THE RELATIONSHIP OF TELEVISION VIEWING TO CREATIVITY AND INTELLIGENCE IN YOUNG SCHOOL CHILDREN

by

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Abstract

An experiment was conducted in order to clarify the relationship of television exposure to cognitive development in young children. Measures of creativity and measures of intelligence (WISC Block Design and Vocabulary subtests) were administered to 160 Grade four and Grade seven children in three British Columbia towns which differed in television accessibility. The results suggested that television exposure has differential effects on the two traits 'creativity' and 'intelligence'. In terms of intelligence, a positive relationship was found between television viewing and vocabulary scores. The relationship between televiewing and creativity was found to be complicated by the type of stimulus material employed. In the case of verbal stimulus materials, children growing up without television obtained significantly higher mean creativity scores than children who grow up with television. In the case of figural stimulus materials, no clear relationship of television exposure to creativity emerged.

Table of Contents

	Page
ABSTRACT	i
TABLE OF CONTENTS	ii
LIST OF TEXT TABLES	iii
LIST OF APPENDIX TABLES	v
LIST OF FIGURES	x
ACKNOWLEDGEMENTS	xi
INTRODUCTION	1
METHOD	9
RESULTS	18
DISCUSSION	42
REFERENCES	51
APPENDIX	54

List of Text Tables

Page

Table 1. Mean Comparisons for Total Fluency Scores in Each Cell of Design 3 x 2 x 2 and Mean Comparisons for Total Fluency Scores Collapsed Over Grade and Sex. 20

Table 2. Mean Comparisons for Total Uniqueness Scores in Each Cell of Design 3 x 2 x 2 and Mean Comparisons for Total Uniqueness Scores Collapsed Over Grade and Sex 22

Table 3. Mean Comparisons for Verbal Fluency Scores in Each Cell of Design 3 x 2 x 2 and Mean Comparisons for Verbal Fluency Scores Collapsed Over Grade and Sex. . 24

Table 4. Mean Comparisons for Verbal Uniqueness Scores in Each Cell of Design 3 x 2 x 2 and Mean Comparisons for for Verbal Uniqueness Scores Collapsed Over Grade and Sex. 25

Table 5. Mean Comparisons for Visual Fluency Scores in Each Cell of Design 3 x 2 x 2 and Mean Comparisons for Visual Fluency Scores Collapsed Over Grade and Sex. . 27

Table 6. Mean Comparisons for Visual Uniqueness Scores in Each Cell of Design 3 x 2 x 2 and Mean Comparisons for Visual Uniqueness Scores Collapsed Over Grade and Sex 28

Table 7. Mean Comparisons for Vocabulary Scales Scores for Each Cell of Design 3 x 2 x 2 and Mean Comparisons for Vocabulary Scales Scores Collapsed Over Grade and Sex. 31

List of Text Tables (Cont'd)

Page

Table 8. Mean Comparisons for Block Design Scaled Scores for Each Cell of Design 3 x 2 x 2 and Mean Comparisons for Block Design Scores Collapsed Over Grade and Sex 33

Table 9. Mean Comparisons for Total IQ Scores for Each Cell of Design 3 x 2 x 2 and Mean Comparisons for Total IQ Scores Collapsed Over Grade and Sex 34

Table 10. Intercorrelations Among the Creativity Measures for the Total Sample 36

Table 11. Verbal and Visual Correlations in Each Cell of Design 3 x 2 x 2 and Verbal and Visual Correlations Averaged Over Grade and Sex 37

Table 12. Intercorrelations Among the Intelligence Measures for the Total Sample 39

Table 13. Intercorrelations Between the Creativity and Intelligence Measures for the Total Sample 40

List of Appendix Tables

Page

Table 1. List of Questions Concerning Television Viewing. . . . 54

Table 2. Source Table for the Analysis of Variance of the Total Fluency Scores - Grade x Town x Sex 2 x 3 x 2 . . 55

Table 3. Newman-Keuls Test of the Town Effect in the Total Fluency Scores 56

Table 4. Simple Main Effects Test of the Grade x Sex Interaction in the Total Fluency Scores 57

Table 5. Source Table for the Analysis of Variance of the Total Uniqueness Scores Grade x Town x Sex 2 x 3 x 2 58

Table 6. Simple Main Effects Test of the Grade x Sex Interaction in the Total Uniqueness Scores 59

Table 7. Source Table for the Analysis of Variance of the Verbal Fluency Scores Grade x Town x Sex 2 x 3 x 2 60

Table 8. Newman-Keuls Test of the Town Effect in the Verbal Fluency Scores 61

Table 9. Simple Main Effects Analysis of the Grade x Sex Interaction in the Verbal Fluency Scores 62

Table 10. Source Table for the Analysis of Variance of the Verbal Uniqueness Scores Grade x Town x Sex 2 x 3 x 2 . .63

Table 11. Newman-Keuls Test of the Town Effect in the Verbal Uniqueness Scores 64

Table 12. Source Table for the Analysis of Variance of the Visual Fluency Scores Grade x Town x Sex 2 x 3 x 2 65

List of Appendix Tables (Cont'd)

Page

Table 13. Source Table for the Analysis of Variance of the Visual Uniqueness Scores Grade x Town x Sex 2 x 3 x 2 66

Table 14. Simple Main Effects and Subsequent Newman-Keuls Analysis of the Town x Grade Interaction in the Visual Uniqueness Scores 67

Table 15. Source Table for the Analysis of Variance of the Vocabulary Scaled Scores Grade x Town x Sex 2 x 3 x 2 . . 68

Table 16. Newman-Keuls Test of the Town Effect in the Vocabulary Scores 69

Table 17. Simple Main Effects and Subsequent Newman-Keuls Analysis of the Town x Sex Interaction in the Vocabulary Scaled Scores 70

Table 18. Source Table for the Analysis of Variance of the Block Design Scaled Scores Grade x Town x Sex 2 x 3 x 2 71

Table 19. Source Table for the Analysis of Variance of the Total IQ Scaled Scores Grade x Town x Sex 2 x 3 x 2 72

Table 20. Intercorrelations Among the Creativity Measures, Among the Intelligence Measures, and Between the Creativity and Intelligence Measures for the McBride Grade Four Ss. 73

Table 21. Intercorrealtions Among the Creativity Measures, Among the Intelligence Measures, and Between the Creativity and Intelligence Measures for the McBride Grade Seven Ss. 74

List of Appendix Tables (Cont'd)

Page

Table 22. Intercorrelations Among the Creativity Measures, Among the Intelligence Measures, and Between the Creativity and Intelligence Measures for the Valemont Grade Four Ss 75

Table 23. Intercorrelations Among the Creativity Measures, Among the Intelligence Measures, and Between the Creativity and Intelligence Measures for the Valemont Grade Seven Ss 76

Table 24. Intercorrelations Among the Creativity Measures, Among the Intelligence Measures, and Between the Creativity and Intelligence Measures for the Salmo Grade Four Ss. . . 77

Table 25. Intercorrelations Among the Creativity Measures, Among the Intelligence Measures, and Between the Creativity and Intelligence Measures for the Salmo Grade Seven Ss. . . 78

Table 26. Intercorrelations Among the Creativity Measures, Among the Intelligence Measures, and Between the Creativity and Intelligence Measures for the McBride Grade Four Females 79

Table 27. Intercorrelations Among the Creativity Measures, Among the Intelligence Measures, and Between the Creativity and Intelligence Measures for the McBride Grade Four Males 80

List of Appendix Tables (Cont'd)

Page

Table 28. Intercorrelations Among the Creativity Measures, Among the Intelligence Measures, and Between the Creativity and Intelligence Measures for the McBride Grade Seven Females 81

Table 29. Intercorrelations Among the Creativity Measures, Among the Intelligence Measures, and Between the Creativity and Intelligence Measures for the McBride Grade Seven Males 82

Table 30. Intercorrelations Among the Creativity Measures, Among the Intelligence Measures, and Between the Creativity and Intelligence Measures for the Valemont Grade Four Females 83

Table 31. Intercorrelations Among the Creativity Measures, Among the Intelligence Measures, and Between the Creativity and Intelligence Measures for the Valemont Grade Four Males 84

Table 32. Intercorrelations Among the Creativity Measures, Among the Intelligence Measures, and Between the Creativity and Intelligence Measures for the Valemont Grade Seven Females 85

Table 33. Intercorrelations Among the Creativity Measures, Among the Intelligence Measures, and Between the Creativity and Intelligence Measures for the Valemont Grade Seven Males 86

List of Appendix Tables (Cont'd)

Page

Table 34. Intercorrelations Among the Creativity Measures, Among the Intelligence Measures, and Between the Creativity and Intelligence Measures for the Salmo Grade Four Females 87

Table 35. Intercorrelations Among the Creativity Measures, Among the Intelligence Measures, and Between the Creativity and Intelligence Measures for the Salmo Grade Four Males 88

Table 36. Intercorrelations Among the Creativity Measures, Among the Intelligence Measures, and Between the Creativity and Intelligence Measures for the Salmo Grade Seven Females 89

Table 37. Intercorrelations Among the Creativity Measures, Among the Intelligence Meausres, and Between the Creativity and Intellignece Measures for the Salmo Grade Seven Males 90

List of Figures

Page

Figure 1. Visual Creativity Items 12

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Although interest in the impact of television on human development is widespread, and television programs (e.g., Sesame Street) have sometimes been designed to stimulate development, the relationship between cognitive development and television exposure remains unclear. The present study was designed to assess the impact of television viewing on the performance of school-aged children on measures of creativity and intelligence, and on the relationship between creativity and intelligence

The difficulty of evaluating knowledge concerning the effects of television has been pointed out by Maccoby (1964), who suggests that it is tempting, if present day children are different in some ways from the children of previous generations, to attribute the changes to television and the other mass media. But it is obvious, she comments, that todays' children are growing up in surroundings that differ from earlier patterns of life in ways other than the accelerated use of mass media. For example, North American society has been recovering from the effects of a major war and living in the shadow of another one; population has shifted from rural to urban to suburban areas, with accompanying changes in the demands that are placed upon children; more mothers are working; and income and living standards have been rapidly rising. To sort out the effects of television from the complex changes that are occasioned by all these other shifts is a difficult task at best.

Yet the advent of television has created a few "experiments of nature", situations in which certain areas, while sharing in most of the social changes of recent times, are late in acquiring television.

Such areas can be contrasted with similar areas which have television, and thus the characteristics of children growing up with and without television can be compared. While there are certain risks in making comparisons of this type, (the towns may differ in other important, but less obvious ways), the findings of several such studies (e.g., Schramm, Lyle, & Parker, 1961), have been instructive.

The present study made use of a "natural" experimental setting for the general purpose of furthering television research, with the specific aim of focussing on the relationship of television viewing to creativity and intelligence in young school-aged children.

The relationship of TV-viewing to intelligence has usually been approached in terms of effects on school performance. A pioneer, extensive study of television effects on children made by Himmelweit, Oppenheim, and Vince (1958) in Great Britain, and a later, also comprehensive study by Schramm, Lyle, and Parker (1961) based on a large sample of North American children, agreed that television has little effect on general school performance. Schramm et al. (1961) did note, however, in their comparison of the two communities "Radiotown" and "Teletown", that children who had been growing up with television appear to come to school with about a one-year advantage in vocabulary. These authors commented, that so far as vocabulary represents general knowledge, it can be said with some confidence that television appears to help children get off to a fast start. However, this advantage apparently is not maintained. Children in the sixth and tenth grades in the two towns did not differ in vocabulary level. The present

study was designed so that comparability of results with the Schramm, et al. (1961) findings could be assessed.

While research interest in the nature of creativity and the creative process has been increasing exponentially (Guilford, 1964), and while several researchers have speculated on the relationship between creativity and television viewing, most have concentrated on only two aspects of the possible relationship. The first line of reasoning concerns changes in the amount of time children with access to television spend in certain other forms of activity, and is represented by Maccoby's (1951) statement that while some television time involves a shift from other mass media to television, much of it is taken from playtime, from practising musical instruments, and from other forms of activity which might be called 'creative' or 'productive'. Evidence concerning this hypothesis is vague. Although a survey by Shizuoda (1962) in Japan and the Himmelweit et al. (1958) study with a British sample both report no effects of TV-viewing on creative or expressive activities and interests, there is little comparability among methods used by the two studies and the measures of creativity employed were crude at best.

The second line of reasoning concerning the relationship between creativity and television viewing is represented by Furo (1971), who regards creativity as a predisposition which controls television behaviour, rather than as a variable potentially affected by it. The first attempt to empirically test this hypothesis was made by Wade (1972), who argued that creative adolescents would make only limited

use of the medium because they are committed to varied activities in their leisure hours, of which media are only a small part. Her findings, while supporting the hypothesized negative correlation between creativity and hours per week spent watching television ($r = -.290$, $p < .001$), do not rule out the alternative explanation of creativity as a variable which is itself affected by TV use. The present study represents the first attempt to test that hypothesis.

To talk about "creativity and intelligence", as if the two terms refer to concepts at the same level of abstraction is to assert, according to Wallach and Kogan (1965), that something akin to Spearman's G (Spearman, 1927) exists in the area of creativity. The concept of G is based on the substantial intercorrelations among traditional indices of intelligence. While evidence for specific abilities also exists (Thurstone, 1938), the fact that different intellectual abilities are appreciably intercorrelated does suggest the existence of a unified dimension of individual differences, and serves as a justification for assigning a single label such as "intelligence" to this domain. Thus, Wallach and Kogan (1965) argue, to speak of "creativity and intelligence", is to assert that these two concepts define dimensions of individual difference that vary independently of each other, or that are at most only minimally related. Yet several attempts to produce empirical evidence of a distinction between creativity and intelligence have failed. Getzels and Jackson (1962) obtained correlations between creativity and intelligence scores of about .3, approximately the same magnitude as the creativity part-score intercorrelations. Their results

were obtained with measures based on Guilford's (1956) work using his Structure-of-Intellect model. Guilford (1956) conceptualized creativity and intelligence as two different processes within the 'operations' dimension of his model, and labelled them respectively divergent and convergent thinking. Yet, Guilford has also reported (Guilford & Christensen, 1956) correlations between general intelligence scores and divergent thinking scores of about the same size ($\underline{r}$ = .25) as the intercorrelations among the divergent thinking tests themselves.

Wallach and Kogan (1965) argued that the kinds of procedures employed by the studies described above were too varied to define a cohesive dimension that is substantially independent of general intelligence. They developed new measures of creativity which were based on Mednick's (1962) definition of creative thinking as the forming of associative elements into new combinations which either meet specified requirements or are in some way useful. Wallach and Kogan (1965) reasoned that under conditions which would assure the appropriateness of associations a more creative person would give more verbal associations, and more that are unique, to a stimulus than would a less creative individual. They also noted that most previous attemtpts to assess creativity (e.g., Guilford & Christensen, 1956; Getzels & Jackson, 1962) had consisted of giving paper-and-pencil "tests" to groups of people, with time limits imposed. Wallach and Kogan (1965) suggested that in view of the literature describing the introspections of people known to be creative (Ghiselin, 1952; Rugg,

1963) it might be important to try to assess creativity under a relaxed, gamelike atmosphere in which subjects would not feel that their performance was being evaluated, or that they were under pressure to produce.

Wallach and Kogan (1965) studied the relationship between creativity and intelligence in 151 Grade 5 children. Their creativity tasks, designed to measure associative fluency and based on Mednick's (1962) theory of an associative basis of the creative process, included both verbal and visual items. These measures were administered to children individually, in a relaxed, gamelike atmosphere, with no time limits imposed. In contrast with the results obtained by Getzels and Jackson (1962), and by Guilford and Christensen (1956), Wallach and Kogan (1965) found non-significant correlations between creativity task and intelligence test scores (for 100 such correlations, average $\underline{r}$ = .09), and significant part-score correlations for each trait (for IQ, n = 45 correlations, average $\underline{r}$ = .51; for creativity, n = 45 correlations, average $\underline{r}$ = .41). Their interpretation was that they had succeeded in defining a dimension of individual difference which was independent of the traditional notion of general intelligence. Since publication of these results a number of partial replications of the creativity - intelligence distinction have appeared (e.g., Ward, 1968; Pankove & Kogan, 1968; Cropley & Maslany, 1969; Wallach & Wing, 1969; Williams & Fleming, 1969).

Based on the work of Wallach and Kogan (1965), a main assumption of the present study is that there exists a unified dimension of

individual difference in cognitive behaviour appropriately labelled creativity and that the two concepts 'creativity' and 'intelligence' define dimensions of individual difference that vary independently, or that are at most only minimally related. Consistent with this assumption it is possible to hypothesize differential effects of television viewing on the two traits, for example, positive or neutral effects on intelligence and negative effects on creativity. The Grade four and Grade 7 age levels were chosen for the present investigation in order to enable a comparison of the results with the Wallach and Kogan (1965) findings, and to extend the age generalizability of the observed creativity-intelligence distinction both downward and upward in age. Selection of the Grade 4 and Grade 7 age levels also enabled a comparison of the vocabulary results with those of Schramm et al. (1961).

The specific hypotheses of the study were as follows.

1. Creativity is a variable which is itself affected by television exposure, and children who grow up without television will obtain higher mean creativity scores than will children who grow up with television

2. If television can serve as a stimulus for intellectual development, it will be most likely to affect verbal measures of intelligence which are somewhat related to informational experience. Thus, in general, children growing up in towns with television reception will score higher on a vocabulary test than will children in a town lacking

television. However, if consistent with past findings, this effect will occur only for the younger children (Grade 4) and will not be maintained at the Grade 7 age level.

3. While television is likely to affect verbal intelligence tests scores, it is unlikely to affect performance - type intelligence test scores. To the extent that intelligence test performance is environmentally determined,direct experience rather than information accumulation would be expected to influence performance test scores. Thus, differences on the WISC block design test among children varying in television experience will be minimal.

4. The findings of Wallach and Kogan (1965) will be replicated by the present study. Low correlations between the creativity and intelligence measures, and high intercorrelations within each set of measures will be obtained, and thus the age generalizability of the creativity-intelligence distinction will be extended in both a downward and upward direction.

Method

Towns.

The study was conducted in three communities in British Columbia selected for their similarity with respect to population (town = about 750, area = about 2,500), econcomic base, ethnic background of residents, social structure, school system, and distance from larger metropolitan areas. One of the towns "NoTel", did not have television reception at the time of data collection (although a few residents located on hills surrounding the town reported that they sometimes picked up weak signals). The second community, "OneTel", received only one channel (CBC) and reception was reported to be poor (snowy) in certain areas or at certain times during the winter months. The third town "MultiTel", was not far from the United States border. Residents not on the cable got one U.S. channel (CBS) and those subscribing to the cable got one Canadian (CBC) and three U.S. (ABC, CBS, and NBC) channels. Reception in MultiTel was reported to be consistently good. The three towns thus represented a continuum of television experience.

While the community without television (NoTel) was not "pure" in the sense of complete absence of access to television, since a few of the residents from surrounding hills reported that they sometimes received weak signals from one station, and residents sometimes watched television when visiting elsewhere, fewer than 14% of the children tested had access to television on an everyday basis. This

provided a sharp contrast to the two TV towns (OneTel and MultiTel), where 100% of the children tested had access to television on an every-day basis.

Subjects.

A total of 160 school children from the three towns served as subjects. Fifty-eight of these children, 29 from Grade Four (19 males and 10 females) and 29 from Grade Seven (14 males and 15 females), were residents of NoTel. Fifty-three of the children, 24 from Grade Four (16 males and 8 females), and 29 from Grade Seven (12 males and 17 females), resided in OneTel. The remaining 49 children were residents of MultiTel, 23 of these in Grade Four (10 males and 13 females), and 26 in Grade Seven (11 males and 15 females).

In order to ensure that all subjects were local residents, only those children who had resided in their particular town for at least three years were included in the study. In addition, subjects from the two television towns (OneTel and MultiTel) had to have had a television set in their homes for a minimum period of three years. All children meeting these criteria served as subjects in order to provide samples which would be as large as possible.

Dependent Variables.

The measures of intelligence used were one verbal and one performance subtest from the Wechsler Intelligence Scale for Children (WISC). The verbal subtest was Vocabulary; the performance subtest was Block Design. Selection of the Vocabulary subtest was based on the fact that it possesses a very high correlation with the total

verbal scale score, and with the full scale score, of the WISC. In addition, a vocabulary test was selected so as to provide a comparison with previous results concerning television and intelligence (Schramm et al. 1961). The Block Design subtest from the performance scale of the WISC was selected because of its high correlation with the total performance scale score and with the full scale score. Finally, these two subtests were used by Wallach and Kogan (1965) as part of their group of intelligence measures, and comparability of results could therefore be assessed.

The creativity task measures were adapted from those used by Wallach and Kogan (1965). The five verbal items required the child to name uses for a common item, for example, a magazine. The five visual items were simple line drawings; each was drawn in black on a white 4 x 6 inch plastic card (see Figure 1)

Design

The three between subject independent variables were Town (NoTel, OneTel, and MultiTel), Grade (4 and 7), and Sex. Thus the experimental design included 12 independent groups of subjects. Due to differences in the number of subjects available in each town and grade, there were not equal numbers of subjects in each group. To have randomly discarded subjects to attain equal group size would have resulted in groups sufficiently small that generalizations would have been unwarranted.

All subjects received each of the four dependent variable tasks, the two intelligence measures and the two creativity measures. In

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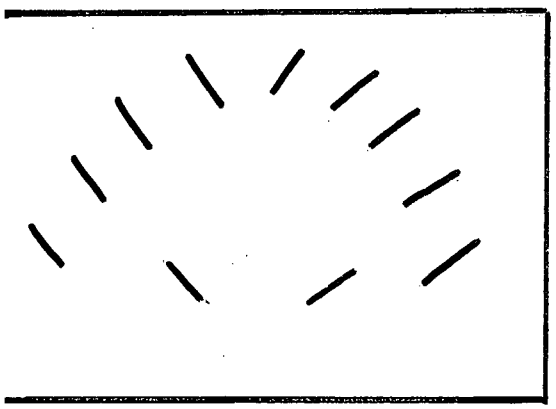

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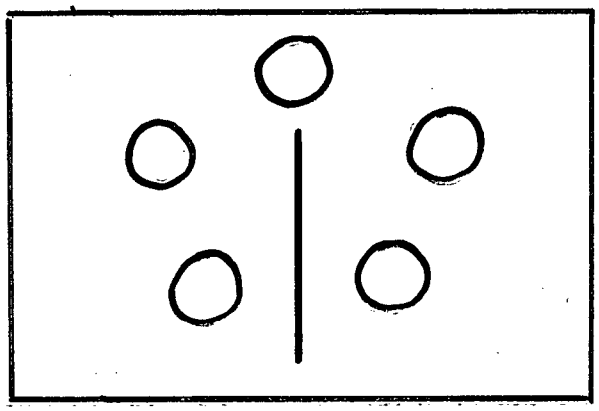

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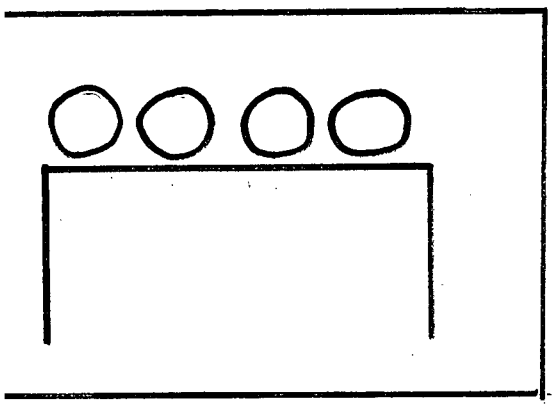

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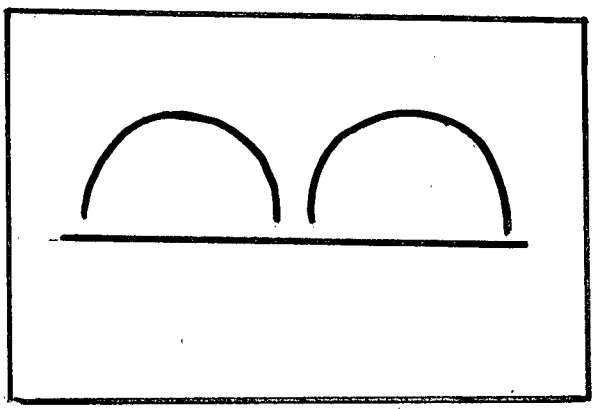

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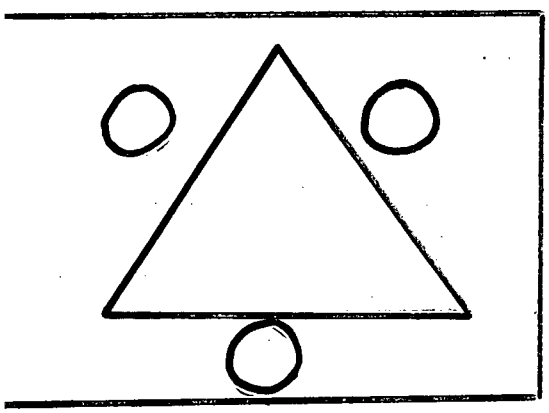

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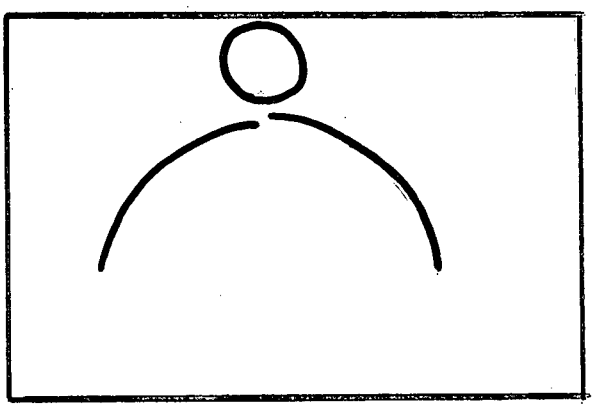

5.

F I G U R E 1.

all cases the order of presentation of the four dependent measures was the same, with the two creativity task measures preceding the two intelligence measures. Although it is customary research procedure to counterbalance the order of presentation of dependent measures, this was not done in the present study for two reasons. First, direct comparison in an absolute sense of performance on the two kinds of measures was not meaningful. The second reason for not counterbalancing was that the atmosphere experienced by the subject is considered by Wallach and Kogan (1965) to be a critical dimension of task context for the creativity measures. Thus, the fact that an evaluative set is inherent in the presentation and nature of the two intelligence tasks led to a decision to place them last in the order of presentation. Of the two creativity task measures, the five verbal items were always presented second, and in the same order. Of the two intelligence measures, the presentation of the Vocabulary subtest always preceded the presentation of the Block Design subtest. As the Block Design subtest was the only one of the four dependent measures which was timed, the decision to place it last in the order of presentation was based simply on the reasoning that it would be a more comfortable transition for the child from a non-evaluative to an evaluative atmosphere if the timed subtest came last.

Procedure.

Each child was tested individually in a private room provided by the school. The door to the experimental room was always kept closed, and there were never any interruptions once the procedures had begun.

Each session began with the experimenter introducing herself to the child and saying "Hi, I have some games here. I hope you will like them, but first, I need to know your name." At this point the child's name, age, and birthdate were taken. Following this the child was asked questions concerning his or her television viewing experience. (A list of these questions is provided in the Appendix, Table 1).

Following the recording of the child's reply to these questions, the presentation of the four dependent measures began.

The general instructions for the verbal associative task were:

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 of the ways you can think of that you might use string? (At this point the experimenter let the child try). Yes, those are fine. I was thinking that you could also use string to attach a fish hook, to jump rope, to sew with, to hang clothes on, and to pull the blinds. (The experimenter varied her suggestions so as not to duplicate any the child had provided). There are lots more too, and yours were very good examples. I can see that you already understand how we play this game. So let's begin now. And remember, think of all the different ways you could use the object that I name. Here we go.

The experimenter's explanation of the example was provided in such a manner as to convey the feeling of suggestion rather than of

finality. The possible answers were given slowly and in a suggesting tone, so as to provide the impression that she was thinking of them at the time.

The five items in this procedure, in their order of administration were as follows:

1. "Tell me all the different ways you could use a magazine."
2. "Tell me all the different ways you could use a knife."
3. "Tell me all the different ways you could use a shoe."
4. "Tell me all the different ways you could use a button--the kind that is used on clothing".
5. "Tell me all the different ways you could use a key--the kind that is used in doors."

The procedure for the visual associative task was then introduced to the child as follows:

Here's a game where you can really feel free to use your imagination. In this game I am going to show you some drawings. After looking at each one, I want you to tell me all the things you think each complete drawing could be. Here is an example--you can turn it any way you'd like to. (The experimenter than gave the example card to the child.) What could this be? (The child was encouraged to try some suggestions). Yes, those are fine. Some other kinds of things I was thinking of were the rising sun, a porcupine, eye lashes, a brush, a carnation, and probably there are lots of other things too. (The experimenter's particular suggestions were varied so as not to include any given by the child). I can see that you already know how we play

this game. So let's begin now.

Once again the experimenter's suggestions for the example were presented slowly, in such a manner as to indicate that she was thinking of them at the time. The "pattern meanings" procedure consisted of five items, in addition to the example. Each drawing appeared on a separate 4 x 6 inch card. The visual items are illustrated in Figure 1. Each of the five test cards was presented to the child with the instruction: "here is another drawing. Tell me all the things you think this could be."

In keeping with the rationale of a non-evaluative atmosphere for the creativity measures, the experimenter made a determined effort during their administration to avoid any expression of verbal or behavioural cues which would indicate to the child that he or she was under any pressure of time while responding to the individual items.

Following the completion of the visual creativity task, the Vocabulary and Block Design subtests of the WISC were administered. In the Vocabulary subtest, the child must provide definitions for each of a number of words, arranged in a series of increasing difficulty. In the Block Design subtest, the child has to assemble blocks so as to duplicate a design displayed on a card. A number of different designs are employed. The administration of Vocabulary and Block Design subtests followed the general procedures set down in the WISC manual (Wechsler, 1949). The completion of the fourth dependent measure (Block Design subtest) signalled the end of the experimental session with the child.

Scoring.

In accordance with the Wallach and Kogan (1965) method, two kinds of scores were obtained from the creativity task measures. Items were scored for both Fluency (the total number of responses), and for Uniqueness (responses occurring but once in the sample of 160 children). Responses which were repetitious or obscure (less than 1% of the total), were excluded from these scores. Thus, there were six scores for each child on the creativity task items. Three of these were Fluency scores, including one for verbal items, one for visual items, and a total Fluency score; and three were Uniqueness scores (Verbal, visual, and total). In all cases reliability was calculated by multiplying two times the number of agreements obtained by two independent scorers, and dividing the result by the total of scorer 1 plus the total of scorer 2. Two scorers working independently and using responses to all items by 20 subjects reached 100% agreement on Fluency scores. Using the responses of the total sample to the item "magazine", 95% agreement was reached on Uniqueness scores.

Scoring for the Vocabulary and Block Design subtests of the WISC followed the general procedures set down in the WISC manual. Following these rules, independent scorers eventually reached 94% agreement on Vocabulary scores (it is perhaps worth noting that several sessions were required to develop additional rules for scoring Vocabulary items to supplement those provided in the WISC manual). Raw Vocabulary and Block Design scores were then converted to scaled score equivalents in accordance with the WISC manual procedures.

Results

The three independent variables employed in the study were Town (NoTel vs OneTel vs MultiTel), Grade (4 vs 7), and Sex.

Two types of dependent variables were employed in the experiment: measures of creativity (one verbal and one visual) and measures of intelligence (one verbal and one performance). The two creativity measures were scored for both number of associates (Fluency) and for uniqueness of associates (Uniqueness). In addition, Total Fluency and Total Uniqueness scores were obtained by collapsing across verbal and visual items. Thus there were six scores for each child for the creativity measures. Three kinds of scores were utilized from the two intelligence measures: a verbal scaled score (Vocabulary); a performance scaled score (Block Design); and a Total IQ scaled score (Vocabulary plus Block Design). Thus a total of nine separate 3 x 2 x 2 between subject analyses of variance was performed, with one analysis for each dependent measure. In addition, correlational analyses among the creativity measures, among the intelligence measures, and between the creativity and intelligence measures were carried out.

Results from the analyses of variance of the creativity measures are presented first, followed by the results of the IQ analyses, and then by the correlational analyses.

Creativity Tasks

The verbal (alternate uses) creativity items were scored for both Fluency and Uniqueness as were the visual (pattern meanings) creativity

items. These two kinds of scores were also analyzed by collapsing over verbal and visual items (Total Fluency and Total Uniqueness). Presentation of the results will begin with the analyses of the Total Fleuncy and Total Uniqueness scores followed by the more specific Verbal Fluency, Verbal Uniqueness, Visual Fluency, and Visual Uniqueness analyses.

Total Fluency. The mean numbers of responses (fluency) to the creativity items by boys and girls at each grade level in each town are presented in Table 1. For the purposes of this analysis scores were collapsed over berbal and visual items (Total Fluency). Results from the analysis of variance performed on these scores are presented in the Appendix (Table 2).

Two significant sources of variation emerged from this analysis. Most notable was the effect of Town $F(2, 148) = 3.85$, $p < .05$). Subsequent analysis of this main effect by the Newman-Keuls procedure (Appendix, Table 3) revealed that students in the no-television town (NoTel) produced significantly greater numbers of associates (i.e., had higher Total Fluency scores) to the creativity items than did students in the multi-channel television town. (NoTel > MultiTel, $p < .05$). No other pairwise comparisons were significant.

The second significant source of variation emerging from the Total Fluency analysis was the Grade x Sex interaction, $F(1, 148) = 4.50$, $p < .05$). A breakdown of this interaction by simple main effects analyses (Appendix, Table 4) revealed a significant effect of Grade (age) only for the performance of the males, with Grade 7 males

Table 1

Mean Comparisons for Total Fluency Scores in Each Cell of Design 3 x 2 x 2

	Grade 4		Grade 7	
	Boys	Girls	Boys	Girls
NoTel	35.5	53.3	49.4	50.2
	n=19	n=10	n=14	n=15
OneTel	33.5	46.0	42.3	35.3
	n=16	n=8	n=12	n=17
MultiTel	39.8	41.0	35.7	23.6
	n=10	n=13	n=11	n=15

Mean Comparisons for Total Fluency Scores Collapsed Over Grade and Sex

NoTel	45.7
	n=58
OneTel	38.0
	n=53
MultiTel	38.3
	n=49

producing more associates to the creativity items than Grade 4 males ($p < .01$). The performance of females in Grades 4 and 7 did not differ. When the sexes were compared at each grade level, a significant sex difference in performance was found at Grade 4 only, with females producing more associates than males ($p < .05$).

To summarize, results from the analysis of the Total Fluency scores showed that NoTel children produced significantly greater numbers of associates to creativity task items than MultiTel children. In addition an age difference was found for males only, with Grade 4 performing more poorly than Grade 7, and a sex difference occurred only in Grade 4, with females performing better than males.

Total Uniqueness. The mean numbers of unique responses for boys and girls at each grade level in each town are presented in Table 2. For the purposes of this analysis scores were collapsed over berbal and visual items (Total Uniqueness). Results from the analysis of variance performed upon these scores are presented in the Appendix, (Table 5).

Grade emerged from this analysis as a significant source of variation $F(1, 148) = 5.28$, $p < .05$. Grade 7 children produced significantly more unique responses than those in Grade 4. However, this main effect of Grade was somewhat qualified by a significant Grade x Sex interaction $F(1, 148) = 4.15$, $p < .05$. Subsequent simple main effects analyses of this interaction (see Appendix, Table 6) revealed that the Grade 7 childre performed better than those in Grade 4 only in the case of the males ($p < .01$). In addition, among the Grade 7 subjects, males produced more unique responses than females ($p < .05$).

Table 2

Mean Comparisons for Total Uniqueness Scores in Each Cell of Design 3 x 2 x 2

	Grade 4		Grade 7	
	Boys	Girls	Boys	Girls
NoTel	5.7	7.7	10.0	10.3
	n=19	n=10	n=14	n=15
OneTel	4.8	7.1	8.8	3.6
	n=16	n=8	n=12	n=17
MultiTel	5.5	5.6	11.0	7.0
	n=10	n=13	n=11	n=15

Mean Comparisons for Total Uniqueness Scores Collapsed Over Grade and Sex

NoTel	9.1
	n=58
OneTel	5.7
	n=53
MultiTel	7.2
	n=49

Verbal Fluency. The mean numbers of verbal fluency responses obtained for boys and girls at each grade level in each town are presented in Table 3. Results form the analysis of variance performed upon these data are presented in the Appendix (Table 7).

As was the case with the Total Fluency scores, Town emerged as a significant source of variation, $F(2, 148) = 6.60$, $p < .01$. Subsequent analysis of the Town main effect by the Newman-Keuls procedure (Appendix, Table 8) revealed that children in NoTel had higher mean Verbal Fluency scores than did children in OneTel and MultiTel (NoTel > OneTel; NoTel > MultiTel, $p < .01$). The scores of children in OneTel and MultiTel did not differ significantly (i.e., NoTel > OneTel = MultiTel).

A second significant source of variation emerging from the analysis of the Verbal Fluency scores was a Grade x Sex interaction, $F(1, 148) = 4.86$, $p < .05$). A breakdown of this interaction by analysis of simple main effects (Appendix, Table 9) revealed a significant difference for males only, with Grade 7 males performing better than those in Grade 4 ($p < .05$).

Verbal Uniqueness. The mean numbers of unique responses produced for verbal items by boys and girls at each grade level in each town are presented in Table 4. Results from the analysis of variance performed on these data are presented in the Appendix (Table 10).

Town again emerged as a significant source of variation, $F(2, 148) = 4.95$, $p < .01$. Subsequent analysis by the Newman-Keuls procedure (Appendix, Table 11) showed that NoTel children gave more verbal responses

Table 3

Mean Comparisons for Verbal Fluency Scores in Each Cell of Design 3 x 2 x 2

	Grade 4		Grade 7	
	Boys	Girls	Boys	Girls
NoTel	24.4	35.0	35.6	32.1
	n=19	n=10	n=14	n=15
OneTel	18.8	26.1	25.4	20.5
	n=16	n=8	n=12	n=17
MultiTel	20.9	22.3	26.6	23.6
	n=16	n=13	n=11	n=15

Mean Comparisons for Verbal Fluency Scores Collapsed Over Grade and Sex

NoTel	30.9
	n=58
OneTel	21.9
	n=53
MultiTel	23.4
	n=49

Table 4

Mean Comparisons for Verbal Uniqueness Scores

in Each Cell of Design 3 x 2 x 2

	Grade 4		Grade 7	
	Boys	Girls	Boys	Girls
NoTel	2.6	4.4	4.9	4.4
OneTel	1.6	2.1	4.1	1.2
MultiTel	3.0	2.0	1.9	2.0

Mean Comparisons for Verbal Uniqueness Scores

Collapsed Over Grade and Sex

NoTel	3.9
OneTel	2.1
MultiTel	2.2

that were unique in the sample than children in either OneTel (NoTel > OneTel, $p < .05$) or MultiTel (NoTel > MultiTel, $p < .01$). The performance of OneTel and MultiTel children did not significantly differ (i.e., NoTel > OneTel = MultiTel).

To summarize the results from the analyses of verbal creativity items, children from the town without television (NoTel) had significantly higher Verbal Fluency and Verbal Uniqueness scores than did the children from either of the towns with television, while these latter two groups did not significantly differ. While the main effect of Town was not qualified by any interactions, a significant Grade x Sex interaction did emerge in the Verbal Fluency scores. Grade 7 boys performed better than Grade 4 boys, whereas no Grade difference was found among the performance of the girls.

Visual Fluency. The mean Visual Fluency scores for boys and girls at each grade level in each town are presented in Table 5. Results from the analysis of variance performed on these data are presented in the Appendix, Table 12.

The only significant source of variation to emerge from this analysis was Grade, $F(1, 148), = 4.55, p < .05$. Older (Grade 7) subjects produced signficantly greater numbers of associates to the visual creativity items (i.e., had higher mean Visual Fluency scores) than did younger (Grade 4) children.

Visual Uniqueness. The mean Visual Uniqueness scores for boys and girls at each grade level in each town are presented in Table 6. Results from the analysis of variance performed on these data are presented in

Table 5

Mean Comparisons for Visual Fluency Scores

in Each Cell of Design 3 x 2 x 2

	Grade 4		Grade 7	
	Boys	Girls	Boys	Girls
NoTel	15.7	18.2	20.9	24.7
OneTel	16.0	19.8	16.9	14.8
MultiTel	18.0	18.6	27.2	19.9

Mean Comparisons for Visual Fluency Scores

Collapsed Over Grade and Sex

NoTel	19.8
OneTel	16.4
MultiTel	20.9

Table 6

Mean Comparisons for Visual Uniqueness Scores

in Each Cell of Design 3 x 2 x 2

	Grade 4		Grade 7	
	Boys	Girls	Boys	Girls
NoTel	3.1	3.3	5.0	5.9
OneTel	3.2	5.1	3.8	2.4
MultiTel	2.5	3.5	9.1	5.0

Mean Comparisons for Visual Uniqueness Scores

Collapsed over Grade and Sex

NoTel	4.4
OneTel	3.4
MultiTel	5.0

the Appendix, Table 13.

Grade emerged as a significant source of variation $F(1, 148) = 6.03$, $p < .01$. However, this main effect of Grade was qualified by a significant Grade x Town interaction, $F(2, 148) = 3.82$, $p < .05$). A breakdown of this interaction by analysis of simple main effects and subsequent Newman-Keuls analyses (See Appendix, Table 14) revealed the following pattern of results. From the point of view of a comparison between grades in each town, the performance of children in Grades 4 and 7 differed only in MultiTel (Grade 7 > Grade 4, $p < .01$). For both the NoTel and OneTel towns, the Visual Uniqueness scores for Grades 4 and 7 did not differ significantly. Analysis of the same Grade x Town interaction from the point of view of a comparison among towns at each grade level revealed no significant differences among towns for the Grade 4 children. However, at the Grade 7 age level, children in NoTel performed significantly better than those in OneTel ($p < .05$) and children from MultiTel also gave more visual responses that were unique than those in OneTel ($p < .01$). There was no significant difference between the performance of Grade 7 subjects in MultiTel and NoTel (i.e., MultiTel = NoTel < OneTel).

To summarize, the results for the Visual creativity measure were somewhat more complex than the results from the Verbal creativity measure. For the Visual Fluency scores the only significant source of variation was a grade effect such that Grade 7 subjects gave more responses to visual items than Grade 4 subjects. For Visual Uniqueness, Grade 7's performed better than Grade 4's only in MultiTel. Furthermore no significant difference in Visual Uniqueness was obtained across

towns for the Grade 4 children. However for the Grade 7 students, OneTel children performed more poorly than either the multiTel or NoTel children while the performance of these latter two groups did not significantly differ.

Intelligence Measures

Scoring for the Vocabulary and Block Design subtests of the WISC followed the general procedures set down in the WISC manual. Raw Vocabulary and Block Design scores were then converted to scaled score equivalents in accordance with the WISC manual procedures.

Vocabulary. The mean Vocabulary scaled scores for girls and boys in each grade in each town are presented in Table 7. Results from the analysis of variance performed upon these data are presented in the Appendix (Table 15).

Town emerged as a significant source of variation, $F(2, 148) = 4.36$, $p < .01$. Subsequent analysis by the Newman-Keuls procedure (Appendix , Table 16), revealed that children from MultiTel performed significantly better on the Vocabulary subtest than both children from OneTel (MultiTel > OneTel, $p < .05$) and children from NoTel (MultiTel > NoTel, $p < .05$).

However, this Town main effects was qualified by a significant interaction with sex, $F(2, 148) = 3.29$, $p < .05$. Subsequent analysis of simple main effects (see Appendix, Table 17) revealed a significant difference among the towns for males only ($p < .01$). Further analysis

Table 7

Mean Comparisons for Vocabulary Scaled Scores

for Each Cell of Design 3 x 2 x 2

	Grade 4		Grade 7	
	Boys	Girls	Boys	Girls
NoTel	9.4	11.2	9.5	10.0
OneTel	11.3	11.3	10.6	8.8
MultiTel	12.9	11.6	11.8	10.1

Mean Comparisons for Vocabualry Scaled Scores

Collapsed Over Grade and Sex

NoTel	9.9
OneTel	10.4
MultiTel	11.4

by the Newman-Keuls procedure (Appendix, Table 17) showed that males in MultiTel obtained significantly higher mean vocabulary scaled scores than those in NoTel (MultiTel > NoTel, $p < .01$) and males in OneTel also earned significantly higher vocabulary scores than those in NoTel (OneTel > NoTel, $p < .05$). The performance of male children from the two towns with television did not significantly differ (OneTel = MultiTel > NoTel).

Not unexpectedly, Grade also emerged as a significant source of variation $F(1, 148) = 6.77$, $p < .01$. Older (Grade 7) students performed significantly better on the Vocabulary subtest than did younger (Grade 4) students.

Block Design. The mean Block Design scaled scores for boys and girls at each grade level in each town are presented in Table 8. Results from the analysis of variance performed upon these scores are presented in the Appendix (Table 18).

Sex emerged as the only significant source of variation, $F(1, 148) = 8.26$, $p < .01$. Male children had higher scores than female children on the Block Design subtest. This finding is consistent with past research in which boys by the early school years do consistently better than girls on spatial tasks such as the WISC Block Design subtest (Maccoby, 1966).

Total IQ. The mean combined Vocabulary and Block Design scaled scores (Total IQ) for boys and girls at each grade level in each town are presented in Table 9. Results from the analysis of variance performed upon these scores are presented in the Appendix (Table 19).

Table 8

Mean Comparisons for Block Design Scaled Scores

for Each Cell of Design 3 x 2 x 2

	Grade 4		Grade 7	
	Boys	Girls	Boys	Girls
NoTel	11.4	10.5	11.8	11.6
OneTel	11.4	9.3	12.0	10.5
MultiTel	12.5	10.3	11.2	9.6

Mean Comparisons for Block Design Scales Scores

Collapsed Over Grade and Sex

NoTel	11.4
OneTel	10.9
MultiTel	10.8

Table 9

Mean Comparisons for Total IQ Scores

for Each Cell of Design 3 x 2 x 2

	Grade 4		Grade 7	
	Boys	Girls	Boys	Girls
NoTel	20.9	21.7	21.4	21.6
OneTel	22.6	20.7	22.6	19.7
MultiTel	25.4	21.9	23.1	19.7

Mean Comparisons for Total IQ Scores

Collapsed Over Grade and Sex

NoTel	21.4
OneTel	21.4
Multitel	22.2

Sex emerged as the only significant source of variation, $F(1, 148) = 5.5$, $p < .05$. This finding is presumably a result of the large sex difference for the Block Design subtest scores; when the two kinds of scores were combined (Vocabulary and Block Design), the difference still held.

Correlational Analyses

The (Pearson product-moment) correlations among the creativity measures for the sample of 160 children are shown in Table 10. The four creativity indices were very strongly intercorrelated. While it is recognized that the two kinds of total scores (Total Fluency and Total Uniqueness) are contaminated (i.e., they are part-whole correlations), they have been included in the table for the sake of completeness. Fourteen of the fifteen correlations are significant at the .01 level and the remaining correlation reaches the .05 level of significance. In addition, for the sample as a whole, the two verbal indices of creativity (fluency and uniqueness scores on the alternate uses task) are substantially correlated with the two visual (pattern meanings) indices (see Table 11). While it can be seen from the table that this finding does not hold when the smallest subgroups are considered (very small sample size), of the 24 possible correlations, 14 are significant at the .01 level and an additional 3 reach the .05 level of significance. Only 7 correlations fail to reach significance. These results are similar to those of Wallach and Kogan (1965).

Table 10

Intercorrelations Among the Creativity Measures for the Total Sample (N = 160)

		2	3	4	5	6
1.	Uses Uniqueness	.77	.36	.44	.49	.76
2.	Uses Fluency		.49	.59	.58	.73
3.	Patterns Uniqueness			.83	.17	.86
4.	Patterns Fluency				.36	.81
5.	Total Fluency					.37
6.	Total Uniqueness					

For 158 df, r.'s of .16 and .21 are significant at the .05 and .01 levels respectively.

Table 11

Verbal and Visual Correlations in Each Cell of Design 3 x 2 x 2

			Fluency	Uniqueness
NoTel	Grade 4	Boys	.88**	.66**
		Girls	.73*	.66*
	Grade 7	Boys	.82**	.51*
		Girls	.86**	.79
OneTel	Grade 4	Boys	.66**	.60**
		Girls	.21	.60
	Grade 7	Boys	.08	.25
		Girls	.64**	.24
MultiTel	Grade 4	Boys	.75**	.75**
		Girls	.65**	.39
	Grade 7	Boys	.70**	.01
		Girls	.87**	.91**

Verbal and Visual Correlations Averaged Over Grade and Sex (Fisher r to z transformations)

	Fluency	Uniqueness
NoTel	.79**	.66**
OneTel	.43**	.44**
MultiTel	.76**	.61**

** $p < .01$

* $p < .05$

The correlations among the intelligence measures for the sample as a whole are presented in Table 12. Vocabulary and Block Design scaled scores are positively correlated and as in the case of the creativity indices reported in Table 10, the coefficient is significant at the .01 level. (The two part-whole correlations in column three are included for the sake of completeness although their high positive correlation would be expected).

These findings for the intelligence measures are not surprising and simply reflect the already well-established fact that traditional measures of intelligence generally tap, in addition to more specific abilities, a single underlying dimension of individual variation.

The correlations between the creativity and intelligence measures are presented in Table 13. The correlations between creativity and intelligence for the sample as a whole are quite low. While two of the eighteen *r*.'s are significant at the .01 level and an additional 6 reach the .05 level of significance, no correlation exceeds .23. (This finding holds in spite of the inclusion in the table for the sake of completeness of the part-whole correlations--Total IQ, Total Uniqueness, Total Fluency, which would be expected to be spuriously high).

In summary, the findings of the correlational analyses of the Intelligence and Creativity measures very closely replicate those of Wallach and kogan (1965). Correlations between the two sets of measures are consistently low and intercorrelations within each measure are high. Tables have been incouded in the Appendix (Tables 20 through 37)

Table 12

Intercorrelations Among the Intelligence Measures for the Total Sample (N = 160)

		2	3
1.	WISC Vocabulary	.35	.79
2.	WISC Block Design		.85
3.	Total I.Q.		

For 158 df, *r*.'s of .16 and .21 are significant at the .05 and .01 levels respectively.

Table 13

Intercorrelations Between the Creativity and Intelligence Measures for the Total Sample (N = 160)

	WISC Vocabulary	WISC Block Design	WISC I.Q.
1. Uses Uniqueness	.14	.13	.16 p <.05
2. Uses Fluency	.09	.16 p <.05	.15
3. Paterns Uniqueness	.10	.07	.10
4. Patterns Fluency	.17 p <.05	.13	.18 p <.05
5. Total Fluency	.16 p <.05	.22 p <.01	.23 p <.01
6. Total Uniqueness	.14	.13	.17 p <.05

For 158 df, r.'s of .16 and .21 are significant at the .05 and .01 levels respectively.

which supply these correlations for each of the possible subgroups in the study. In general the pattern of results for each of the subgroups mirrors the findings reported above for the sample as a whole.

Discussion

The low correlations obtained between the creativity and intelligence measures and high correlations within each set of measures strongly replicate the findings of Wallach and Kogan (1965) and others (Ward, 1968; Pankove & Kogan, 1968; Cropley & Maslany, 1969; Wallach & Wing, 1969; Williams & Fleming, 1969).[1] Thus strong statistical support is provided for a main assumption underlying the present study, namely that creativity and intelligence are cohesive dimensions of individual variation that are substantially independent of one another. The sex difference in performance on the Block Design subtest (i.e., boys obtained higher mean scaled scores than girls), is also consistent with past studies (Maccoby, 1966). These replications of results from previous studies lend credibility to those aspects of the present study which provide new information, namely the results from both the creativity and intelligence measures as they relate to television exposure.

Considering intelligence first, the pattern of results supported the hypothesized relationship of television viewing to the two aspects of intellectual development measured. In general, children growing up in the towns with television had higher vocabulary scores than the children in the town lacking television, and in the case of boys the difference was significant. There were, however, no significant

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[1]The Wallach-Kogan research was based on a sample of American fifth graders, and the partial replications cited above have extended the age generalizability of the observed creativity-intelligence distinction both downward and upward. The present study, however, provides the first replication with children at the Grade 4 and Grade 7 age levels, and is the first to utilize a Canadian sample.

differences among the mean Block Design scores obtained by the children in the three towns. These findings support the reasoning that to the extent that intelligence is environmentally determined, television can serve as a stimulus for those aspects of verbal intellectual development which are related to information accumulation, but does not particularly affect those aspects of intellectual development reflected by performance-type intelligence test scores. If the latter are influenced at all by the environment, they are influenced more by direct experience than by information accumulation.

The vocabulary findings of the present study are similar to those of Schramm, Lyle, and Parker (1961) who found that children growing up with television appear to come to school with about a one-year advantage in vocabulary over children growing up without television. For the boys in the present study the vocabulary advantage of the television children was also about one year. For girls, while the vocabulary difference among the towns was not significant, it was in the same direction (i.e., the girls in the television towns had higher mean vocabulary scores than the girls in NoTel), but the gain was not as large as that shown by the boys. The present findings do differ from those of Schramm et al. (1961) in one respect. When assessing older children in the sixth and tenth grades Schramm et al. (1961) found that the children in the two towns "Radiotown" and "Teletown" did not differ in vocabulary level. In other words, the television-related vocabulary advantage held only for children entering school. In the present study the one-year vocabulary advantage seen in the Grade 4 boys from the

two television towns was also shown by the Grade 7 boys. It is difficult to speculate on this discrepancy in findings with only two studies as a basis for comparison, and the question concerning age-related differences in the relationship between television and vocabulary scores must therefore be left open.

The results pertaining to verbal creativity provided strong support for the hypothesis that creativity is a variable which it itself affected by television exposure. The children growing up in the town without television had significantly higher Verbal Fluency and Verbal Uniqueness scores than did the children from either of the two towns with television. This finding is especially interesting in light of the results reported above for verbal intelligence measure. Although the children from the two television towns scored highest on the verbal measure of intelligence, they did not also earn higher verbal creativity scores. On the contrary, it was the children who did least well on the Vocabulary subtest (NoTel subjects) who did best on the verbal creativity measure. It can thus be concluded that although both the the procedures designed for studying creativity require the exercise of verbal skill, the child's ability to display creativity [as defined by Wallach and Kogan (1965)] has little to do with whether or not the child exhibits the behaviour that will earn him or her a high score on a measure of verbal intelligence. This finding that the relationship between television and verbal creativity was diametrically opposite to the relationship between television and verbal intelligence provides a further demonstration of the relative orthogonality of creativity and

intelligence.

The pattern of results for the visual measure of creativity (pattern meanings procedure) were unexpected, and in sharp contrast to those for the verbal (alternate uses) procedure. The only consistent pattern to emerge was an age difference in performance such that Grade seven children in all three towns obtained higher Visual Fluency scores than Grade 4 children. In the case of Visual Uniqueness, this age difference occurred in MultiTel only, while among the Grade 7 students those in OneTel produced fewer unqiue responses than either students in NoTel or MultiTel.

This diversity in results between the verbal and visual creativity measures is the more perplexing since for the sample as a whole, the two verbal indices of creativity (fluency and uniqueness) derived from the alternate uses procedure are substantially correlated with the two visual indices (fluency and uniqueness) derived from the pattern meanings procedure (see Table 11)[2]. Thus the pattern of relationships within each town is the same.

The question can be raised concerning the extent to which the overall pattern of results for the visual creativity measure obtained in the present study may be concealing more substantial relationships within particular subgroups of subjects. For example, it is possible that

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[2]When the smallest subgroups are considered, 7 of the possible 24 correlations do not reach the .05 level of significance (see Table 11). This finding undoubtedly reflects the lability of correlations for small samples.

television viewing experience may facilitate the use of visual stimulus materials such that the performance of children in the television towns was raised to the level of the children in NoTel. A closer examination of the relationship between time spent viewing television by individual subjects within each town and performance on visual and verbal creativity items is proposed as the next stage of analysis of the present data. (Such an analysis would also allow a re-examination of the verbal creativity results to see if the powerful relationship seen across the three towns is reproduced within each town).

Other investigators have also reported various discrepancies in cross-sectional data for verbal and figural stimulus materials. For example, the mean fluency score difference between the Wallach and Kogan (1965) middle-class fifth graders and the Wallach and Wing (1969) college freshmen favoured the latter sample (i.e., the older subjects had higher fluency scores), but the discrepancy was considerably larger for verbal than for figural items. The finding (Ward, Kogan & Pankove, 1972) that black disadvantaged fifth-graders were less productive than their middle-class counterparts on verbal items, but somewhat more productive on figural items is also of interest. These authors suggested that perhaps a task such as alternate uses favours subjects with richer experiential repertoires, whereas figural tasks may have more to do with the organization and accessibility of repertoires. In spite of the considerable generality demonstrated in the present work and in previous research for various tasks and indices of creativity, there apparently are very distinct differences between verbal and

and nonverbal tasks, and there is a need for studies which are explicitly directed toward the issue of verbal-figural differences. The variations just delineated within the creativity domain make it equally apparent that investigations pertaining to the optimal conditions required for the enhancement of creativity will have to specify what sort of creativity the investigator has in mind.

A further issue remains concerning the verbal creativity findings. What links can be proposed to account for the observed relationship between television exposure and creative ability as expressed in the alternate uses task? One way of conceptualizing this issue has been suggested by Wallach and Kogan (1965). Although these authors were not concerned with the effects of television viewing per se, they pointed out that in the case of both the number and the uniqueness of the associational responses that a person can generate under various circumstances the cognitive units in question must be 'capable' of production or generation if there is to be any hope of their being produced. That is, they must exist in some kind of stored form in the first place; were they not part of the individual's behavioural repertoire they could not be generated under any circumstances. Thus, Wallach and Kogan (1965) point out, if we assess a person's capacity to generate cognitive elements, one factor influencing that person's performance as a ceiling or upper bound is the extensiveness of his or her repertoire. In addition, Crockett (1965) postulates what may be called the "frequency of interaction" hypothesis, that cognitive complexity varies with the degree to which an individual "interacts frequently and intimately"

with environmental objects in a particular domain. Some indirect support for these notions has been rpovided by the present study. On a purely observational level, a difference was noted between the types of responses given to the verbal stimulus items by the children in the no-television town and those in the television towns. For example, to the alternate uses item 'knife', children in the town without television tended to give a much wider range of alternates. In addition to the common category of response "to cut food", many of these children included responses such as: to cut tent pegs, to skin an animal, to cut rushes to use as torches, etc., while the children from the two television towns tended to give mainly single category responses such as to cut butter, to cut bread, to cut tomatoes, etc. For the moment however, hypotheses concerning differences in behavioural repertoires between children in the three towns remain purely conjectural and are only suggested as a possible focus of future investigations. In terms of the present data however, a category range analysis of the creativity measures is planned as a partial empirical test of this notion. In a study employing the Wallach and Kogan (1965) creativity items, Ward (1966) found that most of the responses given by all subjects in his sample could be placed into one "most common" category for each item and that all other responses could also be placed in one of a few categories, (e.g., for uses for a cup, six categories were sufficient--uses related to drinking; use as a container--other than for liquids; use as a toy; use as a weapon; use for or in decoration; and household uses). Thus a "category range" score could

be calculated for each child for each of the creativity items. Such an analysis would also provide futher information concerning the visual creativity results.

The issue of whether creativity is best viewed as a variable which is itself affected by television viewing, or as a predisposition which controls television behaviour deservesfurther discussion. While the present results provide support for the former interpretation, they obviously do not rule out the latter nor do they rule out the possibility of a complex interaction between the two variables. This same issue can also be raised concerning the relationship between television viewing and intelligence. Fortunately, a follow-up of the present study is planned for 1976 (at which time NoTel will have had television for two years), and thus an excellent opportunity exists to clarify these relationships. It will be possible at that time to compare the present scores obtained by the children in NoTel on both measures of creativity and intelligence, with those obtained by these same children after they have been viewing television for two years.

The present study was conducted in the hope of clarifying the relationship of television exposure to cognitive development in young children. The results suggest that television exposure has differential effects on the two traits 'creativity' and 'intelligence'. In terms of intelligence, the findings of the present study support the hypotheses of a positive relationship between television viewing and verbal intelligence (vocabulary) socres, and no relationship between televiewing

and performance (block design) scores. The relationship between television viewing and creativity was complicated by the type of stimulus material employed. In the case of verbal stimulus materials, children growing up without television obtained significantly higher mean creativity scores than children growing up with television. In the case of figural stimulus materials, no clear relationship between television exposure and creativity emerged.

References

Crockett, W. H. Cognitive complexity and impression formation. In B. A. Maher (Ed.), Progress in experimental personality research. Vol. 2. New York: Academic Press, 1965

Cropley, A. J., and Manslany, G. W. Reliability and factorial validity of the Wallach-Kogan creativity tests. British Journal of Psychology, 1969, 60, 395-398.

Furu, T. Television and children's life: a before-after study. Japan Broadcasting Corporation, 1962.

Getzels, J. W. and Jackson, P. W. Creativity and intelligence. New York: Wiley, 1962.

Ghiselin, B. (Ed.) The Creative Process. New York: Mentor, 1955.

Guilford, J. P. The structure of intellect. Psychological Bulletin, 1956, 53, 267-293.

Guilford, J. P. and Christensen, P. R. A factor-analytic study of verbal fluency. Rep. psychol. lab., No. 17. Los Angeles: University of Southern California, 1956.

Guilford, J. P. Some new looks at the nature of creative processes. In N. Frederiksen and H. Gulliksen (Eds.), Contributions to mathematical psychology. New York: Holt, Rinehart and Winston, 1964. Pp. 161-176.

Himmelweit, H. T., Oppenheim, A. N., and Vince, P. Television and the child. Published for the Nuffield Foundation. New York, London, Ontario: Oxford University Press, 1958.

Maccoby, E. E. Television: its impact on school children. Public Opinion Quarterly, 1951, 15, 421-444.

Maccoby, E. E. Effects of mass media. Review of Child Development Research, 1. New York: Russell Sage, 1964.

Maccoby, E. E. (Ed.), The Development of Sex Differences. Stanford University Press: Stanford, California, 1966.

Mednick, S. A. The associative basis of the creative process. Psychological Review, 1962, 69, 220-232.

Pankove, E., and Kogan, N. Creative ability and risk taking in elementary-school children. Journal of Personality, 1968, 36, 420-439.

Rugg, H. Imagination. New York: Harper, 1963.

Schramm, W., Lyle, J., and Parker, E. B. Television in the lives of our children. Stanford, California: Stanford University Press, 1961.

Spearman, C. The abilities of man. New York: Macmillan, 1927.

Thurstone, L. L. Primary mental abilities. Psychometric Monographs, No. 1. Chicago: University of Chicago Press, 1938.

Wade, S. E. Adolescents, creativity and media. American Behavioural Scientist, 1971, 14, 341-351.

Wallach, M. A., and Kogan, N. Modes of thinking in young children: A study of the creativity-intelligence distinction. New York: Holt, Rinehart and Winston, 1965.

Wallach, M. A., and Wing, C. W. Jr. The talented student: A validation of the creativity-intelligence distinction. New York: Holt, Rinehart and Winston, 1969.

Ward, W. C. Reflection-impusivity in kindergarten children. Child Development, 1968, 39, 867-874.

Ward, W. C., Kogan, N., and Pankove. Incentive effects in children's creativity. Child Development, 1972, 43, 669-676.

Williams, T. W. and Fleming, J. W. Methodological study of the relationship between associative fluency and intelligence. Developmental Psychology, 1969, 1, 155-162.

APPENDIX

Table 1

List of Questions Concerning Television Viewing[1]

1. Have you ever had a television at home?

2. Do you have a television which is working at home now?

   If yes:

   a) How long have you had your television?

   b) How many hours do you watch television on school days? On weekends?

   If No:

   a) Do you ever watch television at anyone else's house? If so

   b) How often do you watch there?

   c) How many hours do you watch there on school days? On weekends?

   d) For how long have you been going there to watch television?

---

[1]The nature of the questions and the exact order in which they were asked was based upon the individual child's responses. It was not possible to follow an exact format as there was so much variation in the television viewing histories of the children.

Table 2

Source Table for the Analysis of Variance of the Total Fluency Score - Grade x Town x Sex - 2 x 3 x 2

Source	SS	df	MS	F	p
Town	2433.33	2	1216.66	3.86	< .02
Grade	6.18	1	6.18	0.02	---
Sex	832.31	1	832.31	2.64	---
Town x Grade	590.95	2	295.47	0.94	---
Town x Sex	445.74	2	222.87	0.71	---
Grade x Sex	1419.02	1	1419.02	4.50	< .04
Town x Grade x Sex	682.93	2	341.47	1.08	---
Error	46653.26	148	315.22		

Table 3

Newman-Keuls Test of the Town Effect in the Total Fluency Scores

Source	SS	df	MS	F	p
Town	2433.33	2	1216.06	3.86	< .02

Order	1	2	3
Treatments in Order of Positions	OneTel	MultiTel	NoTel
$\bar{T}$	38.00	38.33	45.74

Truncated Range	2	3
$S_{\bar{x}}$ q .95	6.80	8.16
$S_{\bar{x}}$ q .99	8.99	10.21

	NoTel	OneTel	MultiTel
NoTel	---	0.33	7.74 p < .07
OneTel		---	7.42 p < .05
MultiTel			---

Table 4

Simple Main Effects Test of the Grade x Sex Interaction in the Total Fluency Scores

Mean Scores	Grade 4	Grade 7
Males	35.48 (n=44)	43.05 (n=37)
Females	46.29 (n=31)	40.75 (n=48)

Source	SS	df	MS	F	p
Sex for Grade 4	2126.39	1	2126.39	6.75	$p < .05$
Sex for Grade 7	116.92	1	116.92	0.35	---
Grade for Males	4284.95	1	4284.95	13.59	$p < .01$
Grade for Females	577.28	1	577.28	1.83	
Error		148			

Table 5

Source Table for the Analysis of Variance of the

Total Uniqueness Scores - Grade x Twon x Sex - 2 x 3 x 2

Source	SS	df	MS	F	p
Town	139.94	2	69.97	1.60	---
Grade	231.41	1	231.41	5.28	< .03
Sex	17.55	1	17.55	0.40	---
Town x Grade	70.48	2	35.24	0.80	---
Town x Sex	67.92	2	33.96	0.78	---
Grade x Sex	182.22	1	182.22	4.16	< .05
Town x Grade x Sex	54.85	2	27.43	0.63	---
Error	6484.03	148	43.81		

Table 6

Simple Main Effects Test of the Grade x Sex Interaction in the Total Uniqueness Scores

Mean Scores	Grade 4	Grade 7
Males	5.32 (n=44)	9.95 (n=37)
Females	6.68 (n=31)	6.90 (n=48)

Source	SS	df	MS	F	p
Sex for Grade 4	36.60	1	33.60	0.77	---
Sex for Grade 7	194.41	1	194.41	4.44	$p < .05$
Grade for Males	430.49	1	430.49	9.83	$p < .01$
Grade for Females	0.90	1	0.90	0.02	---
Error		148	43.81		

Table 7

Source Table for the Analysis of Variance of the Verbal Fluency Scores - Grade x Town x Sex - 2 x 3 x 2

Source	SS	df	MS	F	p
Town	2711.59	2	1355.80	6.60	< .01
Grade	314.79	1	314.79	1.53	---
Sex	84.24	1	84.24	0.41	---
Town x Grade	67.04	2	33.52	0.16	---
Town x Sex	117.89	2	58.95	0.29	---
Grade x Sex	998.83	1	998.83	4.86	< .03
Town x Grade x Sex	160.13	2	80.06	0.39	---
Error	30389.85	148	205.34		

Table 8

Newman-Keuls Test of the Town Effect in the Verbal Fluency Scores

Source	SS	df	MS	F	p
Town	2711.59	2	1355.80	6.60	< .01

Order	1	2	3
Treatments in Order of Positions	OneTel	MultiTel	NoTel
$\bar{T}$	21.98	23.41	30.97

Truncated Range	2	3
$S_{\bar{x}}$ q .95	5.49	6.59
$S_{\bar{x}}$ q .99	7.26	8.24

	OneTel	MultiTel	NoTel
One Tel	---	1.43	8.98 p .01
MultiTel		---	7.56 p .01
NoTel			---

Table 9

Simple Main Effects Analysis of the Grade x Sex Interaction in the Verbal Fluency Scores

Mean Scores	Grade 4	Grade 7
Males	21.52 (n=44)	29.65 (n=37)
Females	27.42 (n=31)	25.29 (n=48)

Source	SS	df	MS	F	p
Sex for Grade 4	632.33	1	632.33	2.08	---
Sex for Grade 7	396.62	1	396.62	1.93	---
Grade for Males	1327.11	1	1327.11	6.46	$p < .05$
Grade for Females	85.26	1	85.26	0.42	---
Error		148	205.33		

Table 10

Source Table for the Analysis of Variance of the Verbal Uniqueness Scores - Grade x Town x Sex - 2 x 3 x 2

Source	SS	df	MS	F	p
Town	114.56	2	57.28	4.95	< .01
Grade	9.94	1	9.94	0.86	---
Sex	3.11	1	3.11	0.27	---
Town x Grade	22.50	2	11.25	0.97	---
Town x Sex	18.78	2	9.39	0.81	---
Grade x Sex	22.11	1	22.11	1.91	---
Town x Grade x Sex	30.98	2	15.49	1.34	---
Error	1711.89	148	11.57		

Table 11

Newman-Keuls Test of the Town Effect in the Verbal Uniqueness Scores

Source	SS	df	MS	F	p
Town	114.56	2	57.28	4.95	< .01

Order	1	2	3
Treatments in Order of Positions	OneTel	MultiTel	NoTel
$\bar{T}$	2.18	2.20	3.95

Truncated Range	2	3
$S_{\bar{x}}$ q .95	1.39	1.56
$S_{\bar{x}}$ q .99	1.79	1.96

	OneTel	MultiTel	NoTel
OneTel	---	0.02	1.77 p < .05
MultiTel		---	1.75 p < .01
NoTel			---

Table 12

Source Table for the Analysis of Variance of the Visual Fluency Scores - Grade x Town x Sex - 2 x 3 x 2

Source	SS	df	MS	F	p
Town	428.92	2	214.46	2.64	---
Grade	369.13	1	369.13	4.55	< .04
Sex	4.53	1	4.54	0.06	---
Town x Grade	436.83	2	218.42	2.69	---
Town x Sex	275.29	2	137.65	1.70	---
Grade x Sex	164.53	1	164.53	2.03	---
Town x Grade x Sex	159.57	2	79.78	0.98	---
Error	11998.57	148	81.07		

Table 13

Source Table for the Analysis of Variance of the Visual Uniqueness Scores - Grade x Town x Sex - 2 x 3 x 2

Source	SS	df	MS	F	p
Town	46.71	2	23.35	1.15	---
Grade	122.50	1	122.50	6.04	< .02
Sex	2.13	1	2.13	0.10	---
Town x Grade	155.28	2	77.64	3.83	< .03
Town x Sex	33.03	2	16.52	0.81	---
Grade x Sex	63.16	1	63.16	3.11	---
Town x Grade x Sex	59.53	2	29.77	1.47	---
Error	3002.56	148	20.29		

Table 14

Simple Main Effects and Subsequent Newman-Keuls Analysis of the Town x Grade Interaction in the Visual Uniqueness Scores

Mean Scores	NoTel	OneTel	MultiTel
Grade 4	3.21 (n=29)	3.83 (n=23)	3.09 (n=23)
Grade 7	5.52 (n=29)	3.07 (n=30)	6.77 (n=26)

Source	SS	df	MS	F	p
Grade for NoTel	77.41	1	77.41	3.81	---
Grade for OneTel	7.51	1	7.51	0.37	
Grade for MultiTel	165.47	1	165.47	8.15	$p < .01$
Town for Grade 4	7.39	2	3.69	0.18	---
Town for Grade 7	201.16	2	100.58	4.96	$p < .05$

Newman-Keuls Test of the Significant Effect of Town for Grade 7

Source	SS	df	MS	F	p
Town for Grade 7	201.16	2	100.58	4.96	$p < .05$

Order	1	2	3
Treatments in Order of Position	OneTel	NoTel	MultiTel
$\bar{T}$	3.17	5.52	6.67

Truncated Range	2	3
$S_{\bar{x}}$ q .95	2.28	2.74
$S_{\bar{x}}$ q .99	3.02	3.43

	OneTel	NoTel	MultiTel
OneTel	---	2.35 $p < .05$	3.60 $p < .01$
NoTel		---	1.25
MultiTel			---

Table 15

Source Table for the Analysis of Variance of the Vocabulary Scaled Scores - Grade x Town x Sex - 2 x 3 x 2

Source	SS	df	MS	F	p
Town	54.75	2	27.37	4.36	< .02
Grade	42.51	1	42.51	6.77	< .01
Sex	4.64	1	4.64	0.74	---
Town x Grade	6.51	2	3.25	0.52	---
Town x Sex	41.30	2	20.65	3.29	< .04
Grade x Sex	14.63	1	14.63	2.33	---
Town x Grade x Sex	1.08	2	0.54	0.09	---
Error	928.84	148	6.28		

Table 16

Newman-Keuls Test of the Town Effect in the Vocabulary Scores

Source	SS	df	MS	F	p
Town	54.75	2	27.37	4.36	< .02

Order	1	2	3
Treatment in Order of Positions	NoTel	OneTel	MultiTel
$\bar{T}$	9.93	10.42	11.39
Truncated Range			
$q_{\bar{x}}$ .95	0.96	1.15	
$q_{\bar{x}}$ .99	1.27	1.44	

	NoTel	OneTel	MultiTel
NoTel	---	0.48	1.46 p <.05
OneTel		---	0.97 p <.05
MultiTel			---

Table 17

Simple Main Effects and Subsequent Newman-Keuls Analysis of the Town x Sex Interaction in the Vocabulary Scaled Score

Mean Scores	NoTel	OneTel	MultiTell
Males	9.52 (n=33)	11.07 (n=27)	12.14 (n=21)
Females	10.48 (n=25)	9.73 (n=26)	10.82 (n=28)

Source	SS	df	Ms	F	p
Sex for NoTel	13.24	1	13.24	2.11	---
Sex for OneTel	23.90	1	23.90	3.81	---
Sex for MultiTel	20.95	1	20.95	3.34	---
Town for Males	93.77	2	46.89	7.47	$p < .01$
Town for Females	16.60	2	8.30	1.32	---
Error		148	6.28		

Newman-Keuls Test of the Significant Effect of Town for Males

Source	SS	df	MS	F	p
Town for Males	93.77	2	46.89	7.47	$p < .01$

Order	1	2	3
Treatments in Order of Position	NoTel	OneTel	MultiTel
$\bar{T}$	9.52	11.07	12.14

Truncated Range	2	3
$S_{\bar{x}}$ q .95	1.37	1.64
$S_{\bar{x}}$ q .99	1.81	2.05

	NoTel	OneTel	MultiTel
NoTel		1.56 $p < .05$	2.63 $p < .01$
OneTel			1.07 ---
MultiTel			

Table 18

Source Table for the Analysis of Variance of the Block Design Scales Scores - Grade x Town x Sex - 2 x 3 x 2

Source	SS	df	MS	F	p
Town	7.28	2	3.64	0.39	---
Grade	1.90	1	1.90	0.21	---
Sex	76.41	1	76.41	8.27	< .01
Town x Grade	35.77	2	17.88	1.93	---
Town x Sex	16.63	2	8.31	0.90	---
Grade x Sex	5.36	1	5.36	0.58	---
Town x Grade x Sex	0.14	2	0.07	0.01	---
Error	1368.03	148	9.24		

Table 19

Source Table for the Analysis of Variance of the Total I.Q. Scales Scores - Grade x Town x Sex - 2 x 3 x 2

Source	SS	df	MS	F	p
Town	39.66	2	19.83	0.92	---
Grade	26.43	1	26.43	1.23	---
Sex	118.72	1	118.72	5.52	< .02
Town x Grade	41.28	2	20.64	0.96	---
Town x Sex	109.59	2	54.80	2.55	---
Grade x Sex	2.28	1	2.28	0.11	---
Town x Grade x Sex	2.00	2	1.00	0.05	
Error	3178.91	148	21.48		

Table 20

Intercorrelations Among the Creativity Measures for McBride Grade Four (N=29)

		2	3	4	5	6
1.	Uses-Uniqueness	.83	.63	.84	.48	.95
2.	Uses Fluency		.61	.81	.72	.83
3.	Patterns-Uniqueness			.66	.39	.82
4.	Patterns-Fluency				.43	.85
5.	Total-Fluency					.49
6.	Total-Uniqueness					

Intercorrelations Among the Intelligence Measures for McBride Grade Four (N=29)

		2	3
1.	WISC - Vocabulary	.55	.89
2.	WISC - Block Design		.87
3.	Total IQ		

Intercorrelations Between the Creativity and Intelligence Measures for McBride Grade Four (N=29)

		WISC Vocabulary	WISC Block Design	Total IQ
1.	Uses-Uniqueness	.18	.09	.16
2.	Uses-Fluency	.20	.14	.20
3.	Pattern-Uniqueness	.11	.13	.13
4.	Patterns-Fluency	.21	.11	.18
5.	Total-Fluency	.26	.27	.30
6.	Total-Uniqueness	.17	.11	.16

For 27 df, r.'s of .367 and .470 are significant at the .05 and .01 levels respectively

Table 21

Intercorrelations Among the Creativity Measures for McBride Grade Seven (N=29)

		2	3	4	5	6
1.	Uses-Uniqueness	.75	.55	.63	.36	.88
2.	Uses-Fluency		.58	.77	.39	.75
3.	Patterns-Uniqueness			.79	.38	.87
4.	Patterns-Fluency				.40	.81
5.	Total-Fluency					.42
6.	Total-Uniqueness					

Intercorrelations Among the Intelligence Measures for McBride Grade Seven (N=29)

		2	3
1.	WISC - Vocabulary	.51	.83
2.	WISC - Block Design		.90
3.	Total IQ		

Intercorrelations Between the Creativity and Intelligence Measures for McBride Grade 7 (N=29)

		WISC Vocabulary	WISC Block Design	Total IQ
1.	Uses-Uniqueness	.27	-.03	.11
2.	Uses-Fluency	.04	.04	.05
3.	Patterns-Uniqueness	.33	.13	.25
4.	Patterns-Fluency	.09	-.02	.02
5.	Total-Fluency	.04	-.05	-.01
6.	Total-Uniqueness	.34	.05	.20

For 27 df, r.'s of .367 and .470 are significant at the .05 and .01 levels respectively

Table 22

Intercorrelations Among the Creativity Measures
for Valemont Grade Four (N=24)

		2	3	4	5	6
1.	Uses-Uniqueness	.81	.59	.40	.76	.87
2.	Uses-Fluency		.57	.39	.90	.76
3.	Patterns-Uniqueness			.63	.69	.90
4.	Patterns-Fluency				67	.59
5.	Total-Fluency					.81
6.	Total-Uniqueness					

Intercorrelations Among the Intelligence Measures
For Valemont Grade Four (N=24)

		2	3
1.	WISC - Vocabulary	.34	.78
2.	WISC - Block Design		.85
3.	Total IQ		

Intercorrelations Between the Creativity and
Intelligence Measures for Valemont Grade Four (N=24)

		WISC Vocabulary	WISC Block Design	Total IQ
1.	Uses-Uniqueness	.16	.18	.21
2.	Uses Fluency	.10	.24	.21
3.	Patterns-Uniqueness	.22	.10	.19
4.	Patterns-Fluency	.47	.44	.55
5.	Total-Fluency	.19	.34	.33
6.	Total-Uniqueness	.22	.16	.23

For 24 df, r.'s of .388 and .496 are significant at the .05 and .01 levesl respectively.

Table 23

Intercorrelations Among the Creativity Measures for Valemont Grade Seven (N=29)

		2	3	4	5	6
1.	Uses-Uniqueness	.74	.31	.35	.71	.78
2.	Uses-Fluency		.25	.30	.87	.61
3.	Patterns-Uniqueness			.69	.54	.73
4.	Patterns Fluency				.72	.73
5.	Total-Fluency					.81
6.	Total-Uniqueness					

Intercorrelations Among the Intelligence Measures for Valemont Grade 7 (N=29)

		2	3
1.	WISC - Vocabulary	.32	.71
2.	WISC - Block Design		.89
3.	Total IQ		

Intercorrelations Between the Creativity and Intelligence Measures for Valemont Grade Seven (N=29)

		WISC Vocabulary	WISC Block Design	Total IQ
1.	Uses-Uniqueness	.30	.15	.25
2.	Uses-Fluency	.35	.12	.26
3.	Patterns-Uniqueness	.32	.20	.30
4.	Patterns-Fluency	.41	.36	.46
5.	Total-Fluency	.46	.28	.42
6.	Total-Uniqueness	.42	.33	.44

For 27 df, r.'s of .367 and .470 are significant at the .05 and .01 levels respectively.

Table 24

Intercorrelations Among the Creativity Measures for Salmo Grade 4 (N=23)

		2	3	4	5	6
1.	Uses-Uniqueness	.73	.54	.41	.59	.90
2.	Uses Fluency		.63	.71	.89	.78
3.	Patterns-Uniqueness			.83	.80	.85
4.	Patterns-Fluency				.94	.68
5.	Total Fluency					.78
6.	Total-Uniqueness					

Intercorrelations Among the Intelligence Measures for Salmo Grade Four (N=23)

		2	3
1.	WISC - Vocabulary	.28	.69
2.	WISC - Block Design		.88
3.	Total IQ		

Intercorrelations Between the Creativity and Intelligence Measures for Salmo Grade Four (N=23)

		WISC Vocabulary	WISC Block Design	Total IQ
1.	Uses-Uniqueness	.33	.32	.40
2.	Uses-Fluency	.20	.37	.37
3.	Patterns-Uniqueness	.35	.13	.27
4.	Patterns-Fluency	.25	.18	.26
5.	Total-Fluency	.25	.32	.36
6.	Total-Uniqueness	.39	.27	.39

For 21 df, R.'s of .413 and .526 are significant at the .05 and .01 levels respectively.

Table 25

Intercorrelations Among the Creativity Measures for Salmo Grade Seven (N=26)

	2	3	4	5	6
1. Uses-Uniqueness	.65	.39	.31	-.10	.59
2. Uses-Fluency		.71	.70	-.14	.78
3. Patterns-Uniqueness			.93	-.39	.97
4. Patterns-Fluency				-.16	.89
5. Total-Fluency					-.37
6. Total-Uniqueness					

Intercorrelations Among the Intelligence Measures for Salmo Grade Seven (N=26)

	2	3
1. WISC - Vocabulary	.31	.81
2. WISC - Block Design		.80
3. Total IQ		

Intercorrelations Between the Creativity and Intelligence Measures for Salmo Grade Seven (N=26)

	WISC Vocabulary	WISC Block Design	Total IQ
1. Uses-Uniqueness	.03	-.09	-.03
2. Uses-Fluency	.20	.14	.21
3. Patterns-Uniqueness	-.06	.03	-.01
4. Patterns-Fluency	.04	.01	.03
5. Total-Fluency	.16	.13	.17
6. Total-Uniqueness	-.04	.01	-.02

For 24 df, R.'s of .388 and .496 are significant at the .05 and .01 levels respectively.

Table 26

Intercorrelations Among the Creativity Measures for McBride Grade 4 Females (N=10)

		2	3	4	5	6
1.	Uses-Uniqueness	.70	.66	.86	.77	.97
2.	Uses Fluency		.59	.73	.99	.72
3.	Patterns-Uniqueness			.53	.61	.80
4.	Patterns-Fluency				.82	.83
5.	Total-Fluency					.78
6.	Total-Uniqueness					

Intercorrelations Among the Intelligence Measures for McBride Grade 4 Females (N=10)

		2	3
1.	WISC - Vocabulary	.80	.95
2.	WISC - Block Design		.94
3.	Total IQ		

Intercorrelations Between the Creativity and Intelligence Measures for McBride Grade 4 Females (N=10)

		WISC Vocabulary	WISC Block Design	Total IQ
1.	Uses-Uniqueness	.15	.49	.34
2.	Uses-Fluency	-.05	.49	.22
3.	Patterns-Uniqueness	-.21	.10	-.06
4.	Patterns-Fluency	.15	.54	.36
5.	Total-Fluency	-.01	.51	.25
6.	Total-Uniqueness	.06	.41	.25

For 8 df, r.'s of .632 and .765 are significant at the .05 and .01 levels respectively.

Table 27

Intercorrelations Among the Creativity Measures for McBride Grade 4 Males (N=19)

		2	3	4	5	6
1.	Uses-Uniqueness	.92	.65	.87	.16	.94
2.	Uses-Fluency		.68	.88	.43	.90
3.	Patterns-Uniqueness			.70	.34	.86
4.	Patterns-Fluency				.22	.88
5.	Total-Fluency					.24
6.	Total-Uniqueness					

Intercorrelations Among the Intelligence Measures for McBride Grade 4 Males (N=19)

		2	3
1.	WISC - Vocabulary	.55	.89
2.	WISC - Block Design		.87
3.	Total IQ		

Intercorrelations Between the Creativity and Intelligence Measures for McBride Grade 4 Males (N=19)

		WISC Vocabulary	WISC Block Design	Total IQ
1.	Uses-Uniqueness	.13	-.07	.03
2.	Uses-Fluency	.25	.02	.16
3.	Patterns-Uniqueness	.20	.14	.20
4.	Patterns-Fluency	.17	.01	.11
5.	Total-Fluency	.31	.28	.34
6.	Total-Uniqueness	.17	.01	.10

For 19 df, r.'s of .433 and .549 are significant at .05 and .01 levels respectively.

Table 28

Intercorrelations Among the Creativity Measures for McBride Grade 7 Females (N=15)

		2	3	4	5	6
1.	Uses-Uniqueness	.78	.79	.78	.23	.91
2.	Uses-Fluency		.66	.86	.42	.74
3.	Patterns-Uniqueness			.86	.39	.97
4.	Patterns-Fluency				.43	.87
5.	Total-Fluency					.35
6.	Total-Uniqueness					

Intercorrelations Among the Intelligence Measures for McBride Grade 7 Females (N=15)

		2	3
1.	WISC - Vocabulary	.55	.85
2.	WISC - Block Design		.90
3.	Total IQ		

Intercorrelations Between the Creativity and Intelligence Measures for McBride Grade 7 Females (N=15)

		WISC Vocabulary	WISC Block Design	Total IQ
1.	Uses-Uniqueness	.29	.30	.34
2.	Uses-Fluency	.01	.13	.08
3.	Patterns-Uniqueness	.18	.16	.19
4.	Patterns-Fluency	.09	.15	.14
5.	Total-Fluency	.05	.26	.19
6.	Total-Uniqueness	.24	.22	.26

For 15 df, r.'s of .482 and .606 are significant at the .05 and .01 levels respectively.

Table 29

Intercorrelations Among the Creativity Measures for McBride Grade 7 Males (N=14)

		2	3	4	5	6
1.	Uses-Uniqueness	.78	.51	.73	.44	.93
2.	Uses-Fluency		.56	.82	.37	.79
3.	Patterns-Uniqueness			.63	.40	.78
4.	Patterns-Fluency				.41	.79
5.	Total-Fluency					.48
6.	Total-Uniqueness					

Intercorrelations Among the Intelligence Measures for McBride Grade 7 Males (N=14)

		2	3
1.	WISC - Vocabulary	.48	.81
2.	WISC - Block Design		.90
3.	Total IQ		

Intercorrelations Between the Creativity and Intelligence Measures for McBride Grade 7 Males (N=14)

		WISC Vocabulary	WISC Block Design	Total IQ
1.	Uses-Uniqueness	.28	-.20	.00
2.	Uses-Fluency	.10	-.02	.03
3.	Patterns-Uniqueness	.57	.11	.36
4.	Patterns-Fluency	.04	-.25	-.14
5.	Total-Fluency	.03	-.30	-.18
6.	Total-Uniqueness	.44	-.09	.15

For 14 df, r.'s of .497 and .623 are significant at the .05 and .01 levels respectively.

Table 30

Intercorrelations Among the Creativity Measures for Valemont Grade 4 Females (N=8)

		2	3	4	5	6
1.	Uses-Uniqueness	.90	.60	.53	.96	.88
2.	Uses-Fluency		.54	.21	.93	.79
3.	Patterns-Uniqueness			.68	.71	.90
4.	Patterns-Fluency				.53	.68
5.	Total-Fluency					.93
6.	Total-Uniqueness					

Intercorrelations Among the Intelligence Measures for Valemont Grade 4 Females (N=8)

		2	3
1.	WISC - Vocabulary	.34	.74
2.	WISC - Block Design		.88
3.	Total I.Q.		

Intercorrelations Between the Creativity and Intelligence Measures for Valemont Grade 4 Females (N=8)

		WISC Vocabulary	WISC Block Design	Total IQ
1.	Uses-Uniqueness	-.24	.70	.38
2.	Uses-Fluency	-.39	.45	.12
3.	Patterns-Uniqueness	.00	.74	.52
4.	Patterns-Fluency	.21	.83	.70
5.	Total-Fluency	-.26	.68	.35
6.	Total-Uniqueness	-.13	.81	.50

For 8 df, r.'s of .632 and .765 are significant at the .05 and .01 levels respectively.

Table 31

Intercorrelations Among the Creativity Measures for Valemont Grade 4 Males (N=16)

		2	3	4	5	6
1.	Uses-Uniqueness	.77	.60	.25	.55	.88
2.	Uses-Fluency		.56	.66	.81	.74
3.	Patterns-Uniqueness			.49	.57	.90
4.	Patterns-Fluency				.83	.42
5.	Total-Fluency					.63
6.	Total-Uniqueness					

Intercorrelations Among the Intelligence Measures for Valemont Grade 4 Males (N=16)

		2	3
1.	WISC - Vocabulary	.38	.82
2.	WISC - Block Design		.83
3.	Total IQ		

Intercorrelations Between the Creativity and Intelligence Measures for Valemont Grade 4 Males

		WISC Vocabulary	WISC Block Design	Total IQ
1.	Uses-Uniqueness	.44	-.22	.12
2.	Uses-Fleuncy	.80	.24	.62
3.	Patterns-Uniqueness	.41	-.30	.06
4.	Patterns-Fluency	.70	.34	.62
5.	Total-Fluency	.70	.30	.60
6.	Total-Uniqueness	.49	-.29	.11

For 16 df, r.'s of .468 and .590 are significant at the .05 and .01 levels respectively.

Table 32

Intercorrelations Among the Creativity Measures for Valemont Grade 7 Females (N=17)

		2	3	4	5	6
1.	Uses-Uniqueness	.70	.24	.23	.55	.67
2.	Uses-Fluency		.46	.64	.94	.68
3.	Patterns-Uniqueness			.60	.57	.87
4.	Patterns-Fluency				.85	.58
5.	Total-Fluency					.70
6.	Total-Uniqueness					

Intercorrelations Among the Intelligence Measures for Valemont Grade 7 Females (N=17)

		2	3
1.	WISC - Vocabulary	.13	.57
2.	WISC - Block Design		.88
3.	Total IQ		

Intercorrelations Between the Creativity and Intelligence Measures for Valemont Grade 7 Females (N=17)

		WISC Vocabulary	WISC Block Design	Total IQ
1.	Uses-Uniqueness	-.07	.11	.05
2.	Uses-Fluency	.15	.22	.25
3.	Patterns-Uniqueness	.13	.14	.18
4.	Patterns-Fluency	.26	.09	.20
5.	Total Fluency	.21	.20	.26
6.	Total-Uniqueness	.04	.15	.14

For 17 df, r.'s of .456 and .575 are significant at the .05 and .01 levels respectively.

Table 33

Intercorrelations Among the Creativity Measures for Valemont Grade 7 Males (N=12)

		2	3	4	5	6
1.	Uses-Uniqueness	.77	.25	.36	.80	.75
2.	Uses-Fluency		.05	.08	.81	.53
3.	Patterns-Uniqueness			.74	.46	.66
4.	Patterns-Fluency				.64	.83
5.	Total-Fluency					.89
6.	Total-Uniqueness					

Intercorrelations Among the Intelligence Measures for Valemont Grade 7 Males (N=12)

		2	3
1.	WISC - Vocabulary	.39	.74
2.	WISC - Block Design		.90
3.	Total IQ		

Intercorrelations Between the Creativity and Intelligence Measures for VAlemont Grade 7 Males (N=12)

		WISC Vocabulary	WISC Block Design	Total IQ
1.	Uses-Uniqueness	.26	.05	.15
2.	Uses-Fluency	.30	-.04	.14
3.	Patterns-Uniqueness	.35	.18	.29
4.	Patterns-Fluency	.47	.53	.60
5.	Total-Fluency	.56	.27	.45
6.	Total-Uniqueness	.42	.35	.45

For 12 df, r.'s of .532 and .661 are significant at the .05 and .01 levels respectively.

Table 34

Intercorrelations Among the Creativity Measures for Salmo Grade 4 Females (N=13)

		2	3	4	5	6
1.	Uses-Uniqueness	.49	.39	.08	.31	.82
2.	Uses-Fluency		.42	.65	.90	.55
3.	Patterns-Uniqueness			.75	.65	.84
4.	Patterns-Fluency				.91	.51
5.	Total-Fluency					.58
6.	Total-Uniqueness					

Intercorrelations Among the Intelligence Measures for Salmo Grade 4 Females (N=13)

		2	3
1.	WISC - Vocabulary	.43	.78
2.	WISc - Block Design		.90
3.	Total IQ		

Intercorrelations Between the Creativity and Intelligence Measures for Salmo Grade 4 Females (N=13)

		WISC Vocabulary	WISC Block Design	Total IQ
1.	Uses-Uniqueness	.06	.11	.11
2.	Uses-Fluency	.03	.48	.34
3.	Patterns-Uniqueness	.31	.27	.34
4.	Patterns-Fluency	.17	.39	.36
5.	Total Fluency	.11	.48	.38
6.	Total-Uniqueness	.23	.23	.27

For 13 df, r.'s of .514 and .641 are significant at the .05 and .01 levels respectively.

Table 35

Intercorrelations Among the Creativity Measures for Salmo Grade 4 Males (N=10)

		2	3	4	5	6
1.	Uses-Uniqueness	.92	.75	.60	.76	.95
2.	Uses-Fluency		.80	.75	.89	.93
3.	Patterns-Uniquenss			.92	.95	.91
4.	Patterns-Fluency				.95	.78
5.	Total-Fluency					.89
6.	Total-Uniqueness					

Intercorrelations Among the Intelligence Measures for Salmo Grade 4 Males (N=10)

		2	3
1.	WISC - Vocabulary	-.03	.54
2.	WISC - Block Design		.82
3.	Total IQ		

Intercorrelations Between the Creativity and Intelligence Measures for Salmo Grade 4 Males (N=10)

		WISC Vocabulary	WISC Block Design	Total IQ
1.	Uses-Uniqueness	.52	.43	.66
2.	Uses-Fluency	.42	.40	.58
3.	Patterns-Uniqueness	.53	.19	.47
4.	Patterns-Fluency	.36	.06	.25
5.	Total-Fluency	.41	.26	.46
6.	Total-Uniqueness	.56	.36	.62

For 10 df, r.'s of .576 and .708 are significant at the .05 and .01 levels respectively.

Table 36

Intercorrelations Among the Creativity Measures for Salmo Grade 7 Females (N=15)

		2	3	4	5	6
1.	Uses-Uniqueness	.86	.91	.75	-.23	.96
2.	Uses-Fluency		.90	.87	.01	.90
3.	Patterns-Uniqueness			.75	-.28	.98
4.	Patterns-Fluency				.37	.77
5.	Total-Fluency					-.26
6.	Total-Uniqueness					

Intercorrelations Among the Intelligence Measures for Salmo Grade 7 Females (N=15)

		2	3
1.	WISC - Vocabulary	.09	.73
2.	WISC - Block Design		.73
3.	Total IQ		

Intercorrelations Between the Creativity and Intelligence Measures for Salmo Grade 7 Females (N=15)

		WISC Vocabulary	WISC Block Design	Total IQ
1.	Uses-Uniqueness	.01	-.28	-.18
2.	Uses-Fluency	-.00	.04	.02
3.	Patterns-Uniqueness	-.09	-.08	-.12
4.	Patterns-Fluency	.18	-.13	.03
5.	Total-Fluency	.34	.08	.28
6.	Total-Uniqueness	-.05	-.15	-.14

For 15 df, r.'s of .482 and .606 are significant at the .05 and .01 levels respectively.

Table 37

Intercorrelations Among the Creativity Measures for Salmo Grade 7 Males (N=11)

		2	3	4	5	6
1.	Uses-Uniqueness	-.02	-.01	-.05	.30	.09
2.	Uses-Fleuncy		.69	.70	-.39	.69
3.	Patterns Uniqueness			.98	-.52	.99
4.	Patterns-Fluency				-.52	.97
5.	Total-Fluency					-.48
6.	Total-Uniqueness					

Intercorrelations Among the Intelligence Measures for Salmo Grade 7 Males (N=11)

		2	3
1.	WISC - Vocabulary	.34	.82
2.	WISC - Block Design		.81
3.	Total IQ		

Intercorrelations Between the Creativity and Intelligence Measures for Salmo Grade 7 Males (N=11)

		WISC Vocabulary	WISC Block Design	Total IQ
1.	Uses-Uniqueness	.12	.34	.28
2.	Uses-Fluency	.40	.21	.37
3.	Patterns-Uniqueness	-.18	-.02	-.13
4.	Patterns-Fluency	-.15	-.04	-.12
5.	Total-Fluency	.02	.22	.14
6.	Total-Uniqueness	-.17	.01	-.10

For 11 df, r.'s of .553 and .684 are significant at the .05 and .01 levels respectively.