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ABSTRACT

A longitudinal study of various measures of creativity was conducted to determine the validity of a number of possible predictors of an arts orientation. Tests of creative thinking, creative personality, divergent thinking, intelligence, and school achievement were administered to above-average fifth-graders (N=23), who also drew pictures based on a common theme. Students then took the ACT Interest Inventory 1 year and 3 years later. Arts interest in sixth grade was predicted by expert ratings of the fifth-grade drawings for artistic merit and scores on creative thinking and creative personality measures. The only fifth-grade measure which predicted arts interest in eighth grade was artistic merit of drawings. Artistic competence in fifth grade was a leading indicator of a developing arts orientation in the eighth grade. The study concluded that: (1) expert ratings of drawings for artistic merit were the best means tested for early identification of artistic talent; (2) problem finding requires skills or abilities that were not assessed by the intelligence quotient measures, but were correlated with achievement and creativity criteria; (3) the divergent thinking exercise used in the study seemed to have a verbal bias that was absent from the creative thinking exercise; and (4) in the long run, many determinants other than thinking skills affect developing career orientations. (Contains 27 references.) (Author/JDD)

Creativity Tests and Artistic Talent

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Running Head: CREATIVITY TESTS

Abstract

A longitudinal study of various measures of creativity was conducted to determine the validity of a number of possible predictors of an arts orientation. Tests of creative thinking, creative personality, divergent thinking, intelligence, and school achievement were administered to above-average fifth graders (N = 23), who also drew pictures based on a common theme. Arts interest in sixth grade was predicted by expert ratings of drawings for artistic merit (.59) and scores on the creative thinking (.43) and creative personality measures (.40). The only fifth-grade measure which predicted arts interest in eighth grade was artistic merit of drawings (.45). Artistic competence in fifth grade was a leading indicator of a developing arts orientation in the eighth grade. Expert rating of drawings for artistic merit was the best means among those tested for early identification of artistic talent.

Creativity Tests and Artistic Talent

The ability of creativity tests to predict artistic performance has recently been questioned (cf. Wallach, 1985). In what way must tests of creative thinking be constructed to correlate with artistic performance? What procedures can programs for the gifted and talented now employ to identify artistically talented individuals? The following longitudinal study of the development of creative thinking addressed such questions.

A definition of creative thinking was derived from research on open-ended problem solving -- such as divergent thinking -- and research on problem finding. Guilford (1975) said that divergent-thinking exercises differed from convergent exercises in "the degree of restraint or limitation upon the desired answer" (p. 40). Similarly, problem finding has been said to differ from problem solving in the degree to which the problem has a known formulation (Dillon, 1982; Getzels, 1975; Getzels & Csikszentmihalyi, 1976). If these two conditions are coordinated and combined, they suggest a problem situation that constrains neither problem formulation nor problem solution. Creative thinking may be defined as a meaningful response to any situation which calls for finding a problem and solving it in one's own way.

It is difficult to imagine a situation in which there are constraints neither on the problem nor on its solution. The type of problem to be formulated offers a form of constraint, such as the logical form of divergent thinking investigated by Guilford (1967) and Torrance (1963), or the Piagetian mode of problem finding

more recently investigated by Arlin (1975, 1977). In practice, another constraint may be ontological, given that knowledge can only progress with respect to what is known. Added constraints may be esthetic, both in science and the arts. Still, problems may be classified in relation to the various situations that they pose the problem solver (e.g., Getzels, 1975). My own analysis of the various possibilities has been elaborated elsewhere (Wakefield, 1989, 1992). At this point, it is sufficient to note that problems are defined and solved in different contexts. These contexts restrict the freedom of the problem solver to differing degrees.

This conception of problem finding and solving suggests that a potentially very fruitful, but virtually unexplored territory for research is the systematic alteration of problems to introduce greater or lesser degrees of constraint. Theory is surprisingly well developed in comparison to empirical research in this area. Studies have focused on what in retrospect appear to be relatively minor alterations, such as whether or not open-ended tests should be timed (e.g. Hattie, 1977, 1980). As Wallach (1985) noted in a review of this research, timing really seems to make little difference. Whether or not more substantive alterations make any difference is an unasked question, but developments in theory suggest that it is a significant question, and it is the question that motivated the empirical research presented here.

As Arlin's (1975) study implies, however, problem-solving skills of a given type must developmentally precede the ability to find or set that type of problem. The implication for children who are 10 and 11 years of age is that the type of

problem that they can effectively formulate is not logical in either Piaget's formal or concrete sense, but must be prelogical, that is, both found and solved by preoperational thinking skills. If one wishes to begin a study of problem finding with children in the fifth grade, then, one should not expect adultlike creative thinking. Instead, one should begin with problem-solving tasks that do not call for mature logic.

Such tasks exist in some of the open-ended exercises designed by Wallach and Kogan (1965) to test the divergent thinking of fifth graders. These tasks call for the subject to supply multiple meanings or interpretations for each of a series of lines or patterns drawn on four-by-six inch cards. This task calls for associative but not necessarily logical thinking. To induce problem finding in this exercise, one may alter the problem situations posed in each series by introducing a blank card, then asking the child to draw his or her own pattern or line before interpreting it in as many ways as possible. This modification permits the child freedom to find a problem and solve it in his or her own way, but it does not call for logical thinking, either in problem-finding or problem-solution stages.

What the task seems to call for in the problem-finding stage is intuition. Intuition has been theorized as one element in problem finding (Getzels & Csikszentmihalyi, 1967; Wakefield, 1988) and is thought to be common among creative people in general (MacKinnon, 1978, pp. 130-131). "Intuitive perception" is the term MacKinnon coined in the late 1950s to describe perception that was

not stimulus-bound (known as "sense perception"), but stimulus-free. Obviously, perception bound to the stimulus of a blank card would be bound to nothing at all.

By inserting a blank card among cards from each series, an experimenter can provide subjects with opportunities to find problems before solving them in a meaningful and individual way. Wakefield (1985) hypothesized that fluency of responses to such "creative" opportunities would correlate more highly with other measures of creativity than would fluency of responses to presented patterns and lines. It was also anticipated that such creative responses would correlate more highly with arts interest one and three years later than would responses to other measures of creativity.

Method

Subjects

Kilby School is the last laboratory school in the State of Alabama and is an administrative unit of the University of North Alabama. In 1984, the 23 pupils in the fifth grade (11 boys and 12 girls) were all tested with the modified divergent-thinking measures for a study of problem finding in a divergent-thinking exercise. Kilby has a fairly selective admissions policy, and the subjects' fourth-grade scores on a test of academic aptitude ranged from the 48th to the 99th percentile. On the California Achievement Tests, which were administered in the fifth grade the same month as the study measures, 17 pupils (74%) scored one year or more above the national mean grade placement. None scored one or more years below

the mean. By all measures of scholastic ability and achievement, the group tested was above average, ranging from average to academically gifted.

This sample was judged especially appropriate for testing because of the "threshold hypothesis." This hypothesis asserts that creativity and intelligence are not closely related when subjects tested are average and above in ability. The threshold itself varies with the test, but there seems to be general agreement that subjects significantly below average do not possess the intellectual skills to be creative in any field (cf. Csikszentmihalyi & Getzels, 1988). Still, the threshold may be "surprisingly low" (MacKinnon, 1978, p. 123). By restricting the intellectual range of the sample to average and above, one can minimize the degree of autocorrelation that otherwise seems to result from correlating measures of creative thinking with intelligence.

Measures and Procedure

Cards 1 through 5 in both Pattern and Line Meanings were used as indicated in Wallach and Kogan's (1965) study, but subjects were presented with a blank card and a pencil after Card 4 in each series. The examiners gave these special instructions: "Here is a blank card and a pencil. Make a pattern (or line) of your own, then tell me all the different things it could be." Only mutually exclusive responses were accepted. Each pupil received two scores, one for divergent fluency and the other for creative thinking. The reliability of scores was estimated by correlating corresponding scores for Pattern Meanings with those for Line Meanings. These correlations, when adjusted by the Spearman-Brown prophecy

formula, yielded reliability coefficients of .94 for divergent fluency and .82 for creative thinking. The diminished reliability of the creative-thinking score was interpreted as a function of estimating reliability over 2 items instead of 10.

Pattern and Line Meanings were followed by three subtests of the WISC-R, all of which were administered as in the Wallach and Kogan study. The three subtests were: Vocabulary (a verbal measure that correlates highly with the total battery score), Block Design (a measure of nonverbal intelligence that correlates highly with the total battery score and that calls for analytical thinking), and Picture Arrangement (a performance measure that relates to ability to see a situation whole and comprehend it). Scale scores were computed for each of these subtests.

Two other tests were administered to the group: the Group Inventory for Finding Creative Talent, or GIFT (Rimm, 1980) and the California Achievement Tests (as part of a routine assessment of progress). The GIFT yields three scale scores (Imagination, Independence, and Many Interests) and a total score. Total scores for the upper elementary level (Grades 5 and 6) seem adequately reliable for identification of individual talent and have been validated through correlation with ratings of drawings and stories for artistic merit (e.g., Davis & Rimm, 1977). According to the score report, eight of the Kilby students scored highly enough on the total score to indicate that "the child has characteristics similar to those of highly creative children." Normal curve equivalent scores were used on this test.

The California Achievement Tests were used in their 1977 edition. Scale scores were available for all students on language (mechanics and expression) and mathematics (computation and application) portions of the tests. Scores were also available for 22 students on the reading and spelling sections and on the total battery. For comparative purposes, the study used only the scores on the language and mathematics portions of the test battery.

Students were also given an opportunity to "draw a picture appropriate to the title, 'Playing Tag in the School Yard.' You may draw any picture you like -- whatever you may imagine for this theme." This open-ended exercise (with no time limit) was adopted from the Getzels and Jackson (1962, p. 257) study of creativity and intelligence. Two raters (the head of the university art department and a graduate art student) were asked to rate the drawings for artistic merit on a scale from 1 to 5 (Rimm & Davis, 1980). The elements of artistic merit were perceived to be the originality of the idea and the degree of talent with which the idea was expressed. Combined ratings (with a reliability of .77) and Spearman rank-order correlations were used in further computations with this variable.

Finally, students took the ACT Interest Inventory one year and three years later. Students initially took the UNIACT in its computerized form (called DISCOVER) at the university library, and 19 of the original 23 (83%) received stanines which could be used in later computations. Because the reliability and validity of the UNIACT is not established for this age level, only the Creative Arts scale was used in further calculations. The reliability of this scale was estimated

(from the scores of eight pupils who volunteered to retake the inventory) to be .54. In the three-year follow-up, 18 students returned the mailed inventory in its regular form. All of these scores were usable, and raw scores were converted into stanines through norms for Grades 8-10 supplied by the ACT.

Two female research assistants were trained to administer individually the modified divergent-thinking exercises and the intelligence measures, but neither they nor the classroom teacher nor the raters of the artwork were informed of the central hypothesis of the study. Each of the two research assistants tested approximately the same number of boys and girls. The group achievement and creativity measures were administered by the classroom teacher. The drawing exercise was completed after the pupils were finished with the group creativity measure. All of the initial testing (including the achievement testing) took place within two weeks.

A year later, when these 23 students were in the sixth grade, they completed a unit on vocational awareness (at the request of the researcher) by taking the UNIACT in its computerized form. Then three years after the initial testing, UNIACT surveys were mailed to the 23 original subjects. In a final follow-up effort six years after the initial testing, parents of the two students whose drawings were rated most highly in fifth grade were contacted about their child's artistic achievements through junior year in high school.

Results

The means and standard deviations of study variables are reported in Table 1. The WISC-R and CAT scores tended to be above average, especially in the domain of verbal ability and skills. Similarly, normal curve equivalent scores for the GIFT (which have an average of 50.0) were above average for this group, indicating characteristics related to creativity.

Insert Table 1 about here

The intercorrelations of the variables are reported in Table 2. The central hypothesis was confirmed by the significant correlation (.46, $p < .05$) of the creative-thinking score (fluency of response to the personally drawn pattern and line) with the GIFT score, but a weaker correlation (.33, n.s.) of the divergent-thinking score with the GIFT score, despite the higher reliability of the divergent-thinking than the creative-thinking measure.

Insert Table 2 about here

Results not presented in the table were correlations of creative and divergent thinking with subscales on the GIFT. Creative- and divergent-thinking scores correlated equally significantly with GIFT scores on scales for Imagination and Independence, but unequally with the scale labeled Many Interests. Although neither creative nor divergent thinking correlated significantly with Many Interests,

the difference in correlations (.20 versus -.10) was statistically significant ($t = 2.09$, $p < .05$), that is, creative thinking correlated significantly more highly with Many Interests than did divergent thinking.

The difference in the concurrent validity of creative- versus divergent-thinking scores was more strikingly revealed with respect to the experts' ratings of drawings for artistic merit (shown in Table 2). Creative thinking significantly (.38, $p < .05$) predicted these ratings, whereas divergent thinking did not (.10, n.s.). This difference was perhaps related to the fact that unlike creative thinking and the ratings of drawings, divergent thinking was significantly correlated with both verbal and nonverbal intelligence (.45 and .36, $p < .05$).

Perhaps the most dramatic finding of the initial study was that, of all the measures, only creative thinking correlated significantly with the experts' ratings of drawings for artistic merit. In other words, these ratings were not correlated with intelligence or school achievement as measured in a traditional or routine manner.

Three measures in the initial study significantly predicted arts interest one year later. A highly significant correlation (.59, $p < .01$) was obtained between ratings of drawings for artistic merit and arts interest, which confirmed the validity of the ratings. Significant correlations were also obtained between arts interest and both creative thinking (.43, $p < .05$) and GIFT scores (.40, $p < .05$), confirming the predictions made through these scores. Arts interest may also have been predicted by divergent thinking (.36, n.s.) had a larger group of subjects returned usable scores.

To provide some follow-up information for these students in eighth grade, UNIACT surveys were sent out three years after the initial study to all of the original subjects who could be contacted by phone. Eighteen surveys (78% of the original sample) were returned. What was somewhat surprising was that none of the psychometric measures administered three years earlier predicted interest in the arts in eighth grade. Only rating of drawings for artistic merit significantly predicted arts interest three years later ($r_s = .45$, $p < .05$). Even sixth-grade arts interest fell short of correlating significantly with eighth-grade arts interest ($N = 15$, .33, n.s.). Artistic competence in the fifth grade emerged as the best predictor of an arts orientation in the eighth grade.

Although the statistical results of the three-year follow-up did not justify sending out surveys in high school to this group, parents of two of the students whose drawings were rated most highly were contacted about the achievements of their children by 11th grade. These data provided information for the following cases.

Case 1. The student ("Nicole") whose drawing was given the highest rating by art experts for artistic merit had average divergent- and creative-thinking scores in fifth grade. Her normal curve equivalent score on the GIFT was above average, but it did not reach the criterion for giftedness on this measure (the 85th percentile). A year after the initial testing, however, Nicole's "high-point" interests were technical or artistic careers, both with stanines of 9. By eighth grade, her

interest in scientific careers was her high-point score (stanine 9), and interests in arts and enterprising careers were tied for second (stanine 8).

Nicole's talent and changes in interest are reflected in her training and development. After elementary school, she began attending a private, religiously oriented school with national recognition for academic excellence, but because of its small size and limited resources, without formal art or creative writing programs. From sixth to eighth grade, she received private art lessons, but unfortunately, this small art studio closed. Nicole is doing very well in high school with a "straight-A" average in her junior year, and she is making plans to go to college with an initial major in marine biology. Her parents indicated that she continues to enjoy art as a hobby.

According to the art experts, Nicole's drawing revealed some features indicative of a special talent in art. Of special interest to the experts was the central "chase," between two figures on the playground. They noted that in contrast to most of the drawings, this one portrayed a girl chasing a boy. This portrayal was unusually proficient, but their attention was drawn to the expression in the eye of the boy being chased. Delight and excitement were communicated by a glance over his shoulder. If the rating had been an art contest, this drawing would have been the winner. The second-place drawing was craftsmanlike, with more realistic figures, but according to the experts, did not reveal the same degree of talent in this domain.

Case 2. The student ("Sheha") whose drawing was rated second most highly for artistic merit ranked fourth in divergent thinking and second in creative thinking. Sheha was among those who scored highly enough on the GIFT to indicate that they possess characteristics of highly creative children. A year after initial testing, her high point interest was in science (stanine 9), followed by the arts (stanine 8). By eighth grade, however, her interest in science had declined and had been surpassed by interests in the arts (still stanine 8) and social service careers (stanine 7).

Sheha's parents are both school teachers, and academic achievement is very important to them. Sheha has done very well in a large public high school, and by 11th grade was in all advanced placement (AP) classes. Although the high school has art and creative writing programs, her parents stressed Sheha's achievements in math and public speaking competitions. An essay she wrote about her family's way of celebrating a holiday tradition won an award from the local newspaper and was published. Although her parents have great interest in her entrance into a good college and indicated that math was her favorite subject, they did not indicate her likely major. Given Sheha's changes in interest in the past, one might infer that she may still be undecided about an initial college major.

Discussion

Studies with small numbers of subject can be criticized on the grounds that they are not representative of larger groups, or that results do not reflect small, but

statistically significant relationships, but they also deserve to be defended on the same grounds. In a study of creative thinking and the arts orientation, intensive examination may yield as many insights as a more extensive study. The Kilby study was an attempt to study a classroom group intensively, using 10 carefully selected measures and repeated follow-ups to determine which results, if any, might have substantive as well as statistical significance.

The results indicated quite clearly that the psychometric measures used in this study did not have great power to predict an arts orientation over the long term. The experimental measure that operationalized the definition of creative thinking did predict artistic interests and ratings of drawings for artistic merit, but three years later, these ratings proved better predictors of artistic interests than did the measure of creative thinking. The first insight gained from this study is that expert ratings of drawings (or stories) for artistic merit offer a means to identify artistic talent in elementary school that is superior to most if not all measures of cognitive skill or ability. The cognitive measures used in this study could not match the judgment of experts, who in ordinary evaluations can function as consultants as well as raters.

One should hasten to add that even though the cognitive measures were limited in their usefulness as predictors of arts interest, the measure of arts interest (the Creative Arts scale on the UNIACT) performed quite well in relation to the ratings by experts, both one and three years after the ratings. Although it might not be as stable in upper elementary as in junior high years, an arts orientation

does seem to be emerging during this period. It seems to be more closely related to competence (in terms of originality and talent in expression) than to cognitive skill or ability. Originality and technical skill, then, should be assumed to be the leading indicators of an arts orientation, rather than cognitive skills, and early attempts to discover talent should be based on these indicators.

Amabile (1983, pp. 37-63) has perhaps done the most work to establish the reliability of a "consensual assessment technique" to provide an alternative to standardized tests to assess creativity. This technique relies on ratings of artwork by multiple judges, who usually have some degree of expertise. Although Amabile and her colleagues have not always trained judges nor provided them with evaluation criteria, she has been consistently able to arrive at reliability coefficients of .75 to .90 over single tasks (such as rating collages or Haiku poems), indicating a considerable degree of agreement among judges. Agreement may be higher among low or moderate ratings than among high ratings, and it may not be as high over multiple tasks as on a single task (Runco, 1989), but this or a somewhat more structured technique for evaluating creativity needs to be explored as an alternative to objective tests, particularly to assess the artistic creativity of elementary school children.

The second insight gained from this study relates to the nature of problem finding. The creative-thinking exercise (that introduced problem finding) was highly correlated with divergent thinking, but creative thinking was a better predictor of various criteria of creativity and artistic competence than was divergent thinking.

It appears that problem finding requires skills or abilities that were not assessed by the IQ measures, but that at the same time were correlated with achievement and creativity criteria. Getzels and Jackson (1962, pp. 26-28) noted similar findings with respect to achievement among their group of 26 "high creative" in comparison to "high IQ" adolescents. Getzels and Jackson found that achievement scores of the creative group matched those of the highly intelligent group. Even though they were working with divergent-thinking tests, their explanation still seems valid: The finding "may be related to excellence in cognitive functions not sampled by standard intelligence tests" (p. 27).

What might these other cognitive functions be? What the task in the Kilby study suggests is that the more creative children were superior in intuitive perception than the less creative children. Recall here that intuitive perception is the term MacKinnon (1978, pp. 130-131) used to describe perception that is not stimulus-bound, but stimulus-free and capable of perceiving possibilities rather than just realities. This form of perception is called for on divergent-thinking tasks (e.g., Getzels & Jackson, 1962, pp. 127-128), but when problem finding is involved in the task, intuitive perception seems to be called for to a greater degree. If the reality of the blank card were uniquely to be perceived, the result might be what corresponds to "writer's block:" anxiety that prevents effectively dealing with the situation.

Other cognitive skills or personality characteristics that may contribute to creative thinking (such as imagination and independence) appeared to contribute

about equally to creative and divergent thinking. One personality characteristic that appeared to differentiate creative from divergent thinking was the GIFT scale labeled Many Interests. Items on this scale indicated many hobbies, interest in making up stories and in art, and interest in other times and places. The difference in correlations with creative versus divergent thinking was not a result of the item to assess interest in art ("I like to paint pictures"), which all except one student endorsed, but of interests in hobbies and other times and other people. This result suggests that many interests are derived from openness to experience, which is another characteristic of creative individuals (MacKinnon, 1978, p. 129).

The third insight gained related to the nature of the divergent-thinking tests used, and what they measure. They differed from the creative-thinking exercises in their significant correlations with both verbal and nonverbal intelligence measures. Also of interest was their somewhat higher correlation with verbal ability (as measured by the WISC-R Vocabulary scale) than with nonverbal ability (as measured by the WISC-R Block Design scale). The divergent-thinking exercise used in this study seemed to have a verbal bias that was absent from the creative-thinking exercise. This finding contrasts with the results of Wallach and Kogan for the verbal and performance WISC-R scales in their study, which were neither positively nor differentially correlated with frequency of response to patterns or lines. This contradiction is puzzling, because all of the measures adopted from the Wallach and Kogan study were administered as reported in that study.

These results do confirm the hypothesis that at least in some studies, some divergent-thinking measures calling for verbal response have a verbal bias that renders positive correlation with ratings of drawings for artistic merit less likely (Lloyd-Bostock, in 1979). Verbal measures of divergent thinking do not correlate well with measures of visual imagination (McHenry & Shouksmith, 1970). Neither does the verbal bias of some divergent-thinking measures render correlation with arts interest more likely, because arts interest does not necessarily share the verbal bias. Arts interest in this study did not correlate significantly or differentially with verbal versus nonverbal intelligence (.09 vs. .13).

As mentioned earlier, this technical point is important, but one can get so bogged down in technicalities that the overall picture becomes obscured. The overall picture in the Kilby study suggests that in the long run, many determinants other than thinking skills affect developing career orientations. Artistic competence in the elementary years has already been singled out as the best predictor of an arts orientation as children enter high school. In addition, children's home environment, school environment, and even their community and society may influence their developing career orientation. The six-year follow-up hints at such factors: different home environments, the closing of a small art school, the ethos of a high school, a newspaper contest that displays talent to the community, and so on. The three- and six-year follow-ups reveal that thinking skills may only indirectly influence the development of an arts orientation.

What emerges from this small, longitudinal study of creative thinking is the tentative conclusion that artistic competence is a better indicator of the development of artistic talent than is a creativity test score. Although experimental measures of creative thinking which incorporate problem finding as well as open-ended problem solving offer us new insights into the nature of creative thinking, they may be limited as measures of taient in any single domain. Talent in its domain-specific manifestation may not only be a combination of cognitive skills, but a continuously developing product both of cognition and personality, and of the individual and his or her environment.

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Table 1

Fifth-Grade Means and Standard Deviations (N = 23)

Variable	Mean	SD
WISC-R Scales		
Vocabulary	12.9	2.5
Block Design	11.4	2.4
Picture Arrangement	11.3	1.9
Achievement Scales		
CAT Language	591.5	59.9
CAT Mathematics	507.4	39.0
Divergent Thinking	3.7	1.7
Creative Thinking	4.8	2.7
GIFT Total (NCE score)	60.0	17.6

Table 2

Intercorrelation of Variables for Fifth Graders (N = 23)

	1. WISCV	2. WISCB	3. WISCP	4. CATL	5. CATM	6. DT	7. CT	8. GIFT	9.[a] ArtR	10[b] ArtI
1.	-	.66*	.37*	.34	.29	.45*	.23	.40*	-.23	.09
2.		-	.26	.49*	.28	.36*	.20	.31	-.03	.13
3.			-	.26	.38*	.18	.09	.26	-.06	.05
4.				-	.69**	.39*	.41*	.27	.05	.22
5.					-	.28	.40*	.41*	-.04	.20
6.						-	.76**	.33	.10	.36
7.							-	.46*	.38*	.43*
8.								-	.20	.40*
9.									-	.59**

Note: WISCV = WISC-R Vocabulary; WISCB = WISC-R Block Design: WISCP = WISC-R Picture Arrangement; CATL = CAT Language; CATM = CAT Math; DT = Divergent Thinking; CT = Creative Thinking; GIFT = Group Inventory for Finding Creative Talent; ArtR = Rated artistic merit of drawings; ArtI = Artistic Interests.

[a]Spearman rank-order correlation coefficients

[b]N = 19

*p < .05

**p < .01

Author Note

This paper is based on "Creative Thinking in the Fifth Grade," Chapter 2 of Creative thinking: Problem-solving skills and the arts orientation (Norwood, NJ: Ablex Publishing Corporation, 1992).