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The Degree of Relatedness of Four Creative Personality Factors with Ideational Fluency of Intermediate Grade Children.

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THE DEGREE OF RELATEDNESS
OF FOUR CREATIVE PERSONALITY
FACTORS WITH IDEATIONAL FLUENCY
OF INTERMEDIATE GRADE CHILDREN

SCOTT G. ISAKSEN

THE DEGREE OF RELATEDNESS OF FOUR CREATIVE PERSONALITY
FACTORS WITH IDEATIONAL FLUENCY OF
INTERMEDIATE GRADE CHILDREN

A Thesis

Presented to the Faculty of
the Interdisciplinary Center for Creative Studies
State University College at Buffalo
Buffalo, New York

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

by

Scott G. Isaksen

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THE DEGREE OF RELATEDNESS OF FOUR CREATIVE PERSONALITY
FACTORS WITH IDEATIONAL FLUENCY OF
INTERMEDIATE GRADE CHILDREN

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Sidney J. Parnes

Interdisciplinary Center for Creative Studies

The study was concerned with the relationship between creative personality traits as measured by Williams' "How Do I Really Feel About Myself?" Inventory (1972) and ideational fluency as measured by item five of the Alternate Uses Test from the Wallach and Kogan (1965) ideational productivity battery. The second objective of the study was to ascertain the relationships between each of the four sub-scales of Williams' Inventory (curiosity, complexity, imagination, and risk-taking) and ideational fluency. Additional objectives of the study were to determine the test-retest reliability of the Williams' Inventory as well as the feasibility of using the inventory with intermediate grade children.

The sample consisted of 81 intermediate grade children. The main comparison group was comprised of 51 subjects who were used to determine the relationship between the total inventory scores and ideational fluency as well as between each sub-scale and ideational fluency. The remaining 30 students participated in the test-retest reliability study.

For the main comparison group, the experimenter presented the Williams' Inventory orally to the subjects in a group setting. Next, the subjects received the

ideational fluency measure on an individual basis, with a game-like atmosphere, and without time limitation.

The test-retest reliability group was given the inventory orally in a group situation. The test-retest reliability interval was two weeks.

The results indicated a significant relationship between the total score of the Williams' Inventory and the score on the ideational fluency measure ($r=.62$, $p < .001$). There was a significant relationship between each of the four sub-scales and ideational fluency. The sub-scales were curiosity, complexity, imagination, and risk-taking. Their respective correlations with ideational fluency were $r=.57$, $p < .001$; $r=.42$, $p < .01$; $r=.42$, $p < .01$ and $r=.51$, $p < .001$. The test-retest reliability was moderately high ($r=.75$, $p < .001$).

The results indicated that there was a significant relationship between the composite score on the Williams' Inventory and ideational fluency. Each of the inventory's sub-scale scores were significantly correlated with ideational fluency. This, combined with the inventory's reliability and ease of administration suggested its use as an assessment instrument for intermediate grade students.

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INTRODUCTION

The present study is concerned with the affective components of creative functioning. Much research has been conducted to determine the personality correlates of creativity (see appendix A). Studies have correlated self-perception questionnaires with a variety of creativity measures (Halpin, Payne and Ellett, 1973; Curry, 1970; Khatena, 1972; Ference, 1971; Davis and Rim, 1976; and Holmes, 1976). This study was concerned with an inventory which measures specific creative-personality traits (curiosity, complexity, imagination, and risk-taking) and their correlation with "cognitive-creative functioning" as measured by a Wallach and Kogan (1965) test of ideational fluency. The study has determined the relationship of the score on the inventory and each of the sub-scales (mentioned above) with ideational fluency.

Guilford (1976b) suggests that creative-personality traits have a relatively enduring nature. Consequently, the study examined the test-retest reliability of the Williams' Inventory. Since there exist an ever-increasing number of educational programs with affective-creative objectives, the study was concerned with the usability of the inventory as an assessment instrument for objectives relating to curiosity, complexity, imagination and risk-taking.

The term creativity has been rather vague. Wallach and Wing (1969), in studying talented students, made a distinction between creativity and intelligence. They found some forms of cognitive ability to be more independent of conventional intelligence than others. Generally, they

found characteristics that were of two basic types: a person's ability to generate a large number of ideas in response to a given task requirement; and his ability to produce many unique ideas. They found that the sheer output of ideas is a more potent indicator of creative accomplishment than uniqueness of ideas. Their findings suggest that a person's readiness to generate ideational possibilities would act as an index of his overall disposition toward creativity.

For the purposes of the present study, the indicator of cognitive-creative functioning was ideational fluency, defined by Wallach and Kogan (1965) and Wallach and Wing (1969) as being the number of ideas generated in response to a given task requirement.

Focusing on the affective components of creative functioning, Williams (1972, p.66) found four consistent characteristics in evaluating personality traits of highly creative children. The identifiable traits, which Williams defines, are curiosity, complexity, imagination, and risk-taking:

Curiosity: The thirst to be inquisitive and want to know. To toy with an idea and try it on for size. Willingness to question, explore and follow an inclination just to see what might happen.

Complexity: The challenge to appreciate intricate problems or ideas. To seek order out of disorder and delve into gaps that exist between how things are and how they might be.

Imagination: The power to wonder or feel intuitive about something that has never happened to the child. To visualize and build images of things or places never ventured into. The ability to dream in a world of fantasy.

Risk-Taking: The courage to make a guess, be different or take a dare. To be able to function without structure and face failure, mistakes, or criticism.

In developing A Total Creativity Program for Individualizing and Humanizing the Learning Process, Williams constructed an inventory to measure the person's view of himself as being a risk-taking, curious, complex, and imaginative individual. For a more complete explanation of the inventory, please refer to appendix D.

Research Material Related to the Study

Creative-Personality

Hinton (1970) states that there are various general interrelationships between creativity and personality and that a great deal more research is needed to attain a more stable profile of these relationships. Davis, Peterson and Farley (1974, p.33) indicate that recent measures of creative abilities ask for attitudinal, personality, and motivational information. "The resultant assumption is that creative people do possess certain attitudes and personality patterns which predispose them to behave creatively."

Since there exist numerous studies, beyond those mentioned above, which synthesize the research relating personality variables and creativity (Arnheim, 1967; Barron, 1968; MacKinnon, 1962; Roweton, 1973; Smith, 1966; Torrance, 1962; Welsh, 1973; Williams, 1971; and Yamamoto, 1973), this review will examine only the four personality traits mentioned by Williams.

In identifying his four consistent personality traits of curiosity, complexity, imagination and risk-taking, Williams (1972) utilized the studies of MacKinnon (1962), Torrance (1965, 1970), Starkweather (1968), Barron (1969), and Many and Ellis (1968). The studies cited in this writing do not represent an exhaustive review of the characteristics, but they lend further support to Williams'

rationale.

Curiosity. Curiosity has been found to be highly related to individuals who possess a relatively high degree of creative thinking ability. Towell (1972) used teacher and self-judgment instruments to identify curiosity, and Torrance Tests of Creative Thinking to obtain an overall creative thinking score. He found that, compared with low scorers on curiosity, elementary school pupils with high curiosity obtained significantly higher scores on the timed test of creative thinking. Langevin (1970), in studying the relationships among the measurements of curiosity, intelligence, and creativity, found curiosity measures to be reliable predictors of creative performance. Barron (1968), in studying a sample of 162 undergraduates at Rhode Island School of Design, determined the relationships among five personality variables (originality, creativity, achievement motivation, curiosity, and self-confidence). He administered the California Psychological Inventory, the Minnesota Multiphasic Personality Inventory, the Barron-Welsh Art Scale, the Guilford Consequences Test, and two questionnaires constructed by the testing committee. The correlations demonstrated significant relationships between curiosity and creativity. Other studies that support these findings include: Hammond (1968), Rosenshield (1967), Salzer (1967), and Susskind (1969).

Risk-Taking. Studies have indicated that risk-taking is a significant factor in identifying creative potential (Pankove and Kogan, 1968; Strum, 1971). Holland (1961) sampled high school students involved in National Merit Competition. He designed a risk-taking measure which included the tendencies of independence, expressiveness, asocial behavior, conscious originality, and high aspirations for future achievement. Holland reported creative performance occurred more frequently among those students

with a high risk-taking score. Pankove (1967) examined the relationship between creativity and risk-taking in fifth-grade children. She utilized various manipulatory devices to measure risk-taking ability (ring toss, clues, shuffleboard). There was a positive, significant relationship for the boys. There was a positive, but not significant, relationship for the girls. She also found that creativity and intelligence exerted a combined effect on risk-taking, however, creativity had a greater influence. Conversely, Dunn (1974), conducting a similar study using manipulatory devices, found non-significant results for both sexes. The contrary finding may result from the lack of a clear and precise definition for the creativity measurement task. Summerfield (1974), in assessing the relationship of age, creativity and risk-taking to self-actualization, found risk-taking and creativity to be highly related. In addition, both of these factors were related to self-actualization.

Complexity. Preference for complexity has been viewed as a creative personality trait (Eisenman, 1972). Arnheim (1967) writing in Art and Visual Perception: A Psychology of the Creative Eye describes complexity as being essential for artistic differentiation and creative artistic imagination. Barron (1968), in studying the simplicity and complexity relationship to personality, developed the Barron-Welsh Art Scale in conjunction with Welsh. He gave both the scale and the Minnesota Multiphasic Personality Inventory to 80 male graduate students who were artists and non-artists. The results indicated that the person who decided in favor of complexity was, in general, more original, creative, and has a greater tolerance for unusual ideas and formulations. MacKinnon (1962) found that creative architects showed not only an openness to their own feelings and emotions, keen self-awareness, positive self regard and wide

interests, but, most clearly, a preference for the complex. Smith (1970, p.70), in discussing the social-emotional nature of creativeness states: "The creative person delights in complex situations which demand he discover unifying principles to organize and integrate. He is often challenged by disorder." Smith's statements agree with the findings of Taylor (1961) and Barron (1955).

Imagination. Imagination has been conceptualized in a multitude of diverse ways. For example, Alex Osborn (1963, p.27) states:

...imagination is a field so wide and so hazy that a leading educator has called it an area where psychologists fear to tread. For it takes many forms--some of them wild, some of them futile, some of them somewhat creative, and some of them truly creative.

Generally speaking, imagination is related to originality, creativity, non-conformity, aesthetic sensitivity, independence, expressiveness, and a wide range of other variables (Osborn, 1953; Barron, 1968; Parnes, 1967; Gough, 1962). Because of the wide diversity in the conceptualization of the term imagination, as compared with the more precise and consistent conceptualizations of the other three sub-scales discussed, no attempt will be made to elaborate on the many studies surrounding this term; instead the reader is referred to the above six references and appendices A, B, and C.

Cognitive-Creative

Since Getzels and Jackson (1962), Guilford (1976b), Torrance (1974), and Wallach (1969) conducted extensive literature reviews on the intellectual-cognitive nature of creativity, the remainder of the review will examine only selected research relating to this area.

Wallach and Kogan (1965) and Wallach and Wing (1969) broke away from traditional methods of testing creative performance and attempted to find a better way. In reviewing the forms of cognitive activity and research by Guilford and others, Wallach (1969) found that some of these forms seem to be more independent of intelligence than others. Wallach and Wing (1969, p.13) state:

Various researchers have been concerned with trying to isolate forms of cognitive activity that might be meaningfully described as tapping creative roots in thought processes, as distinct from mere reflections of a person's level of general intelligence.

Wallach and Kogan (1965) used a sample of fifth-grade children and administered measures which originated from Guilford. The measures were modified so that time constraint, testing atmosphere, and implication for evaluation were nearly eliminated. Their findings were significant and identical for children of both sexes. Number of ideas generated and number of unique ideas were consistent across various tasks, in their relationship with each other, and in their independence from various indices of intelligence. A study by Christensen, Guilford and Wilson (1957) supports the finding that the number of ideas heavily influenced the number of unique ideas. The results of other researchers have also been supportive (Ward, 1968; Bereiter, 1961; Clark, Veldman and Thorpe, 1965; Orpet and Meyers, 1966; McGuire, Hindsman, King and Jennings, 1961; and Garwood, 1964).

In a later study, Wallach and Wing (1969) examined the creativity-intelligence distinction using the measures of the number of ideas and the number of unique ideas as indicators of creative performance across a wide variety of content areas (leadership, art, social service, literature, dance, dramatic arts, music and science). They found that

their measures of overall ideational ability were unrelated to intelligence and that the number of ideas, rather than the uniqueness of ideas, was a more potent indicator of creative abilities in the various content areas. Further support of these findings comes from personal communication with Dr. A. Simberg (1976), who contributed to the development of the A/C Test of Creative Ability for General Motors Corporation:

Harris and Simberg, in considering the A/C Creative Ability Test, found such a high correlation between ideational fluency and other more qualitative factors that they now have modified the measure's evaluation to include simply the number of ideas.

Specific Statement of Hypotheses

The specific hypotheses for the study were as follows: there will be a relationship between the total scores on the Wallach and Kogan (1965) ideational fluency measure and the total scores on the Williams' Inventory; there will be a relationship between each of the sub-scales (curiosity, complexity, imagination, and risk-taking) of the Williams' Inventory and the Wallach and Kogan (1965) ideational fluency scores. Also, a test-retest reliability study was completed on the Williams' Inventory. Lastly, the research was concerned with how appropriate and usable the Williams' Inventory would be with intermediate grade children.

METHODOLOGY

Subjects. Eighty-one intermediate grade children were selected from a team of 150 fourth- and fifth-graders. Fifty-one of these children, the main comparison group, comprised two intact classes. For the test-retest reliability study, an additional 30 students were selected from the remaining 99 fourth- and fifth-graders. The test-retest reliability group was selected on the basis of time availability during a non-instructional time. All subjects were volunteers. For the main comparison group, there were 11 fourth- and 18 fifth-grade boys. There were eight fourth- and 14 fifth-grade girls. The test-retest reliability group consisted of six fourth- and seven fifth-grade boys, and eight fourth- and nine fifth-grade girls.

Instruments. The instrument used to assess the personality traits was Williams' "How Do I Really Feel About Myself?" Inventory (see appendix D). A validation study was conducted by Williams (1971) utilizing the Torrance Tests of Creative Thinking. High and low scoring groups on creative thinking differed significantly on the affective inventory. Williams (1971, p.31) found:

...high performers on the four cognitive factors of fluent, flexible, original, and elaborative thinking also scored high on the four affective factors of curiosity, complexity, imagination, and risk-taking; and visa versa for the low scoring group.

However, no reliability information was available on Williams' instrument and no studies have examined the relationship of the four sub-scales to other creativity variables (Williams, 1976).

The cognitive-creative test instrument was item five from the Alternate Uses Test, scored for the number of ideas alone (ideational fluency). It was taken from the Wallach and Kogan (1965) battery for Ideational Productivity. With respect to quantity scores, the Spearman-Brown Split Half reliability coefficient for the Alternate Uses instrument is .93. The Item-Sum correlation for item five is .86. The validity of the Ideational Productivity measure has been demonstrated in Wallach and Kogan (1965) and Wallach and Wing (1969).

Procedure. For the main comparison group, the 51 children were used to determine the relationship of the total inventory score and the sub-scale scores with ideational fluency. The Williams' Inventory was read to the total group during a 31 minute session. The Williams' (1972) scoring procedure was followed.

One day later, the experimenter initiated individual testing of the 51 subjects using item five of the Alternate Uses Test. It was communicated to the individual, informally, as suggested by Wallach and Kogan (1965, pp.30-31):

Now, in this game, I am going to name an object--any kind of object, like a light bulb or the floor--and it will be your job to tell me lots of different ways that the object could be used. Any object can be used in a lot of different ways. For example, think about string. What are some ways you can think of that you might use string? (Let the child try.) Yes, those are fine. I was thinking that you could use string to attach a fish hook, to jump rope, to sew with, to hang clothes on, and to pull shades. (Vary suggestions so as not to duplicate any the child has provided.) There are lots of other ways, too, and yours are good examples. I can see that you already understand how we play the game. So, let's begin now. And remember, think of all the different ways you could use the object I name. Here we go.

Tell me all the different ways you could use a shoe (item five).

The general procedure of Wallach and Kogan (1965) was followed for the individual "testing" situation:

The child is given as much time as he wishes for each item. That is, the experimenter exerts no pressure for speed on an item; rather, he encourages the child to continue working on a given question as long as he seems at all motivated to do so. Only if the child indicates with some finality that he is finished with the given question, does the experimenter conclude. The experimenter will later record the number of responses given by the child, not counting duplicate items.

In order to assess the reliability of the inventory, it was administered in a one-half hour session to the secondary comparison group of 30 students. Two weeks later, the inventory was administered again to the same group. In both testing situations the instructions and questions were read. The test-retest reliability of the Williams' Inventory was computed.

RESULTS

Regarding the main group comparisons, the results indicated a significant relationship between a subject's total score on the Williams' Inventory and his score on the ideational fluency measure. Also, each of the Williams' Inventory sub-scales (curiosity, complexity, imagination, and risk-taking) was significantly related to ideational fluency (see table 1).

TABLE 1

PEARSON PRODUCT MOMENT CORRELATION COEFFICIENTS OF THE
WILLIAMS' INVENTORY WITH IDEATIONAL FLUENCY FOR
THE MAIN COMPARISON GROUP

Inventory	r with Ideational Fluency	t Value
Total Score	.62	5.33**
Curiosity	.57	4.85**
Complexity	.42	3.26*
Imagination	.42	3.22*
Risk-taking	.51	4.10**

Note: N=51, df=49 for all comparisons.

*p < .01

**p < .001

The data for the secondary group showed the test-retest reliability of the Williams' Inventory to be high (.75, $p < .001$).

It was noted that the Williams' Inventory was easily administered orally to this intermediate grade sample.

The results show that each of the sub-scale traits is significantly related to lateral fluency. All correlations were positive and significant, but of moderate value.

Regarding reliability, Guilford (1956) has often defined an individual's lateral fluency as the number of responses generated in response to a stimulus. Guilford (1956) also reported that lateral fluency is a measure of creativity. The results indicate stability for lateral fluency over the two test periods and are supportive of the Guilford definition.

Given the reliability of the Inventory and the appropriate methodological procedures for presentation of instructions and questions, the Inventory may be used as an assessment device with intermediate grade students in programs having a lateral fluency objective.

DISCUSSION AND CONCLUSIONS

The results supported the first hypothesis. Indeed, the personality traits of curiosity, complexity, imagination and risk-taking were related to ideational fluency. The composite score for these characteristics was directly related to ideational fluency. Given the coefficient of .62, it would be reasonable to expect groups who score high on the inventory total to score high on ideational fluency. With the variables under consideration, evidence has been provided that the affective and cognitive traits of creative functioning are related.

The results show that each of the sub-scale traits is significantly related to ideational fluency. All correlations were positive and significant, but of moderate value.

Regarding reliability, Guilford (1976b) has often defined an individual's personality as a unique, relatively enduring, pattern of traits; whereas, Treffinger and Poggio (1976) do not expect stability in emotional or irrational measures of creativity. The results indicate stability for these traits over the two week period and are supportive of the former position.

Given the reliability of the inventory and the appropriate methodological modifications (oral presentation of instructions and questions) the instrument might be used as an assessment device with intermediate grade students, in programs having creativity objectives.

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APPENDIX A

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*This is a listing of studies relevant to creative personality. The author has conducted a search through a variety of materials including: indexes available from the Journal of Creative Behavior, lists of studies furnished by the Creative Education Foundation, The Index of Scientific Writings on Creativity by Albert Rothenberg and Bette Greenburg (Archon Books, 1976), and an ERIC key word search.

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APPENDIX B

MacKinnon, in summarizing research, lists the following traits of creative people:

1. Creative people do not represent stereotypes.
2. Creative people are well above average in intelligence.
3. Creative people possess verbal intelligence, spatial intelligence, or sometimes both.
4. Creative persons have unusual capacity to record and retain and have readily available the experience of their life history.
5. They are discerning and observant in a different fashion; they are alert, capable of concentrating readily and shifting if appropriate; they are fluent in scanning thoughts and producing those that serve to solve the problems they undertake; they have a wide range of information at their command.
6. Intelligence alone will not tend to produce creativity. Creativity is the relevant absence of repression and suppression as mechanisms for the control of impulse and imagery. Repression operates against creativity, regardless of how intelligent a person may be.
7. The creative person, given to expression rather than suppression or repression, thus has fuller access to his own experience, both conscious and unconscious.
8. Openness to experience is one of the most striking characteristics of a highly creative person.
9. A highly creative person has a closer identification of feminine traits or characteristics in himself than non-creative. He is more open to feelings and emotions.
10. Everyone perceives and judges, but the creative person tends to prefer perceiving to judging. "Where a judging person emphasizes the control and regulation of experience, the perceptive creative person is inclined to be more interested and curious, more open and receptive, seeking to experience life to the full."
11. Artists, in general, show a preference for feeling, scientists and engineers a preference for thinking. The architects are somewhere between the two groups.
12. A highly creative person is relatively less interested in small detail, more concerned with meaning and implication. He is relatively uninterested in policing his own impulses and images or those of others.
13. A creative person is genuinely independent.
14. He has preference for complexity and his delight is in the challenging and the unfinished.

APPENDIX C

Torrance also made a summary of the studies which tried to identify the personality traits of a highly creative person. He lists the following traits:

1. strong affection
2. altruistic
3. always baffled by something
4. attracted to the mysterious
5. attempts difficult jobs (sometimes too difficult)
6. bashful outwardly
7. constructive in criticism
8. courageous
9. deep and conscientious convictions
10. defies conventions of courtesy
11. defies conventions of health
12. desires to excel
13. determination
14. differentiated value-hierarchy
15. discontented
16. dominant (not in power sense)
17. a fault-finder
18. doesn't fear being thought "different"
19. feels whole parade is out of step
20. likes solitude
21. industrious
22. introversive
23. keeps unusual hours
24. lacks business ability
25. makes mistakes
26. never bored
27. not hostile or negativistic
28. oddities of habit
29. persistent
30. receptive of ideas of others
31. regresses occasionally
32. reserved
33. resolute
34. self-starter
35. sense of destiny
36. shuns power
37. sincere
38. not interested in small details
39. speculative
40. spirited in disagreement

41. tenacious
42. thorough
43. somewhat uncultured, primitive
44. unsophisticated, naive
45. unwilling to attempt anything on mere say so
46. visionary
47. versatile
48. willing to take risks

E.P. Torrance, Guiding Creative Talent, Prentice-Hall, 1962, pp.66-67.

APPENDIX D

ADMINISTERING AND SCORING THE "HOW DO YOU REALLY FEEL
ABOUT YOURSELF?" INVENTORY

ADMINISTERING

You may want to duplicate the exercise shown on pages 12, 12a and 12b. After reading the instructions at the top with the class, ask them to make their most appropriate selection for each sentence. Collect the exercise when the class finishes and score. This is not a timed exercise but should be completed by an upper grade class in one period. For lower grade classes, you may wish to read the sentences aloud with the children. Give only half of the exercise at one time. Collect and score the same way.

SCORING

The following key indicates the most proper answer to each item on the inventory as well as the factor which the item measures. This exercise is constructed to measure the person's view of himself as being a risk-taker (items marked RT), curious (items marked CU), complex (marked CO), and imaginative (marked IM). Of the 50 items, 12 contribute to curiosity, 12 to imagination, 13 to risk-taking, and 13 to complexity. Those items that the pupil selects according to the key below should receive a weighting of two points each. Hence, if all answers agree with the key, 100 raw score points are possible. Answers in the two columns other than the "cannot really decide" column should receive a weighting of 1. If a pupil decides on answers which do not agree with the key, his or her score could be a possible 50 raw score points. For those sentences which the pupil cannot decide on and for which he places an X in the "cannot really decide" column, one point for each should be subtracted from the total score. These items are weighted -1, which penalizes the person who is undecided. Indecision indicates low self-concept. Naturally, the higher raw score indicates the person who feels good about himself or herself. It has been well established that the more creative person knows himself better and has a very positive attitude about himself as being curious, complex, imaginative, and a risk-taker. You may want to obtain scores for each of the factors which the

exercise measures (risk-taking, curiosity, etc.) as well as the total score. In this way you may better learn the child's strengths (high factor scores) and weaknesses (low factor scores). These four feeling behavior scores and a total score should then be entered on each individual child's Creative Potential Profile (Page 15).

Note: The source for all items in Appendix D is Williams' A Total Creativity Program for Individualizing and Humanizing the Learning Process and are utilized with the author's permission.

KEY FOR SCORING "HOW DO YOU REALLY FEEL
ABOUT YOURSELF?" INVENTORY

Sentence Number	Factor Which the Sentence Measures	Mostly True	Partly True	Mostly Untrue	Cannot Decide
1	RT				
2	CU	X			
3	CU	X			
4	CO	X			
5	RT			X	
6	IM			X	
7	CO	X			
8	RT	X			
9	CO			X	
10	CO			X	
11	CU	X			
12	CU	X			
13	IM	X			
14	IM	X			
15	CO			X	
16	IM	X			
17	CO	X			
18	CO			X	
19	CU	X			
20	IM	X			
21	RT			X	
22	RT	X			
23	IM			X	
24	CO	X			
25	RT			X	
26	CO	X			
27	CU	X			
28	CU	X			
29	RT			X	
				X	

Sentence Number	Factor Which the Sentence Measures	Mostly True	Partly True	Mostly Untrue	Cannot Decide
30	IM	X			
31	IM	X			
32	RT				
33	CU			X	
34	RT				
35	RT			X	
36	RT	X			
37	RT	X			
38	CU	X			
39	CU	X			
40	IM			X	
41	IM	X			
42	CO			X	
43	CO	X			
44	RT	X			
45	RT	X			
46	IM	X			
47	IM	X			
48	CU	X			
49	CO			X	
50	CU	X			
	CO	X			

"HOW DO YOU REALLY FEEL ABOUT YOURSELF?" INVENTORY

SAMPLE INSTRUCTIONS AND QUESTIONS

INSTRUCTIONS

This is an exercise which will help you find out how you feel about yourself. You will find some sentences that definitely fit you better than others. These should be marked with an X in the "mostly true about me" column. Other sentences will not fit you at all and should be marked with an X in the "mostly untrue (false) about me" column. Still other sentences may explain you a little, but some parts of them do not seem to fit you. These should be marked with an X in the "partly true or untrue about me" column. Those sentences that you cannot decide about should be marked in the "cannot really decide" column. Try to first decide if the sentence fits, partly fits, or does not fit you at all before marking the "undecided" column. Mark every sentence, and do not think a long time about the sentence. There are no right or wrong answers. Mark the first feeling you have as you read each sentence. This is not a timed exercise, but work as quickly as you can. Remember, try to answer each sentence by the way you really feel about yourself. Place an X in the column you feel is most nearly like you.

QUESTIONS

1. In my class at school I try to make guesses about things even if I don't know the right answer.
2. I am inquisitive about things. For example, like looking through a microscope just to see what I might find.
3. I ask my mother, father, or best friend many kinds of questions when I do not know something.
4. I like a set schedule for doing things at home or at school.
5. Before I am willing to take a chance at playing a new game I want to be sure I will win.
6. It is easy for me to forget things I know, and dream about things I don't know.
7. I believe that if at first I don't succeed, I should keep on trying until I do.

8. I never suggest playing a game at a party that no one else has thought of.
9. I like known ways of doing things rather than trying out new ways.
10. It is good to know that very few things should be accepted as certain or completely true.
11. I am usually interested in doing different things rather than the same thing most of the time.
12. I prefer making new friends rather than keeping the same old friends.
13. I like to daydream about things that have never happened to me.
14. Some day I'd like to be a very socially popular person rather than a person talented in art, music or writing.
15. Some of my ideas are so exciting that I forget other things.
16. I would rather imagine being an astronaut than a business or professional person.
17. I get jumpy when things are uncertain and I don't know what's going to happen next.
18. I really like things that are different.
19. When my opinion differs from that of my parents, I usually wonder what their opinion is and why.
20. I enjoy watching a story on TV about history or some event in the past rather than watching a science fiction film about things that can never really happen.
21. It does not bother me to join a group of my classmates and to express my ideas.
22. I tend to keep quiet when things do not go well, when I fail, or when I make a mistake.
23. When I grow up I would like to create something never made or thought of before.
24. I like friends who are practical and conventional instead of friends who are "way out".

25. I do not like most rules or regulations.
26. I like to try and solve a problem for which I know there will not be a clear-cut answer.
27. I would like to experiment with ways to help control pollution.
28. Once I have solved a problem, I like to stick to that solution instead of trying other ones.
29. I prefer not to recite or talk in front of my class.
30. When reading a book or watching a movie, I like to imagine being one of the characters in the story.
31. I would enjoy writing about living 200 years ago.
32. I dislike it when my friends cannot make a decision.
33. I like to explore old trunks and boxes just to see what might be in them.
34. I would like to have my parents and teachers continue their old habits and ways of doing things instead of changing them.
35. I trust the way I feel about things.
36. It is exciting to make a guess and see if it might be true.
37. It is fun to try puzzles and games that cause me to wonder.
38. I am interested in mechanical things and wonder what they look like inside and how they run.
39. I would rather have a friend who never uses any imagination than one who gets silly ideas.
40. I like to think about new ideas even if they are never useful.
41. I like to have a place for everything and have everything in its place.
42. I think it would be exciting to try to solve some of the world's problems.
43. I like to try out new ideas just to see where they will take me.

44. When playing a game, I am usually more interested in enjoying it than winning it.
45. I like to think about many adventuresome things to do that no one has ever thought of.
46. When I look at a picture of a person I do not know, I like to imagine what that person might really be like.
47. In school or at home, I often look through many books or magazines just to see what is in them.
48. I believe there is just one right answer to most questions.
49. I like to ask questions about objects or situations that others do not usually think of.
50. I really like having a lot of interesting things to do at home or in school.

APPENDIX E

SPEARMAN-BROWN SPLIT-HALF RELIABILITY COEFFICIENTS
FOR THE TEN CREATIVITY VARIABLES (N=151)

Ideational Productivity Measure	Coefficient
Instances-uniqueness	.51
Instances-number	.75
Alternate Uses-uniqueness	.87
Alternate Uses-number	.93
Similarities-uniqueness	.87
Similarities-number	.93
Pattern Meanings-uniqueness	.88
Pattern Meanings-number	.93
Line Meanings-uniqueness	.82
Line Meanings-number	.93

Source: Wallach and Kogan (1965) pp.41.

ITEM-SUM CORRELATIONS FOR THE ALTERNATE
USES PROCEDURE (N=151)

Item	Correlation for Number
1	.80
2	.79
3	.83
4	.84
5	.86
6	.83
7	.83
8	.84

Source: Wallach and Kogan (1965) pp. 42.
Note: This table does not include the correlation for uniqueness.

INTERCORRELATION BETWEEN ALTERNATE
USES-NUMBER AND INTELLIGENCE
MEASURES (N=151)

Intelligence Measure	Intercorrelation
WISC-vocabulary	13
WISC-picture arrangement	09
WISC-block design	06
SCAT-verbal	16
SCAT-quantitative	13
STEP-mathematics	22
STEP-science	15
STEP-social studies	18
STEP-reading	14
STEP-writing	16

Source: Wallach and Kogan (1965) pp. 49.

Note: For 149 df, r's of .16 and .21 are significant at the .05 and .01 levels, respectively. Decimal points are omitted.

APPENDIX F

TABLE 2

RAW DATA FOR THE MAIN COMPARISON GROUP

Subjects	Williams' Inventory					Ideational Fluency
	Tl	Im	Cu	Co	Rt	
1	68	17	18	16	17	25
2	68	16	17	15	20	8
3	70	15	18	19	18	29
4	73	20	18	17	18	14
5	59	12	17	14	16	5
6	73	16	19	17	21	30
7	62	17	15	15	15	20
8	73	15	18	19	21	26
9	56	15	14	12	15	10
10	58	12	20	8	18	18
11	67	19	18	16	14	12
12	65	15	19	12	19	17
13	67	15	19	15	18	11
14	66	16	14	17	19	14
15	66	19	15	14	18	9
16	71	16	18	17	20	19
17	72	17	20	15	20	13
18	61	14	19	11	17	12
19	61	16	13	16	16	12
20	59	14	14	15	16	5
21	70	18	17	19	16	21

TABLE 2 Continued

Subjects	Williams' Inventory					Ideational Fluency
	Tl	Im	Cu	Co	Rt	
22	70	17	18	18	17	17
23	86	21	22	21	22	22
24	68	17	18	16	17	11
25	74	17	18	20	19	17
26	78	17	19	20	22	26
27	81	20	22	19	20	28
28	77	20	19	17	21	25
29	53	15	13	15	10	6
30	60	18	16	11	15	8
31	80	21	21	19	19	24
32	77	20	17	20	20	12
33	77	18	21	20	18	5
34	42	9	11	8	14	2
35	47	8	16	13	10	4
36	59	15	15	16	13	4
37	66	15	19	15	17	20
38	64	14	17	16	17	11
39	71	17	17	18	19	19
40	79	20	21	20	18	21
41	72	18	18	15	21	10
42	50	8	13	18	11	7
43	69	21	20	12	16	20
44	83	20	22	19	22	22
45	72	17	19	18	18	18
46	70	16	19	18	17	20
47	76	19	21	18	18	19
48	71	15	20	14	22	17

TABLE 2 Continued

Subjects	Williams' Inventory					Ideational Fluency
	Tl	Im	Cu	Co	Rt	
49	71	14	17	20	20	10
50	67	16	17	16	18	13
51	75	20	18	19	18	19

Note: Tl=total score, Im=imagination sub-scale score, Cu=curiosity subscale score, Co=complexity sub-scale score, and Rt=risk-taking sub-scale score.

1	68	18	17	18	15	62	18	14	15	17
2	65	21	24	9	13	58	14	21	15	16
3	72	19	18	16	20	75	15	17	18	21
4	70	18	18	18	20	60	21	21	18	22
5	68	17	14	15	16	61	13	14	14	18
6	61	17	18	16	16	72	14	18	18	18
7	78	19	18	21	18	74	17	17	17	18
8	62	17	14	14	13	64	14	14	14	17
9	57	14	13	13	11	66	7	14	16	16
10	68	14	12	16	16	53	13	14	12	15
11	63	9	9	10	8	61	16	15	15	20
12	68	14	14	12	13	65	13	16	16	13
13	64	21	21	18	23	70	16	23	17	21
14	71	18	18	18	18	80	20	21	18	19
15	64	14	14	14	20	67	18	13	11	18
16	62	16	17	18	20	67	13	18	14	20
17	70	17	21	16	20	74	18	21	17	18
18	65	14	13	18	20	75	17	13	18	21

APPENDIX G

TABLE 3

RAW DATA FOR THE SECONDARY COMPARISON GROUP

Subject	Test Scores					Retest Scores				
	Tl	Im	Cu	Co	Rt	Tl	Im	Cu	Co	Rt
1	58	18	17	8	15	62	18	14	15	15
2	57	21	14	9	13	56	13	11	16	16
3	72	18	18	16	20	75	19	17	18	21
4	70	18	16	16	20	80	21	21	16	22
5	60	12	14	16	18	60	12	14	16	18
6	67	17	18	16	16	72	18	18	18	18
7	76	19	18	21	18	74	22	17	17	18
8	62	12	21	14	15	39	14	6	7	12
9	57	14	19	13	11	40	7	13	10	10
10	58	12	12	16	18	53	12	14	12	15
11	32	9	9	10	4	51	16	15	10	10
12	58	15	16	12	15	59	12	16	16	15
13	86	21	23	19	23	79	16	25	17	21
14	71	16	19	18	18	80	20	22	19	19
15	64	14	14	16	20	67	15	13	21	18
16	62	10	17	15	20	67	13	18	16	20
17	79	22	21	16	20	74	20	21	17	16
18	65	14	13	18	20	75	17	13	23	22

TABLE 3 Continued

Subject	Test Scores					Retest Scores				
	Tl	Im	Cu	Co	Rt	Tl	Im	Cu	Co	Rt
19	72	18	19	15	20	71	18	17	17	19
20	61	14	17	16	14	55	14	16	14	11
21	66	12	17	19	18	70	14	18	17	21
22	76	18	21	19	18	80	21	19	20	20
23	66	15	15	16	20	73	15	19	19	20
24	51	9	15	13	14	51	9	11	15	16
25	50	6	14	11	19	50	6	13	11	20
26	75	19	16	17	23	72	18	16	18	20
27	70	16	18	20	16	82	19	22	21	20
28	65	13	19	17	16	73	15	20	23	15
29	80	17	22	19	22	81	20	20	19	22
30	65	14	19	17	15	65	14	19	17	15

Note: Tl=Total Williams' Inventory score, Im=score for imagination, Cu=score for curiosity, Co=score for complexity, and Rt=score for risk-taking.