

A STUDY OF THE CORRELATION
BETWEEN SCORES ON THE TORRANCE
TESTS OF CREATIVE THINKING AND
SCORES ON THE INGENUITY SUBTEST
OF THE FLANAGAN APTITUDE
CLASSIFICATION TESTS

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A Study of the Correlation Between Scores on the Torrance
Tests of Creative Thinking and Scores on the Ingenuity
Subtest of the Flanagan Aptitude Classification Tests

An Abstract
Presented to
the Graduate Council of
Austin Peay State University

In Partial Fulfillment
of the Requirements for the Degree
Master of Art

by
Walter John Herrmann

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ABSTRACT

The twofold purposes of the present study were to determine the degree of relationship between the scores on the Torrance Tests of Creative Thinking (TTCT) and scores on the Ingenuity subtest of the Flanagan Aptitude Classification Tests (FACT), and to determine the intercorrelations of the TTCT.

The subjects were 79 undergraduate students enrolled in Adolescent Psychology classes during the Fall Quarter, 1979, at Austin Peay State University, Clarksville, Tennessee. Both the FACT-Ingenuity and Torrance Tests of Creative Thinking were administered in group settings.

The Pearson product-moment correlation technique was used in the analysis of the data. A significant, but negative correlation was obtained between the scores on Ingenuity and the scores on Verbal Originality.

Intercorrelations for the Torrance Tests of Creative Thinking were obtained.

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To the Graduate Council:

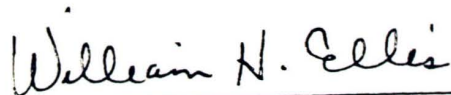
I am submitting herewith a Thesis written by Walter John Herrmann entitled "A Study of the Correlation Between Scores on the Torrance Tests of Creative Thinking and Scores on the Ingenuity Subtest of the Flanagan Aptitude Classification Tests." I recommend that it be accepted in partial fulfillment of the requirements for the degree Master of Arts, with a major in Psychology.


Major Professor

We have read this thesis
and recommend its acceptance:


Second Committee Member


Third Committee Member


Dean of the Graduate School

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CHAPTER I

INTRODUCTION TO THE PROBLEM

In his 1950 presidential address to the American Psychological Association, J. P. Guilford ushered in the current and dynamic area of research on creativity (Razik, 1967). Guilford (1959) believed that this country, as well as others, began to recognize a need for increasing creative performance and the underlying dynamics of creativity itself.

Research directed towards the area of creativity became more apparent during the 1960's. The volume of literature began to swell. Approximately 300 doctoral dissertations related to creativity could be found before 1965. Within the next eighteen months the number had increased to nearly 500. Some 200 new dissertations were produced (Backtold and Werner, 1970).

Perhaps the most troublesome aspect of the field of creativity lies in the definition of creativity. Some definitions of creativity were derived in terms of a product (discovery and invention); others, in terms of a process, a kind of person, or a set of conditions. Some writers have defined creativity as being different from conformity and as requiring non-habitual rather than habitual behavior (Torrance, 1966). There are those who feel that a creative contribution

must be true, general, and surprising in view of what existed at the time of the discovery (Selye, 1962). Some authors state that the term "creative" should be given only to those who possess very rare or particular kinds of ability, while at the same time, there are those who apply the term to all essentially healthy individuals (Torrance, 1966).

On the basis of an analysis of the diverse ways of defining creativity and the requirements of a definition for keeping a program of research focused on factors affecting creative growth in context, Torrance (1966) defined creativity as a process of becoming sensitive to problems, deficiencies, missing elements, disharmonies and similar things; identifying the difficulties; 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.

There are those who object to this definition. Ausubel (1963), for example, objects on the grounds that it does not distinguish between creativity as a highly particularized and substantive capacity and as a generalized constellation of intellectual abilities, personality variables, and problem-solving traits. Kreuter and Kreuter (1964) and Mueller (1964) believed

that the term "creative" should be reserved exclusively for such fields as art, music, and writing. The Kreuters aver that the orientation of Torrance's work has clearly been towards the recognition and development of scientific creativity and that even his definition reflects that concern. The research associates of Torrance, however, have included artists, musicians, creative writers, theologians, psychologists, and sociologists, and they have contributed to the professional literature in these and other areas. The experimental work of Torrance has, in reality, included more activities related to art, creative writing, creative dance, and creative music than to science (Torrance, 1966). One final objection to the definition of creativity proposed by Torrance is that it does not distinguish between creative problem-solving and other types of problem-solving. Newell, Shaw and Simon (1962) state that problem-solving may be called creative when one or more of the following conditions are met:

1. The product of the thinking has novelty and value;
2. The thinking is unconventional in a sense that it requires modification or rejection of previously accepted ideas;
3. The thinking requires high motivation and

persistance, taking place either over a considerable span of time (continuously or intermittenly) or at high intensity; and

4. The problem as initially posed was vague and undefined so that part of the task was to formulate the problem itself.

Torrance (1966) devised the Torrance Tests of Creative Thinking (TTCT) which sample a rather wide range of the abilities in a universe of creative thinking abilities. The TTCT manual (1966) cites the results of several studies of scorer reliability, indicating a range of interscorer correlations from .76 to .99. Studies on alternate-form reliabilities with intervals of one to two weeks yield coefficients ranging from the .70's to the .90's. In general, the verbal scores show higher reliabilities than the figural scores (Torrance, 1966).

To insure content validity, a consistant and deliberate effort was made to base the test stimuli, the test tasks, instructions and scoring procedures on the best theory and research available. Analysis of the lives of indisputably eminent and creative people, the nature of performance regarded as creative, research and theory concerning the functioning of the human mind, and the like were considered in making decisions regarding

the selection of test tasks. An assiduous attempt was made to keep the test tasks free of technical or subject matter content (Torrance, 1966).

In general, there is little evidence of a relationship between the Torrance tests and everyday-life criteria of creative achievement. Ongoing longitudinal studies, cited in the manual, should contribute toward this type of validation (Anastasia, 1968). Bently (1966) conducted a short-range (one week to nine months) predictive validity study of the TTCT using 75 graduate students in Educational Psychology classes. A significant correlation coefficient of .53 was obtained between the scores on the TTCT and scores on subject matter tests of productive thinking. Torrance, Tan, and Allman (1970) conducted a long-range (eight years) predictive validity study of the TTCT in a sample of 114 junior Elementary Education majors. The measure of verbal originality differentiated the subjects on 69 creative behaviors at the .05 level or better. A composite index of creative teaching behavior was devised and found to correlate .62 with the originality score and .57 with the total creativity score on the TTCT.

The 12-year follow-up of the 1959 University of Minnesota High School population was conducted in

1971 (Torrance, 1971). The data collected were almost identical to those secured in 1966 from the class of 1960. Completed questionnaires were obtained from 236 of the original 392 subjects, providing rich data concerning the creative behavior of young people. The correlation between the creativity predictors and the criterion variables (Quantity and Quality of Creative Achievement) was .51, significant at better than the .01 level.

Since knowledge and understanding about creative thinking are still in a relatively underdeveloped state, the Torrance tests are published in the form of a Research Edition. Certain uses for which the test is now ready are described in the TTCT manual (Torrance, 1966).

The Ingenuity subtest of the Flanagan's Aptitude Classification Tests (FACT) grew from a need for the identification of job tasks, components, or elements. Ingenuity was selected as one of the job elements to be measured. Ingenuity, in this context, was seen as being different from reasoning ability. Also, the term "ingenuity", rather than "creativity", was used because the job element being described seemed somewhat more narrow than creativity as conventionally conceived. The concepts of "ingenuity" and "creativity" are, then,

to be differentiated. Creativity is demonstrated when something new is brought into existence. The emphasis is on the newness and lack of previous existence of an idea or product. Ingenuity is demonstrated by inventing or discovering a solution to a problem. Here the emphasis is on the existence of a problem and the demonstration of a quality of genius in solving it in an unusually neat, clever, or surprising way (Flanagan, 1960).

The concept of ingenuity includes the following factors according to Flanagan:

1. A practically useful solution to a real problem should be involved;

2. The solution must be a clever one; that is, it should be more than just satisfactory. It should be unusually fitting and clearly better than what might be expected from the typical person working on the problem; and,

3. It should not be one that could be arrived at by logical routine or mechanical process, but should be novel in the sense of providing a surprisingly good solution to the special problems in the solution.

Flanagan (1957) identifies six criteria that should be applied to each item in a proposed ingenuity test to insure that the item is measuring ingenuity,

or at least includes the necessities for measuring ingenuity. They are:

1. A clear-cut problem should be presented for which an ingenious solution exists that fulfills the three requirements defining ingenuity. The solution to this problem should not be known to any substantial number of persons being tested;

2. It should be possible to derive the solution by deductive reasoning from the facts given in the statement of the problem;

3. The subject must be required to "think of" the solution rather than recognize its applicability or superior quality from a list of possible choices;

4. The statement of the problem should not be such that it defines a particular word or concept so completely that the item is, in fact, merely a vocabulary item of the type where the definition is presented, and the word asked for;

5. The problem situations should be presented in such a way that detailed knowledge of the specific field is not required in order to think of the solution; and,

6. The key word should so obviously provide a pat and unique solution to the problem that the examinee experiences a definite feeling of closure. The solution

should give the subject a definite feeling that it "clicks" or "snaps" into place, so that the moment he recognizes that choice has been given which corresponds to this solution, he accepts it and goes on to the next problem.

A correlation between the Ingenuity and Reasoning subtests of the FACT resulted in an r of .57. A comparison of the Ingenuity and Judgment-Comprehension subtests of the FACT resulted in a correlation of .57. The above data were derived from a sample of 1,056 twelfth-grade students (Flanagan, 1960).

A survey of the literature reveals no published research of correlational studies of Ingenuity subtest with other creativity instruments.

The twofold purposes of the present study were to determine the degree of relationship between the scores on the TTCT and scores on the Ingenuity subtest of the FACT, and to determine the intercorrelations of the TTCT.

CHAPTER II

METHOD

The Sample

The sample consisted of undergraduate students enrolled in Adolescent Psychology during the Fall Quarter, 1979, at Austin Peay State University, Clarksville, Tennessee. The 23 males and 56 females who participated in the present project did so voluntarily. The subjects were freshman, sophomores, juniors, and seniors. The ages ranged from 18 to 49 with a mean of 23.3.

Description of the Instruments

The TTCT is composed of ten subtests which are grouped into a figural and a verbal battery. The first battery is entitled Thinking Creatively with Pictures; the second, Thinking Creatively with Words. The Verbal and Figural Forms A were used in the present study.

In Thinking Creatively with Words, the first three activities utilize an intriguing picture to which the subject responds by (1) writing all the questions he would need to ask to find out what is happening; (2) listing possible causes of the action depicted; and (3) listing possible consequences of the action.

Activity 4 is concerned with ways of improving a toy elephant so that children will have more fun playing with it. Activity 5 calls for a list of unusual uses of cardboard boxes. Activity 6 requires unusual questions that could be asked about the boxes. Activity 7 asks for all the things that would happen if a given improbable situation were true. The entire battery yields a total score in each of three traits: Fluency, Flexibility, and Originality.

Thinking Creatively with Pictures consists of three activities. In Picture Construction, a brightly colored curved design is pasted on a blank sheet in a position and is used as a starting point for drawing an unusual picture "that tells an interesting and exciting story." Picture Completion provides a few lines as a start for drawing a picture in each item. The last activity provides pairs of short parallel lines with which as many different pictures as possible are to be produced. Four total scores are obtained: Fluency, Flexibility, Originality, and Elaboration. The manuals accompanying the Torrance batteries provide detailed scoring guides with many examples.

The FACT Ingenuity test is a new addition to the battery of aptitude tests entitled "Flanagan Aptitude Classification Tests" (Flanagan, 1960). The FACT battery is based on the job element approach to the measurement of aptitudes. The items in this test

require the subject to find "ingenious" solutions that are: (1) practical and useful solutions to a real problem; (2) clever, unusually fitting, and better than solutions which might be expected from typical persons working on these problems; and (3) novel in the sense of providing a surprisingly good solution to the special problem involved (versus one which could be obtained by logical, routine, or mechanical process).

Administration and Scoring

Both the FACT-Ingenuity and the TTCT instruments were administered in groups by the present researcher during the Fall Quarter, 1979, at Austin Peay State University, Clarksville, Tennessee. Each test was scored according to its manual of direction.

CHAPTER III

RESULTS

The Pearson product-moment technique was used to compute the correlation coefficients. Table 1 summarizes the correlations. Means and standard deviations are given in Table 2. Table 3 summarizes the inter-correlations among the seven measures derived from Form A of the TTCT for 79 College Undergraduates.

TABLE 1

Correlations Between the Ingenuity Subtest
of the FACT and Verbal and Figural, Form A,
Measures of the TTCT

| | r | Significance |
|---------------------|-------|--------------|
| Verbal Fluency | .082 | n.s. |
| Verbal Flexibility | -.106 | n.s. |
| Verbal Originality | -.192 | .05 |
| Figural Fluency | .064 | n.s. |
| Figural Flexibility | .152 | n.s. |
| Figural Originality | .152 | n.s. |
| Figural Elaboration | .1518 | n.s. |

TABLE 2
Means and Standard Deviations

| Item | Mean | SD |
|---------------------|--------|-------|
| Ingenuity-FACT | 15.56 | 4.77 |
| Verbal Fluency | 81.15 | 21.39 |
| Verbal Flexibility | 24.48 | 6.80 |
| Verbal Originality | 113.89 | 32.59 |
| Figural Fluency | 18.38 | 5.76 |
| Figural Flexibility | 15.54 | 4.71 |
| Figural Originality | 26.83 | 9.68 |
| Figural Elaboration | 75.52 | 24.95 |

TABLE 3

Intercorrelations Among Seven Measures Derived From Form A of the Torrance Tests
of Creative Thinking for 79 College Undergraduates

| Measure | Verbal Flexi- bility | Verbal Origi- nality | Figural Fluency | Figural Flexi- bility | Figural Origi- nality | Figural Elabo- ration |
|---------------------|----------------------------|----------------------------|--------------------|-----------------------------|-----------------------------|-----------------------------|
| Verbal Fluency | .9459* | .8204** | .5818** | .3711** | .4292** | .2633* |
| Verbal Flexibility | | .7883** | .4750** | .3568** | .4123** | .2678* |
| Verbal Originality | | | .4514** | .2767* | .3063** | .1738 |
| Figural Fluency | | | | .4368** | .4381** | .3696** |
| Figural Flexibility | | | | | .6906** | .9030** |
| Figural Originality | | | | | | .4980** |

* .05 level

** .01 level

CHAPTER IV

DISCUSSION

In that it was thought that ingenuity was one facet of creativity, significant and positive correlations were anticipated between the Ingenuity subtest of the FACT and the Figural and Verbal Subtests of the TTCT. All correlation coefficients except one failed to attain significance. A significant, but negative, correlation was obtained between Ingenuity and Verbal Originality.

In light of the statistical analysis of the data derived in the present study, the FACT Ingenuity subtest and the TTCT are not measuring the same thing. The only significant correlation obtained was negative, which suggests that those two subtests are antithetical in nature. Perhaps the answer to the puzzling problem is to be found in the definitions of the concepts. As was stated previously, Flanagan (1960) used the term ingenuity, rather than creativity, because the job element being described seemed somewhat more narrow than creativity as conventionally conceived. Creativity is demonstrated when something new is brought into existence. The newness and lack of previous existence of an idea or product is accentuated. Ingenuity is

demonstrated by inventing or discovering a solution to a problem. Here, the existence of a problem and the demonstration of a quality of genius in solving it in an unusually neat, clever, or surprising manner is accentuated.

A comparison of Torrance's intercorrelations and the present study reveals interesting similarities. For example, the Torrance study shows a correlation of .81 between Verbal Flexibility and Verbal Fluency. In the present study a correlation of .95 was obtained. Torrance found a correlation of .69 between Verbal Originality and Verbal Fluency. The present study reveals a correlation of .82. Torrance reported a coefficient of .71 between Verbal Originality and Verbal Flexibility. A coefficient of .79 resulted between the same two variables in the current study. Torrance obtained a correlation of .35 between the Figural Flexibility and Verbal Fluency variables. The same two variables in the current study correlated .37. Figural Flexibility and Verbal Flexibility evenuated in a correlation of .25 in the Torrance study, while an r of .36 resulted between the same subtests in the present study.

The remaining intercorrelations in the current research attained significance with but one exception.

Figural Elaboration and Verbal Originality failed to achieve significance though the coefficient was very close to significance at the .05 level. All of the intercorrelations in the Torrance research reached significance at the .05 level or higher.

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