1964) used 825 fifth graders as subjects who were rated by 30 teachers on the above three creativity variables (and others) and divided into High, Low, and Non-Nominated groups. When these ratings were compared with scores on the Ask and Guess Test and the Test of Imagination all three variables were significantly related to the criterion ($p < .001$).

Torrance did a series of studies which emphasized the lack of relationship between creativity and IQ measures and thus, gave indirect validity for the Minnesota Tests in assessing creativity. He made eight partial replications of Getzels & Jackson's study (1958) using five samples from elementary school, one from high school, and two from graduate school. For all the samples except one at the elementary school level, Torrance administered a creativity test battery, Form DX, which consisted of Product Improvement, Unusual Uses (dog, tin can), Circles, and Ask and Guess tasks. For the other sample, earlier tests from the 1958 battery were used.

The different IQ measures employed were the Stanford-Binet, The Otis-Quick -Scoring Mental Ability Test, the Kuhlmann-Anderson, the California Test of Mental Maturity, the Lorge-Thorndike (Verbal) and the Miller Analogies Test. The Iowa Basic Skills Tests and other appropriate achievement tests at the graduate school level were also employed.

For each sample, Torrance divided the subjects into two groups which consisted of those who ranked in the top 20% on creativity tests but not on the IQ or achievement tests, and vice-versa. For each sample he found a difference in group

means which was significant ($p < .001$). Torrance further commented that for most groups, 70% of the creatives would have been missed if a "gifted" group had been selected only on the basis of IQ.

In light of the present validation research undertaken with the Minnesota Tests of Creative Thinking in elementary, high school, and college populations, peer and teacher nominations have been used most often as criterion measures. While this survey presents only a few scattered validity studies, the results appear favorable for the Minnesota Tests at this time; however, further research concerning test validity is necessary in order to adequately reveal the true merit of these tests.

Review of the Literature: Teacher Ratings of Creativity

Although teacher ratings reported in this study tend to agree with many subtest scores on the Minnesota Tests of Creative Thinking, especially for grades four through six, there have generally been reported in the literature, many inconsistencies between subjective assessments of creativity and assessment by more objective methods. Torrance (1962) and Getzels & Jackson (1958) have declared as one influential factor for this lack of agreement, the fact that the highly creative child is less desirable in the classroom than the highly intelligent child.

Review of the Literature: Response Sets

A third method utilized in the present study to investigate creative personality in children involved the hypothesis

that response sets are dynamic personality factors which may be related to creativity. The concept of response set as an influential factor in certain types of behavior has been emphasized in psychological research since Cronbach's (1946) development of the term. Under certain test conditions, an individual's responses do not follow the normally expected pattern dictated by probability, but appear to be influenced by the individual's own idiosyncratic test-taking behavior or his individual response bias or set. These response sets, which Cronbach described as stable personality tendencies, are most influential in unstructured test situations and therefore operate most freely when content level is reduced.

Recent attention has focused on acquiescent response set or the tendency to agree in a test situation, regardless of the item content involved. Couch & Keniston (1960) developed an Over-All Agreement Score (OAS) to measure agreeing tendency and concluded that "stimulus acceptors" could be distinguished from "stimulus rejectors." In other efforts to relate response set to personality measures, Gage (1957) and Jackson (1958) have declared that acquiescence is related to authoritarianism; however, this view is not supported by the above cited authors.

Foster & Grigg (1963) found that acquiescent response scores from three different measures failed to correlate with acquiescent behavior in conformity and compliance situations. McGee (1962) has also emphasized the lack of studies to relate acquiescent response set with a behavioral criterion. Negative response bias or the tendency to disagree with items, was found

to be related to rigidity (Adams, 1962) and to tendencies toward maladjustment (Asch, 1958).

Edwards (1960) has cited evidence for the reliability of a social desirability response set which has characteristically been found to be an extremely prevalent factor on all personality assessment tests.

Certainly the most interesting and perhaps meaningful studies involving response set in personality assessment have been in connection with deviant set responding. Much research in this area has been inspired by Berg's Deviation Hypothesis or Deviant Set Hypothesis:

Deviant response patterns tend to be general; hence, those deviant behavior patterns which are significant for abnormality and thus regarded as symptoms, are associated with other deviant response patterns which are in non-critical areas of behavior and which are not regarded as symptoms of psychological aberration.
(Berg, 1955, p.62)

Berg has stated that individuals displaying deviant response patterns, or the tendency to deviate from the established response bias of a given group, may exhibit these deviant response patterns in non-critical as well as in critical areas of behavior. Also he emphasized the unimportance of item content as deviant response patterns can be obtained from sensory stimuli in different modalities. (Berg, 1959).

Although the above Hypothesis has received sharp criticism from Sechrist & Jackson (1962) concerning the generality of deviant response sets, and from Norman (1963) concerning the lack of importance Berg attaches to test item content, this Hypothesis has been supported by a variety of studies (Barnes, 1955; Hesterly & Berg, 1958; Grigg & Thorpe, 1960).

The Perceptual Reaction Test (PRT) was developed by Berg, Hunt, & Barnes (1949) as an instrument for measuring deviant response sets. The test consists of 60 geometrical designs in red, white, and black, and the subject is instructed to indicate his preference for each design by marking one of four options: Like Much, Like Little, Dislike Little, Dislike Much.

Although Berg (1955) has stated that highly creative people will show deviant set responses on the PRT, little research has been done in connection with creativity and deviant set responding. The purpose of the present study is to investigate the relationship among the Minnesota Tests of Creative Thinking, teacher ratings, and the PRT deviant response sets in creativity assessment.

The following Null Hypotheses will be considered at the .05 level of significance:

1. The selection of creative third grade children by teacher ratings will not differ significantly from selections made by the verbal battery of the Minnesota Tests: a) teacher ratings for creative and non-creative boys will agree with fluency, flexibility, and originality test scores, b) teacher ratings for creative and non-creative girls will agree with fluency, flexibility, and originality test scores.
2. There is no significant relationship between deviant response scores on the PRT and each of the following Minnesota Test scores: a) fluency, b) flexibility, and c) originality.

Chapter II

PROCEDURE

Subjects The subjects in the study were 37 third grade children, 18 boys and 19 girls, from Collegiate, a private school in Richmond, Va. The third grade was chosen because, according to Torrance (1962), there is a significantly greater peak in the developmental growth curve for creativity in the elementary school child at this grade level for both boys and girls. Beginning with the fourth grade and continuing through the fifth, there is a decline in creative growth; there is, however, another rise at the sixth grade level which approaches but does not surpass the earlier third grade peak.

One of the two third grade classes contained children who had been together for two years and been previously rated as being above average in at least one of the following categories: maturity, motivation, creativity, and academic work. The other class was randomly chosen from the remaining 4 third grade classes.

Teacher Ratings The teachers from the two third grade classes were interviewed and given instructions for selecting high and low creative children. Each teacher classified each of her children into one of three following categories: "very creative," "not very creative," or "borderline" (indicating no commitment by the teacher). For the children labeled creative, the teachers

were asked to give the reason which influenced their decision. Table I in the Appendix shows that most of the children were rated as creative on several abilities. Thus, in interviewing the teachers, no specific criteria or definition of creativity was presented and no specified number of children was requested. All "borderline" ratings given by the teachers were discarded; when the ratings from the two teachers for "very creative" and "not very creative" children were combined for the boys and for the girls, separately, there were four groups of seven children each. These four groups, totaling 28 subjects, were used in the first part of this study in the investigation of the relationship between teacher ratings, sex of the child, and creativity test scores.

Both teachers were, in the author's opinion, adequately sophisticated in their approach to the task, as well as very cooperative in supplying the information. They both also endorsed the attitude held by Torrance that creativity and intelligence are not necessarily synonymous terms.

Test Battery The verbal battery, Form VA, of the Minnesota Tests of Creative Thinking developed by Torrance (1960) was given the 28 children to assess total fluency, flexibility, and originality scores. Other variables measured by these verbal tasks were not considered.

Although the verbal battery was designed to measure verbal creativity as differentiated from non-verbal creativity, all of the subjects rated creative were not rated verbally creative; in fact, 50% of the children were rated as non-verbally creative.

However, because there were so few of the creative subjects rated verbally creative by the teachers, and because lack of time restricted the classes being given the non-verbal tasks, all the subjects labeled creative, regardless of the reason given, were used in comparing test scores with teacher ratings. This grouping was further justified by the high interscale correlations found among the verbal and non-verbal tests in the Minnesota battery (Yamamoto, 1964).

The Minnesota Tests were administered to each class, separately, as a group, and took about $1\frac{1}{2}$ hours. The scoring procedure, outlined by Yamamoto at Kent State University (1964) was used in this study.

The PRT The second major part of the present study employed 37 subjects and dealt with the relationship between PRT deviant scores and creativity test scores; comparisons were also made between PRT deviant scores and teacher ratings. The PRT was administered as a group test, separately, for the two classes and took about 15 minutes. This test was given two days after the verbal battery for each group.

Since the key for determining deviant responses for third grade children was unavailable to the author, a key based on a smaller population was employed by combining the present sample of PRT responses with a sample of PRT responses obtained by the author last year from 32 third grade girls at another private school in Richmond, Va. Thus, the key contained twice as many female as male responses; however, the author knows of no evidence to suggest that PRT responses of third graders are biased

by sex. Therefore, the key for determining deviant responses on the PRT was based on the responses of the 69 children in the two samples.

Each of the 60 items on the PRT was analyzed to ascertain the percent of subjects who responded to each of the four given options; a fifth option was constituted by items left blank or scored twice. A cut-off point of 16% (Grigg & Thorpe, 1960) or ≤ 11 responses classified one or more options for each item as deviant for the sample; one point was assigned for each deviant response. In this manner deviant response sets were tallied for all subjects.

Chapter III

RESULTS

A $2 \times 2 \times 3$ repeated measures factorial design was used to analyze the data involving the relationship among sex and two methods of creativity assessment. Factor A was teacher ratings, (high vs. low), Factor B was sex (male vs.. female), and Factor C was test scores (fluency, flexibility, originality) on The Minnesota Tests of Creative Thinking. Each cell contained 7 observations and all tests were conducted at the .05 level of significance.

Table I presents the analysis of variance summary data showing the main effects of sex, teacher ratings, test scores, and their interaction effects. Although the F values for Factor C (test scores) and for AB (ratings by sex) interaction were both significant ($p < .01$), these findings will not be further interpreted due to the F value of ABC (ratings by sex by test scores) interaction which was significant ($p < .05$).

Table II presents the analysis of variance summary data for the simple effects of AB (ratings by sex) interaction at the 3 levels of Factor C (test scores). Interaction Factor AB (ratings by sex) at level c_1 (verbal fluency) was significant ($p < .01$). Interaction Factor AB (ratings by sex) at level c_3 (verbal originality) was also significant ($p < .05$).

Table I

Summary of Analysis of Variance for Teacher Ratings,
Sex, and Creativity Test Scores

Source	SS	df	MS	F
<u>Between Subjects</u>		<u>27</u>		
A (Ratings)	352.0	1	352.0	1.35
B (Sex)	355.5	1	355.5	2.14
AB	2304.5	1	2304.5	8.86**
Error	6240.0	24	260.0	
<u>Within Subjects</u>		<u>56</u>		
C (Test Scores)	4154.0	2	2077.00	60.38**
AC	17.0	2	8.50	.25
BC	93.5	2	46.75	1.35
ABC	249.5	2	124.75	3.62*
Error	1649.0	48	34.40	

**F_{.99}(1, 24) = 7.82
*F_{.95}(1, 24) = 4.26

**F_{.99}(2, 48) = 5.18
*F_{.95}(2, 48) = 3.23

Table II

Analysis of Variance for Simple Effects for Sex
and Teacher Ratings (AB) at Creativity
Test Scores (C)

Source	SS	df	MS	F
Factor AB (Sex by Ratings)				
for level c_1 (Fluency)	1545.15	1	1545.15	14.09**
for level c_2 (Flexibility)	289.27	1	289.27	2.64
for level c_3 (Originality)	720.14	1	720.14	6.57*
Error		24	109.60	

**F_{.99}(1, 24) = 7.82

*F_{.95}(1, 24) = 4.26

Figure 1 shows the profiles of creativity mean test scores for the creative and uncreative groups of both sexes.

A Duncan test shows that for AB (ratings by sex) at level c_1 (verbal fluency), the mean scores for the "uncreative girls" differed significantly ($p < .05$) from the other mean scores. Another Duncan shows that for AB (ratings by sex) at level c_3 (verbal originality), the mean score for the "uncreative girls" differed significantly ($p < .05$) from the other mean scores with the exception of the mean score of the "creative boys."

Table III presents the Pearson r correlation coefficients between PRT deviant response scores and each of the 3 creativity scores, fluency, flexibility, and originality. None of the correlations was significant. A biserial correlation coefficient of $-.324$ between the PRT deviant response scores and teacher ratings of creativity also failed to be significant.

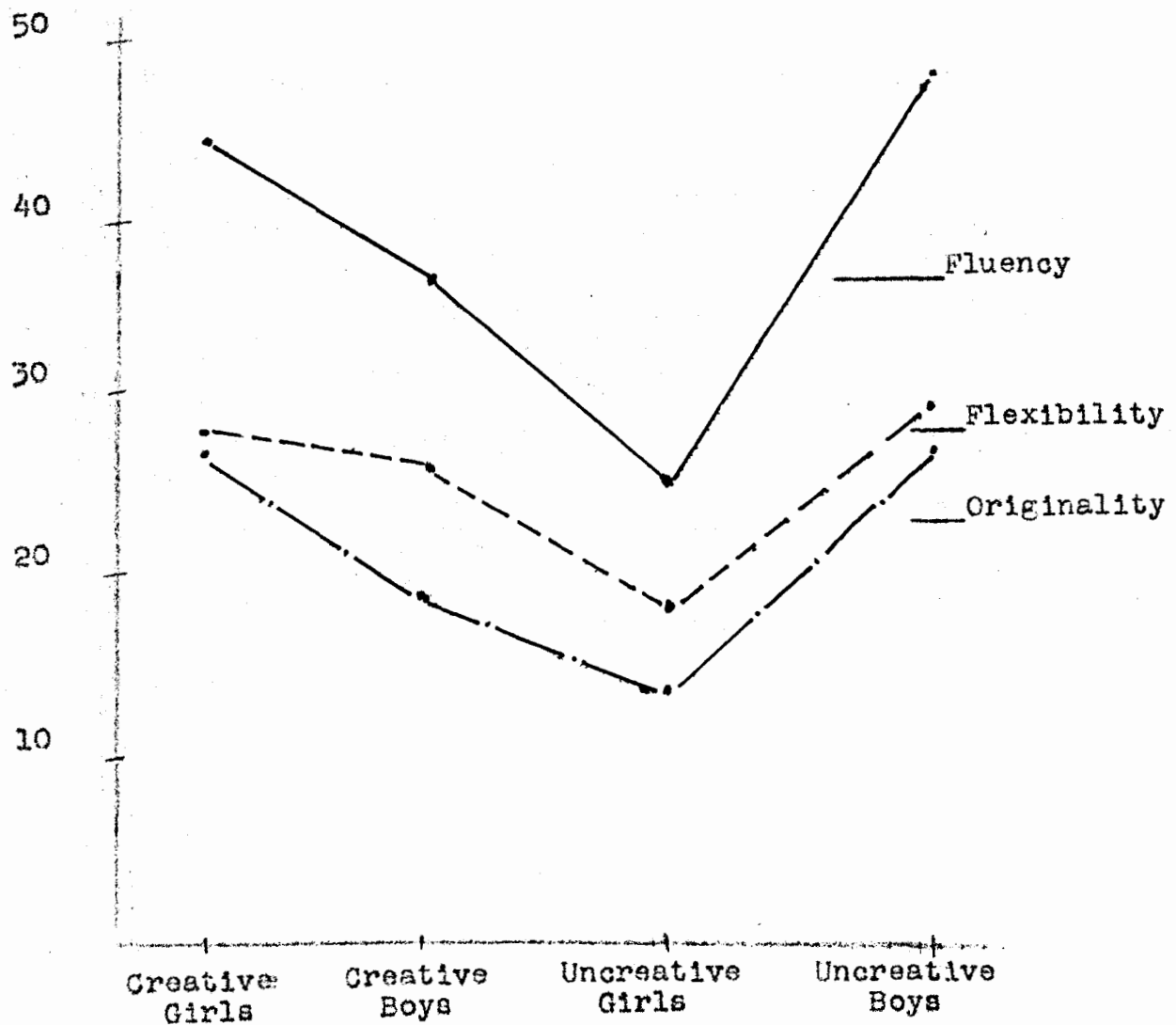


Figure 1. Profiles of Creativity Mean Scores for the Creative and Uncreative Groups of both Sexes.

Table III

Table of Sample Description Data and Correlational Data for PRT Deviant Response Scores and Creativity Scores.

Sample	N	Mean	St. Dev.	r
Flexibility	37	24.7	7.37	
PRT	37	8.6	3.94	.135
Fluency	37	36.2	14.16	
PRT	37	8.6	3.94	.108
Originality	37	20.9	10.32	
PRT	37	8.6	3.94	.068

of data. These last results indicate that the different creativity factors are not independent variables but that they tend to measure the same aspect of behavior. However, in consensus with the idea that creativity comprises many factors, Torrance has not attempted to obtain a composite or total creativity score by combining verbal and non-verbal total scores.

According to the data, the following interpretation of the results will be made. The hypothesis that teacher ratings and test scores would agree in the selection of creative children was partially supported at the .05 level of significance. Since the F value for the ABC interaction factor indicated a relationship between teacher ratings, sex of the child, and test scores at the .05 level, there was justification for investigating the simple interaction effects. Significant ($p < .01$) F values for AB (ratings by sex) at level c_1 (verbal fluency) and at level c_3 (verbal originality) indicate that for these two indices of creativity as measured by the Minnesota Tests, sex of the child was a contributing factor in teacher ratings.

Teacher ratings concerning creativity and the lack of creativity for girls were in agreement with the Minnesota Test results. That is, creative and uncreative girls were correctly identified by their teachers at the .05 level of significance when compared with two measures, fluency and originality, gleaned from the six verbal tests. Scores for flexibility were not significantly different for the four groups.

For teacher ratings concerning creativity in boys, the opposite effects occurred. Ratings of creativity and lack of creativity did not agree with either fluency or originality scores on the tests.

Thus, in a private school situation, teacher ratings of creativity for third grade children appear to be affected significantly by the sex of the child; while girls were correctly identified by both teachers, according to the test results, this phenomenon was not apparent for boys. These results are in agreement with the generally inconsistent findings in the literature between teacher ratings and test creativity measures.

The Null Hypothesis concerning the PRT deviant response scores and the creativity test scores was not rejected at the .05 level of significance for any of the three variables tested. The extremely low correlation coefficients found between PRT deviant response scores and fluency (.108), PRT deviant response scores and flexibility (.135) and PRT deviant response scores and originality (.068), indicate a lack of significant relationship between these creativity variables as measured by the verbal battery of the Minnesota Tests and deviant response scores on the PRT.

It is interesting to note that the lowest correlation (.068) was between PRT deviancy scores and test originality, and that both these measures were defined by the statistically infrequent response. Table III also shows that the highest total mean scores for boys and girls together, and separately, occurred for the variables in the following sequence: fluency, flexibility, and originality.

Thus, in view of the above data, it appears that creative, third grade children do not show non-conforming, deviant behavior patterns on the PRT when their scores are compared with a sample which includes their own group responses. The fact that neither a standardized key nor a cross-validated one for deviant response scores was employed is a consideration which may have affected the results. Other possibly significant hypotheses include the following: 1) the children in the study did not represent a highly creative group, 2) adult subjects may have provided different results as they exhibit more mature PRT deviant response sets and more highly developed creative ability, and 3) non-verbal or other types of creativity tests may have indicated other relationships.

Teacher ratings concerning creativity and PRT deviant response scores were found to be negatively correlated, though not significantly at the .05 level. Thus the PRT was compared with two criterion measures, creativity test scores and teacher ratings, in attempts to clarify the relationship between deviant response sets and creativity. The results indicate that no significant relationship exists between PRT deviancy scores and the Minnesota test scores or between PRT scores and teacher ratings of creativity.

While Berg's Hypothesis that creative individual will exhibit deviant response sets on the PRT was not supported by the data in connection with third grade children and the Minnesota Tests of Creative Thinking or with teacher ratings of creativity, inferences concerning this hypothesized relationship can only be made in relation to the explicit conditions of this study.

Chapter V

SUMMARY

Investigations in the present study were concerned with the following comparisons: 1) the relationship between two methods, teacher ratings and creativity scores, in assessing creativity; 2) the relationship between FRT deviant response scores and creativity scores; and 3) the relationship between FRT deviant response scores and teacher ratings. The three measures of creativity employed were fluency, flexibility, and originality total scores derived from the verbal battery of the Minnesota Tests of Creative Thinking which was administered to two classes of third grade children.

The following results were obtained from statistical analysis:

- 1.) Teacher ratings of creativity for third grade children are influenced by the sex of the child at the .05 level of significance.
- 2.) Teacher ratings for creative and non-creative girls agree with total fluency and originality scores at the .05 level of significance.
- 3.) Teacher ratings for creative and non-creative boys do not agree with total fluency and originality scores at the .05 level of significance.

- 4.) No significant correlations exist between PRT deviant response scores and fluency, flexibility, and originality scores at the .05 level.
- 5.) No significant correlation exists between PRT deviant response scores and teacher ratings of creativity at the .05 level of significance.

APPENDIX

APPENDIX

Table I

Table of Reasons Given by Teachers for Creativity Ratings for Seven Boys and Seven Girls

Reason	Boys (7)	Girls (7)
Artistic	5	5
Musical	3	3
Sensitiveness	1	0
Scientific	1	0
Verbal (Writing, Speech)	5	2

APPENDIX

Table II

Interscorer Reliability Data for 2 Experienced Scorers
(Minneapolis Sample-Yamamoto, 1964, p. 84)

Test	Subtest	Grade	N	Score	r
Ask & Guess	Total (3)	10	78	Flexibility	.91***
Imagination	Product Improvement	10	78	Flexibility	.76***
				Originality	.95***
	Unusual Uses	10	78	Flexibility	.80***
				Originality	.96***

***p < .001

APPENDIX

Table III

Interscorer Reliability Data for Two Experienced Scorers
 (Minneapolis Sample #2-Yamamoto, 1964, p. 85)

Test	Subtest	Grade	N	Score	r
Ask & Guess	Total (3)	5	65	Fluency	1.00***
				Flexibility	.97***
Imagination	Product Improvement	5	65	Fluency	1.00***
				Flexibility	.87***
				Originality	.98***
	Unusual Uses	5	65	Fluency	1.00***
				Flexibility	.84***
				Originality	.92***

***p < .001

APPENDIX

Table IV

Interscorer Reliability Data (4 Scorers, 1 Experienced)
 Total Creativity Scores¹ of 76 pupils in grades 4-6
 (Ohio Sample-Yamamoto, 1964, p. 86)

Scorer				
	A	B	C	D
A		.98***	.98***	.98***
B			.99***	.98***
C				.97***
D				

***p < .001

¹ Total Creativity Score: Fluency, Adequacy, Flexibility (Ask & Guess), Fluency, Flexibility, Originality, Elaboration (Test of Imagination) & Circles.

APPENDIX

Table V

Test-Retest Reliability Data for Ask & Guess and Test of Imagination Given a Class of 70 Fourth, Fifth, & Sixth Graders and Repeated after an Interval of 8 weeks.
(Yamamoto, 1964, p. 88)

Test	Subtest	Score	r
Ask & Guess	I (Ask)	Fluency	.78**
		Flexibility	.72**
	II (Causes)	Fluency	.59**
		Flexibility	.34**
	III (Consequences)	Fluency	.60**
		Flexibility	.43**
	I-III (Total)	Fluency	.74**
		Flexibility	.66**
Test of Imagination	Product Improvement	Fluency	.70**
		Flexibility	.47**
		Originality	.60**
	Unusual Uses	Fluency	.42**
		Flexibility	.28*
		Originality	.46**

**p < .01

*p < .05

APPENDIX

Table VI

Test-Retest Reliability Data for Ask & Guess and Test of Imagination Given a Class of 22 College Seniors and Repeated after a Three Month Interval. (Yamamoto, 1962, quoted in 1964, p.87).

Test	Subtest	Score	r
Ask & Guess	Part I-III	Fluency	.83**
	Part I (Ask)	Flexibility	.56**
Test of Imagination	Product Improvement	Fluency	.69**
		Flexibility	.64**
		Originality	.61**
	Unusual Uses	Fluency	.85**
		Flexibility	.69**
		Originality	.77**

**p < .01

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