

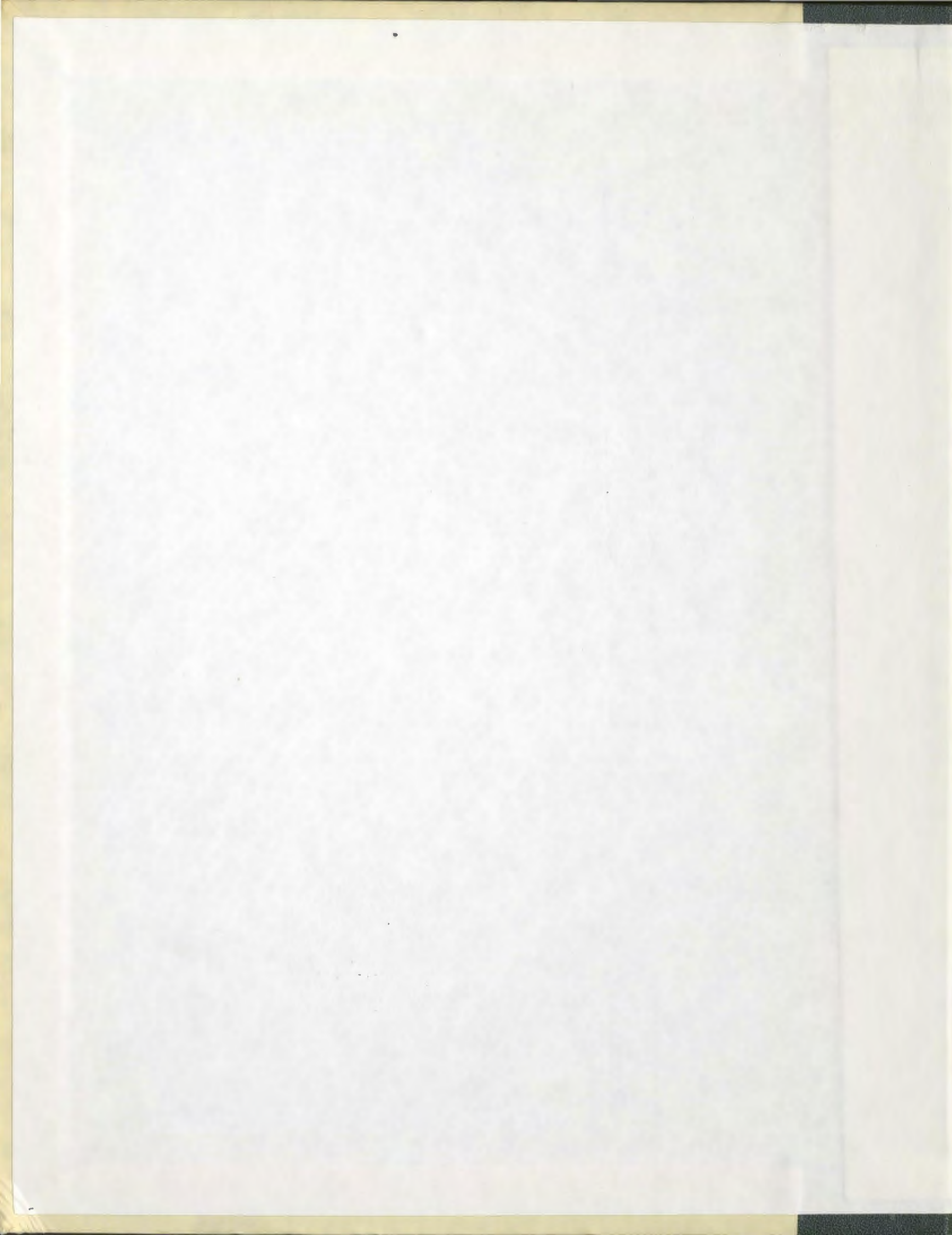
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AND STUDENT TEACHING ACHIEVEMENT

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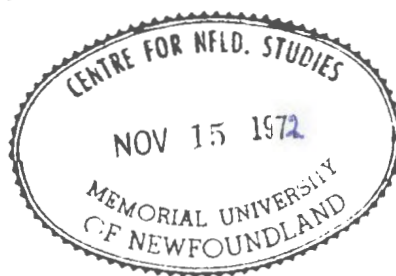
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SYLVIA MAXINE HODDER



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MEMORIAL UNIVERSITY OF NEWFOUNDLAND

THE RELATIONSHIP BETWEEN CREATIVITY, PERSONALITY  
AND STUDENT TEACHING ACHIEVEMENT

BY



SYLVIA MAXINE HODDER

A THESIS

SUBMITTED TO THE FACULTY OF EDUCATION  
IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE  
OF MASTER OF EDUCATION

DEPARTMENT OF EDUCATIONAL ADMINISTRATION

ST. JOHN'S, NEWFOUNDLAND

6th DECEMBER, 1971

Memorial University of Newfoundland  
Committee on Graduate Studies

We, the undersigned, certify that we have read and recommend to the Committee on Graduate Studies, for acceptance, a thesis entitled, "The Relationship Between Creativity, Personality and Student Teaching Achievement," submitted by Sylvia Maxine Hodder in partial fulfilment of the requirements for the degree of Master of Education.

*December 28, 1971*  
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Date

✓ Chairman

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## ABSTRACT

The present study examined the relationship between the variables of creativity and personality and the student teaching achievement of a group of Memorial University of Newfoundland student teachers. More specifically, it investigated whether the grades received by the student teachers from their cooperating teachers were related to their creative thinking abilities and/or one facet of their personality--extraversion. It was also concerned with possible interactions of personal correlates (viz: sex, personality, background) with creativity. As well, the relationship existing between the grade point averages of the student teachers and their achievement in student teaching was considered.

The sample used in this investigation consisted of the ninety-eight student teachers who were enrolled in the student teaching courses at Memorial University of Newfoundland and who participated in the two week student teaching session in May, 1970.

Data for the study included scores obtained by the student teachers on the Torrance Tests of Creative

Thinking, and on the Eysenck Personality Inventory, grades received by the student teachers for their performance in student teaching, the grade point averages of the student teachers, and certain personal factors such as sex and background (urban-rural) of the student teachers.

By analysis of variance, it was determined that a significant relationship did not exist between verbal creativity and student teaching success. For figural and for total creativity, significant differences were found among low, average, and high creative groups on scores of student teaching. Newman-Keuls tests on pairs of means further showed that the significant difference for figural creativity occurred between low and average groups, and the significant difference for total creativity occurred between low and average groups and low and high groups. When analyses were carried out on samples randomly selected from the complete group, these findings were not confirmed so were disregarded.

Extraversion was not found to be a factor influencing student teaching success to a significant degree. Neither was it found that any of the personal correlates interacted with creativity to influence student teaching grades.

A Pearson product-moment correlation of the grades in student teaching and the grades point averages was significant at the .05 level.

On the basis of the F ratios and the correlation coefficient obtained, the present study concluded that creativity is not significantly related to student teaching achievement, but that grade point averages are at the .05 level of significance. The other variables considered--extraversion, sex, background (urban-rural) are not significantly related to student teaching success; nor do they interact with creativity to significantly influence student teaching achievement.

## ACKNOWLEDGEMENTS

The writer wishes to express sincere gratitude to Dr. James Jesse whose guidance and help made possible the completion of this thesis. Thanks are also extended to the Student Teaching Division and to St. Bride's College for their help in acquiring data, and to the student teachers without whose voluntary participation the study could not have been made.

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## CHAPTER I

### THE PROBLEM

The present study examined the relationship between the variables of creativity and personality and the student teaching achievement of a group of Memorial University of Newfoundland student teachers. More specifically, it investigated whether the grades received by the student teachers from their cooperating teachers were related to their creative thinking abilities and/or to one facet of their personality, namely, extraversion. It was also concerned with possible interactions of personal correlates (viz: sex, personality, background) with creativity. As well, the relationship which existed between the grade point averages (G.P.A.'s) of the student teachers and their achievement in student teaching was considered.

#### Background Of The Study

Within the past decade creativity has become a central concern in educational research. In fact, the concept of creativity has become so important as to be almost a cult in educational and psychological thinking. This

is because of a changed outlook on the part of educators as regards the desired outcomes of education and evidence based on observation and empirical research that people who make creative contributions are not necessarily those who possess high intelligence. Educators have further come to think that, if the fullest use of a nation's potential is to be made, people with abilities other than intelligence--and by this they mean especially those with creative thinking abilities--should be identified and their talents developed.

This increasing emphasis on "the education of the creative student" and the "nurturing of creative talents and abilities" has had serious implications for teacher education. Researchers such as E. Paul Torrance have indicated that everybody has potential for creative endeavour in greater or lesser degree, and have suggested strongly that it is the professional responsibility of every teacher to seek out this creative ability, to nurture it, and to provide opportunities for it to flourish. The implication is clear...that this creative talent is most likely to grow and manifest itself if it receives very skilful nourishment which can be best provided by

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a creative teacher.<sup>1</sup> This, consequently, has raised considerable interest in the identification and training of creative teachers.

Unfortunately, however, the question has arisen whether the teacher training institutions are going beyond affording mere "lip-service" to the importance of creative teaching, or whether they are assuming that somehow it will happen. This is especially so for the student teaching part of the teacher education programme, the part which, according to research conducted, has need of strong positive support.

Student teaching has been defined as a major test of total competence at the operational level,<sup>2</sup> and described as a time of integration when what has been learned in academic courses can be reorganized, modified, and adjusted; when what has been learned in professional courses can be tested, tried, and modified as a result of actual experience; and when professional skills and concepts are re-

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<sup>1</sup>Kent G. Alm, "Can Student Teachers Be Creative?" Readings in Student Teaching, Edited by J. Johnson and Floyd Perry (Dubuque, Iowa: Wm. C. Brown Book Company, Inc., 1967), p. 341.

<sup>2</sup>F.B. Stratemeyer and M. Lindsey, Working With Student Teachers (New York: Teachers' College, Columbia University Bureau of Publications, 1958), p. 430.

learned, re-evaluated, and reinforced.<sup>3</sup> It has been cited as the "one indisputably essential element in professional education."<sup>4</sup> Interview and survey studies of college students and in-service teachers have shown it to be the most strongly desirable or needed portion of teacher preparation.<sup>5</sup> It has been further found that student teaching experiences influence the student teacher more than method courses do.<sup>6</sup> All of this points to the need for making this experience as meaningful as possible. Consequently, many questions are being raised about the present student teaching programmes.

One aspect of student teaching giving much concern is the evaluation of the student teacher's proficiency by the cooperating teacher during the student teaching period. One of the assumptions made by any teacher education institution concerning student teaching appears to be that

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<sup>3</sup>Russell L. Trimmer, "Student Teachers Talk Back," Journal of Teacher Education, XI, No. 4 (December, 1960), 537-538.

<sup>4</sup>James B. Conant, The Education of American Teachers (New York: McGraw-Hill, 1963), p. 142.

<sup>5</sup>Henry J. Hermanowicz, "The Pluralistic World of Beginning Teachers," The Real World of the Beginning Teacher (National Education Association, 1966), pp. 43-59.

<sup>6</sup>J.D.M. McAuley, "How Much Influence Has a Cooperating Teacher?" Journal of Teacher Education, XI, No. 6 (March, 1960), 79-83.

just as it is necessary to provide this experience, it is also necessary to rate or grade this experience in terms of functional success in and prediction of future success in teaching. It is accepted, however, that in this evaluation the evaluator must look far beyond the usual marking or awarding of grades, and must consider the student teacher's growth, his achievement, his probable success as a teacher. It is an evaluation which must involve consideration of certain problems or relationships; acceptance of basic values; interpretation and understanding of behaviour; formulation of judgements; and appraisal of knowledge, skills, attitudes and appreciations not always taken into consideration in the process of arriving at a student's grade or mark in regular courses.<sup>8</sup> In fact, in student teaching the evaluation is so much an interrelated part of the experience that it is the particular evaluation process in operation which will primarily determine the

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<sup>7</sup>Pose Lamb, The Student Teaching Process in Elementary Schools (Columbus, Ohio: Charles E. Merrill Books, Inc., 1965), p. 217.

<sup>8</sup>Leander L. Boykin, "Principles of Evaluation in Student Teaching," Evaluating Student Teachers: A Forward Look at Theories and Practices, Thirty-ninth Yearbook of the Association for Student Teaching (Association for Student Teaching, 1960), pp. 8-27.

success of the experience.<sup>9</sup>

Research has been carried out in an attempt to settle some of the controversy raging over the importance of the evaluation of the student teacher to his future career. The necessity of rating, in itself, would point to an assumption of a relationship between success in practice teaching and success in the field, but does the grade received by a student teacher actually help determine his selection for a position? A survey of over three hundred large school districts in the United States was done by Gilbert. It showed that selection methods focused almost entirely on the overt characteristics, that the selection procedures were determined more by what was easily obtainable (i.e. the student teaching grade) than by what might be important to assess.<sup>10</sup>

It may be emphatically noted that Dr. Darrell A, Hindman, in a study of fifty-five hiring officials, found

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<sup>9</sup>Wm. R. Sleeper and Harold E. Telfer, "Evaluation: The Heart of Student Teaching," Readings in Student Teaching, Edited by Jim Johnson and Floyd Perry (Dubuque, Iowa: Wm. C. Brown Book Company, Inc., 1967), 251-255.

<sup>10</sup>Lucien B. Kinney, "A Criterion for the Appointment of Student Teachers: The California Definition," Evaluating Student Teachers: A Forward Look at Theories and Practices, Thirty-ninth Yearbook of the Association for Student Teaching (Association for Student Teaching, 1960), pp. 45-56.

that these officials considered the student teaching grade "to be of great value" in selecting inexperienced teachers.<sup>11</sup>

Another project which investigated one hundred seventy-eight hiring officials found that although sixty-eight per cent. of them felt that the actual letter grade was not vital, ninety-seven of them did think that the evaluation of the student teachers by the cooperating teachers and the college supervisors was.<sup>12</sup>

#### Need For The Present Study

The findings of those studies have determined the importance of this particular evaluation. It is recognized that research in the area is very badly needed, since little headway has been made in finding methods of evaluation eliminating deficiencies such as rater bias in our present methods.<sup>13</sup> Many questions concerning this issue need attention. How should this rating be done? How does the rating affect the relationship between the cooperating teacher and the student teacher? What factors

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<sup>11</sup>David Hershey Mathias, Jr., "The Terminal Evaluation of Student Teachers," (Unpublished Ed.D dissertation, University of Colorado, 1966), p. 3

<sup>12</sup>Ibid., p. 223.

<sup>13</sup>Roger E. Wilk, "An Experimental Study of the Effect of Classroom Placement Variables on Student Teaching Performance," Journal of Educational Psychology, LV (1964), 375-380.

influence the rating? What kind of student teacher is rated highly by the supervising teacher? Most importantly, are the truly superior teachers being identified under the present system of evaluation?

This study is based on the tenet that the school system is no better than the teachers who comprise it, that the quality of the education offered in any school system depends to a very great extent on the quality of the teachers within the system. Therefore, we must be vitally concerned with the recognition, development, and retention of the superior teachers. The study, then is concerned with the last question--are the truly superior teachers being identified? Creativity and superiority are being equated since it is generally felt that although there is no definitive description of a superior teacher, creativity more than any other factor contributes to a teacher's superiority and determines his effectiveness in a learning situation. This feeling is supported, not only by the traditional belief in creative thinking as the highest of mental functions and creative product as the peak of human achievement, but by research.

Bond, in a study of eight hundred fifty-five student teachers at the University of California, Los Angeles,

found a close relationship between high mean scores in creativity and general superiority in teaching, as measured by a checklist of characteristics judged desirable for superior teaching. This justified his conclusion that creativity is essential as a contributor to superior teaching success and that it is proportionally lacking in teachers of inferior ability.<sup>14</sup>

Evidently, then, the question of whether the creative student teacher is being recognized and rewarded is one requiring immediate attention. One of the most fundamental pieces of knowledge in the field of psychology is that behaviour which is rewarded tends to persist. This appears especially true for creative behaviour. Studies have indicated that the development of creativity depends in part on how the creative output is received; that if it is to flourish, it must be appreciated, and it must be facilitated.<sup>15</sup> That this recognition and rewarding is of utmost importance is made even more apparent by Zirbes' finding that if the creativity of a student teacher is not recog-

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<sup>14</sup>Jesse A. Bond, "Analysis of Observed Traits of Teachers Rated Superior in Demonstrating Creativeness in Teaching," Journal of Educational Research, LIII, No. 1 (September, 1959), 7-12.

<sup>15</sup>Eliot E. Eisner, "Research in Creativity: Some Findings and Conceptions," Childhood Education, XXXIX (April, 1963), 371-375.

nized during his student teaching period, he will conform or revert to ways in which he was taught as a child.<sup>16</sup> Another possibility is that he may do as many college creative students do--drop out.

Snyder found that the Massachusetts Institute of Technology loses three times as many students who, when freshmen, preferred to invent new solutions and to take intelligent risks, as they do students who preferred a well ordered and regulated life with tangible results.<sup>17</sup> A study by Heist showed that many more creative students (identified on the basis of personal test data) withdrew from college, that fifty to eighty percent. of college creative students withdrew. This was a significantly higher percentage of withdrawals than that of non-creative students.<sup>18</sup> Heist and his associates, in a follow-up study, concluded that the creative students drop out of college because they are not rewarded for the kinds of achievement in which they excel and for which

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<sup>16</sup>Laura Zirbes, Spurs to Creative Teaching (New York: G.P. Putnam's Sons, 1959), p. 272.

<sup>17</sup>B. Snyder, "Creative Students in Science and English," Universities Quarterly, XXI, No. 2 (1968), 215-218.

<sup>18</sup>P. Heist, "Creative Students: College Transients," The Creative College Student: An Unmet Challenge, Edited by P. Heist (San Francisco: Jossey-Bass, 1968), pp. 35-55.

they are motivated.<sup>19</sup> The staff of Moderator, in a survey of college students, found a high percentage of agreement that not enough attention was given to creative achievement in higher education.<sup>20</sup>

Despite all of this, creativity research has had virtually no impact on higher education. Taylor wrote that although much new has been written concerning the need for developing creativity in higher education (and college students have served as subjects in experiments concerning creative phenomena), there is almost no evidence of experimentation in admissions practices, college teaching, or evaluation of achievement.<sup>21</sup> Even more relevant is his belief that creativity research related to education of teachers and supervision of student teachers is especially needed, and that student teaching divisions need to devise predictors of creative potential.<sup>22</sup>

In recent years the student teaching programme at Memorial University of Newfoundland has been given added

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<sup>19</sup>Ibid.

<sup>20</sup>Moderator, I (1962), 23-24.

<sup>21</sup>Calvin W. Taylor, ed., Creativity: Progress and Potential (Toronto: McGraw-Hill, Inc., 1964), p. 117.

<sup>22</sup>Ibid., p. 128.

importance and emphasis. A Division of Student Teaching has been established. This Division has developed a systematized programme of student teaching as a necessary part of the teacher education programme. The new programme has been requiring the student teachers to spend an ever increasing amount of time in the schools. A new and a more comprehensive evaluation form has been developed.

This study looked at one aspect of the teacher training programme at Memorial University--the evaluation of the student teachers in their practice teaching periods--in an attempt to ascertain to what extent the creative student teacher is considered. It was undertaken because, in view of the research findings already presented, it is quite evident that teacher training institutions have no choice but to make creativity a top priority in the evaluation of their teachers, if they are to retain the more creative teachers.

#### Scope Of The Study

The study focused, then, on the evaluation of student teachers in the present system. The problem investigated was to determine:

- a) the relationship between the creative thinking ability of the student teacher and his student teaching grade;
- b) the relationship between one particular aspect of personality--extraversion as measured by the Eysenck Personality Inventory--of the student teacher and his student teaching grade;
- c) the interaction of sex and creativity level of the student teacher;
- d) the interaction of extraversion and creativity level of the student teacher;
- e) the interaction of background (urban-rural) and creativity level of the student teacher.

#### Limitation of the Study

Under the present student teaching system each student teacher is assigned to a different cooperating teacher. Therefore, underlying the differences in student teaching grades is the fact that they are provided by different cooperating teachers, i.e. there will be differences among raters in their evaluation of the student teachers. A consistency of raters must, then, be assumed here just as it is assumed by the university.

If the raters are not consistent, this is a practical limitation which cannot be overcome, since it is impossible to have the same cooperating teacher for all student teachers. Even if it were, consistency of raters is not assured, since one rater may vary in his evaluation of different students.

### Delimitations of the Study

No attempt was made to study the effect of the following variables on the student teaching grades:

- a) the degree of experience of the student teachers involved in the study;
- b) the number of university years completed by the student teachers;
- c) the programme (primary, elementary, high school) which the students were pursuing.

### Definition Of Terms

The following is a brief description of the terms used in the study. They are operationally defined. Further details will be presented in subsequent chapters.

Creativity.--This meant that quality or process of

thinking measured by the Torrance Tests of Creative Thinking.

Creativity Scores.--These were the scores received by the student teachers on the Torrance tests. There were three groups of scores, one for each of verbal, figural, and total creativity. Each was a composite of individual test scores, measures of fluency, flexibility, originality, and elaboration.

Grade Point Average.--This was the average grade the student teacher had received in all courses taken at the university up to the current level.

Personality.--This referred to only one facet of the student teacher's personality--extraversion, as measured by the Eysenck Personality Inventory. Since it is measured on a scale, this meant that subjects with high scores--towards the extraversion pole--were said to be extraverts; subjects with low scores--towards the introversion pole--were said to be introverts.

Student Background.--This referred only to whether the subjects were from an area which was considered urban (population over 20,000) or from a rural area.

Student Teaching Grade.--This was the grade which was

given to each student teacher by a cooperating teacher, based on his observation and judgement of the student teacher's performance in the classroom during the student teaching period.

### Summary

This chapter presented the problem investigated. It described the background of the study, attempted to establish the need for it, outlined the extent to which the problem was investigated, and explained the terms used.

## CHAPTER II

### REVIEW OF RELATED LITERATURE

Although much research has been carried out in creativity and in student teaching, very few investigations have been concerned with both areas together. The main purpose of this study was to find whether any relationship existed between the creative thinking abilities of student teachers and their achievement in student teaching. The influence of several other variables on this relationship was also investigated. Hence this chapter will give a review of the literature related to tests used in the study and to research findings in the following areas: creativity and student teaching; creativity and achievement; personality and achievement; creativity and the personal correlates of sex, personality, and background; G.P.A. and student teaching achievement.

#### Creativity and Student Teaching

A survey of the literature did not reveal any study similar to the one carried out by this investigator. In fact, very little work in which both student teaching and

creativity were considered appeared to have been done.

In 1962 Weiser studied a sample of two hundred and eighty-two undergraduate students in Education at the University of Missouri working for teacher certification. He administered to the students the Torrance Tests of Creative Thinking, an adjective checklist, and the Educational Interest Inventory. Students scoring in the lowest 27 percent. on a composite creativity measure were compared with those scoring in the highest 27 percent. On the Educational Interest Inventory, the Professor scale characterized the creative group; that is, the creative group displayed the same interests as those displayed by college professors. They did not differ, however, in teaching majors, preferences for elementary or secondary teaching, or plans to obtain advanced degrees. There were also no differences in mean cumulative grade point average or in scores on the Cooperative School and College Ability Tests (SCAT).<sup>1</sup>

A study by Morgan and Woerdehoff considered whether early behaviours of student teachers are related to personality and/or creativity factors. Subjects for the

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<sup>1</sup>E. Paul Torrance, Norms-Technical Manual: Torrance Tests of Creative Thinking (Princeton, N.J.: Personnel Press, Inc., 1961), p. 37.

research were thirty-four student teachers at the secondary school level, at Purdue University.

The Guilford-Zimmerman Temperament Survey was used to measure several personality factors, one of which was sociability. To measure gross creativity, flexibility, and ideational fluency, the investigator used Feldhusen's Creativity Rating Scale, an instrument consisting of sixty-seven items derived from the list of characteristics distinguishing creative individuals found in Torrance's Guiding Creative Talent. These tests were administered to the student teachers one week prior to their entrance into the student teaching experience. To record observed classroom behaviours, the Flanders Interaction Analysis Record was administered during the first week and again during the last week of the student teaching period. The observers consisted of five university supervisors of student teaching.

In order to determine if behaviours of student teachers were related to personality and/or creativity factors, a series of ten regression analyses was run, using the ten personality factors measured by the Guilford-Zimmerman Temperament Survey and the three creativity factors measured by the Creativity Self-Rating Scale.

These thirteen factors were correlates of the behavioural categories of the Interaction Analysis Record. Some relatively high correlations were found. This implied that certain personality traits and/or creativity factor combinations might accurately predict specified classroom behaviours of the student teachers. The four best predictors were found to be a) Ascendance, b) Sociability, c) Masculinity, and d) Gross Creativity.<sup>2</sup>

### Creativity and Achievement

Although no research has been done on the relationship between creativity and success in student teaching, several studies have investigated the relationship of creativity to achievement in school and later vocational success. The results, however, have given rise to some confusion. The findings of Getzels and Jackson,<sup>3</sup> and later of Torrance,<sup>4</sup> strongly suggest that various measures

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<sup>2</sup>J.C. Morgan and F.J. Woerdehoff, "Stability of Student Teachers' Behaviours and their Relationship to Personality and Creativity Factors," Journal of Educational Research, LXII, No. 6 (February, 1969), 251-254.

<sup>3</sup>J.W. Getzels and P.W. Jackson, Creativity and Intelligence (New York: John Wiley and Sons, 1964), p. 25.

<sup>4</sup>E. Paul Torrance, Guiding Creative Talent (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1962), pp. 58-63.

of creative thinking abilities seem to be positively related to academic achievement as assessed by standardized measures; that creative thinking abilities are apparently as important as those measured by traditional measures of I.Q. in educational achievement. Their findings were supported by further work by Yamamoto.<sup>5</sup>

Work by Bish using the Torrance Tests of Creative Thinking with fourth, fifth, and sixth graders showed a correlation, significant at the .001 level, between verbal measures of creativity and achievement (.36 - .42). The correlation between non-verbal measures and achievement was not statistically significant.<sup>6</sup>

However, later studies by Cicirelli<sup>7</sup> and by Wallach and Kogan<sup>8</sup> failed to find any relationship between their measures of creativity and achievement. It was found that whereas intelligence and achievement were

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<sup>5</sup>Kaoru Yamamoto, "Role of Creative Thinking and Intelligence in High School Achievement," Psychological Reports, XIV (1964), 783-789.

<sup>6</sup>Torrance, op. cit., p. 48.

<sup>7</sup>V.G. Cicirelli, "Form of the Relationship Between Creativity, I.Q. and Academic Achievement," Journal of Educational Psychology, LVI (1965), 303-308.

<sup>8</sup>M. Wallach and N. Kogan, Modes of Thinking in Young Children (Toronto: Holt, Rinehart & Winston, 1965), p. 359.

highly correlated (.66 - .67), creativity and achievement showed very low correlations (.11 - .37). They concluded that creativity appears to have a limited predictive value, and that a very weak relationship exists between the two measures.

Holland, on the basis of research in the same area, concluded that good grades in high school or college may be either unrelated or even negatively correlated with potential for creative performance.<sup>9</sup>

Flescher felt that the fact that Getzels and Jackson, Torrance and Yamamoto found significant relationships could be explained by a characteristic of their subjects. All studies were concerned with those people in the creativity groups who possessed sufficiently high intelligence, consistently above 120 I.Q. This view was supported by the work of Ohnmacht. He found that although the creativity measures were related to achievement, the results were not independent of a commonality with intelligence.<sup>10</sup> Therefore, in an attempt to clarify the issue, Flescher

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<sup>9</sup>John L. Holland, "Creativity and Academic Performance among Talented Adolescents," Journal of Educational Psychology, LII, No. 3 (June, 1961), 136-146.

<sup>10</sup>Fred W. Ohnmacht, "Achievement, Anxiety, and Creative Thinking," American Education Research Journal, III (1966), 131-138.

designed an elaborate study to investigate the validity of implications concerning the comparative influence of unusual creative thinking and exceptional intelligence in the learning process. In the study he used the two groups left out by the earlier researchers--one characterized by non-extraordinary intelligence and one by high creativity and high intelligence. He determined that while there exists a significant relationship between intelligence and scholastic performance, creativity is not related to academic success, that, in fact, to speak of a correlation between creativity and school achievement of a formalized kind is itself a negation of what we now know about the relation between creativity and intelligence per se; that is, they are by no means synonymous. He further pointed out that when we talk of creative talent and divergent thinking abilities, we must think, not of school achievement which traditionally requires convergent thinking, but of divergent achievement indices.<sup>11</sup>

Regarding the relationship between creativity and success in work, it has long been recognized that creativity is a distinguishing characteristic of outstanding

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<sup>11</sup>Irvin Flesher, "Anxiety and Achievement of the Intellectually Gifted," Journal of Psychology, LVI (October, 1963), 251-263.

individuals in almost every field. Wallace found this to be so even in a quite routine job such as selling.<sup>12</sup> This is explained by the fact that in work it is often the novelty and flexibility of approach rather than the convergency of approach which counts for success. No attempt has previously been made to see if this is actually so for student teachers.

### Personality and Achievement

The relationship of personality to achievement, even of a convergent nature, has not been fully determined. However, a fair amount of research has been carried out relating the dimension of extraversion to learning theory and behaviour. Research on the success and failure of university students has drawn attention to the important part played by this dimension. Studies by Lynn<sup>13</sup> and by Lynn and Gordon<sup>14</sup> found that good academic achievers were

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<sup>12</sup>H.R. Wallace, "Creative Thinking: A Factor in Sales Productivity," Vocational Guidance Quarterly (Summer, 1961), 222-226.

<sup>13</sup>R. Lynn, "Two Personality Characteristics Related to Academic Achievement," British Journal of Educational Psychology, XXIX (1959), 213-216.

<sup>14</sup>R. Lynn and I.E. Gordon, "The Relationship of Neuroticism and Extraversion to Intellectual and Educational Achievement," British Journal of Educational Psychology, XXXI (1961), 194-203.

characterized by introversion. The tendency for introverted university students to do well academically has also been reported by Furneaux,<sup>15</sup> by Broadbent,<sup>16</sup> and by Bendig.<sup>17</sup>

This finding is what one would expect in view of, among other things, the extravert's preference for speed rather than accuracy and his comparatively poor performance at tasks demanding prolonged vigilance under boring conditions, and also in view of the positive and significant correlation between introversion and persistence at a mental task found by Bakan.<sup>18</sup>

Lynn and Gordon also have looked at areas in which extraverts differ from introverts, and have concluded that there are four major characteristics in which extraverts differ from introverts in a way which would be expected to have an effect on educational achievement.

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<sup>15</sup>J.J. Eysenck and Sybil B.G. Eysenck, Eysenck Personality Inventory Manual (San Diego, California: Educational and Industrial Testing Service, 1968), p. 21.

<sup>16</sup>Ibid.

<sup>17</sup>A.W. Bendig, "Extraversion, Neuroticism and Student Achievement in Introductory Psychology," Journal of Educational Research, LIII (1960), 263-267.

<sup>18</sup>P. Bakan, "Extraversion-Introversion and Improvement in an Auditory Vigilance Task," British Journal of Psychology, L (1959), 325-332.

Briefly, these are: 1) speed, with introverts appearing to form conditioned responses more quickly than extraverts; 2) intelligence, with neurotic introverts tending to be more intelligent than extraverts; 3) work decrement, with introverts being superior to extraverts in tasks requiring sustained work or attention; 4) accuracy and speed, with introverts undertaking tasks slowly and accurately, while extraverts are quick and inaccurate.<sup>19</sup>

In general, then, it can be said that within given academic groups, individuals having scores towards the introversion pole on the extraversion scale of the EPI can be expected to achieve greater academic success. However, all of this research has been based on achievement of a convergent nature, mainly on standardized tests of achievement. That there is some relationship between a teacher's personality and his success is a matter requiring further research. Several studies have indicated relationships between certain personal characteristics and teacher effectiveness. Henjum, using Cattell's 16 Personality Factor found that success at the junior high school level, but not at the senior high level, was re-

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<sup>19</sup>Lynn and Gordon, op. cit.

lated to certain personality characteristics.<sup>20</sup> The researchers involved in this area, however, make no claim to having exhausted the subject.

### Creativity and Personal Correlates

The relationship between creativity and such personal factors as sex, background, and extraversion has not been conclusively determined by research.

The matter of sex differences in creative thinking is a complex one. Research has presented many contradictory findings which have been explained in a variety of ways. The common assertion, however, is that males are more creative than females. In eleven studies of sex differences in creativity reviewed by Maccoby in her discussion of the development of sex differences, three showed no sex differences, three showed girls to be more creative, and five showed boys to be more creative.<sup>21</sup>

In three separate studies, Torrance found a number of differences between the sexes on his measures of creative thinking ability. In general, girls excelled boys

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<sup>20</sup>Arnold Henjum, "A Study of the Student Teacher's Personality Characteristics," Journal of Teacher Education, XX, No. 2 (Summer, 1969), 143-147.

<sup>21</sup>Eleanor E. Maccoby, The Development of Sex Differences (Stanford, California: Stanford University Press, 1966), p. 344.

on all verbal tests, especially after the fourth grade, but boys excelled girls on all scores derived from the figural tests, at all of the grade levels tested. There were also significant differences on particular tests within the batteries.<sup>22</sup> The work of Klausmeier and Wiersma supported these findings,<sup>23</sup> but Phathak studying Indian children found no statistically significant differences between the sexes, using the Torrance Tests of Creative Thinking.<sup>24</sup>

Raina investigated this relationship, proceeding on the assumption that although research had been inconclusive, differences between the sexes on scores for creative thinking should be expected inasmuch as sex differences had already been found on tests of convergent thinking and on many measures in the affective domain, including interests and values. His study showed that males score higher than females on all four verbal dimensions of the Torrance Tests of Creative Thinking,

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<sup>22</sup>E. Paul Torrance, Rewarding Creative Behavior (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1965), p. 127.

<sup>23</sup>J. Klausmeier and W. Wiersma, "Relationship of Sex, Grade Level and Locale to Performance of High I.Q. Students on Divergent Thinking Tests," Journal of Educational Psychology, LXV (1964), 114-119.

<sup>24</sup>Phathak, "Experimental Study of Creativity, and Intelligence, and Scholastic Achievement," Psychological Studies, VII (1962), 1-9.

and on the total, but the  $t$  ratios were significant at the .05 level between the means of the two groups on the fluency and elaboration dimensions and the total only. On the figural all  $t$  ratios were significant at the .01 level with boys scoring higher.<sup>25</sup>

Various attempts have been made to explain or to "explain away" these contradictory findings. Possible explanations have been given in terms of age, educational level, the nature of the task, the nature of the instrument, the emphasis given the definition of the term, biological or socio-cultural influences, etc. This study did not attempt further clarification of the issue, although it did look at the distribution of males and females within the different creative groups. Its purpose in looking at the sex factor was to determine whether it interacted with creativity to produce significant differences in student teaching achievement.

Very little research has been conducted on the question of whether creative thinking abilities are influenced by the urban-rural factor. Taylor asserts that environmental factors are related to creative per-

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<sup>25</sup>M.K. Raina, "A Study of Sex Differences in Creativity in India," Journal of Creative Behaviour, III No. 2 (Spring, 1969), 111-119.

formance,<sup>26</sup> and Iron found that urban people are more creative.<sup>27</sup> Although this is hardly conclusive evidence, this study was concerned with only possible interaction of the variable with creativity.

Taylor names biographical items as one of the most effective predictors of creativity, and one of these items appears to be the personality characteristic of extraversion.<sup>28</sup> Much work has been done in this area, and, although there is some doubt of whether we have reached the point of safely formulating generalizations, it is commonly asserted that various creative groups are low in extraversion.

Studies by Reid, Wickwire and King,<sup>29</sup> by Taylor and Ellison,<sup>30</sup> and by Getzels and Csikszentmihakyi<sup>31</sup>

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<sup>26</sup>Calvin W. Taylor, ed., Creativity: Progress and Potential (Toronto: McGraw-Hill, Inc., 1964), p. 39.

<sup>27</sup>Jerry Lee Iron, "Creative Thinking Abilities of Rural and Urban Elementary School Students," (Unpublished Ph.D. dissertation, East Texas State University, 1967), p. 4.

<sup>28</sup>Sidney J. Parnes and Harold F. Harding, A Source-book for Creative Thinking (New York: Charles Scribner Sons, 1962), p. 162.

<sup>29</sup>Reid, Wickwire and King, "Cognitive and Other Personal Characteristics of Gifted Children," Psychological Reports, V (1959), 729-737.

<sup>30</sup>Jack Getzels, "Creativity," Encyclopedia of Educational Research (1969), pp. 267-275.

<sup>31</sup>Ibid.

reported low sociability for creative people. This finding was reinforced by the work of Drevdahl<sup>32</sup> and Cattell<sup>33</sup> who found various creative groups low in extraversion, more concerned with ideas than with people, and rather uninterested in activities of a social nature. MacKinnon, in a review of research in this area, showed that the majority of creative people were introverts,<sup>34</sup> and, in a study using the Myers-Briggs Type Indicator where introversion means an inclination toward reflection rather than action, he found that creative performers tend to be higher on scores of introversion. He added, however, that although approximately two-thirds of our creative groups score as introverts, there is no evidence that introverts as such are more creative than extraverts.<sup>35</sup>

Accepting that creative people are tending to be introverts, this study looked for an interaction of extraversion and creativity, as a possible influence on student teaching achievement.

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<sup>32</sup>Ibid.

<sup>33</sup>Ibid.

<sup>34</sup>Donald MacKinnon, "The Nature and Nurture of Creative Talent," The American Psychologist, XVII, No. 7 (July, 1962), 484-495.

<sup>35</sup>Ibid.

### Grade Point Averages and Student Teaching Grades

Studies related to G.P.A. or academic success and its relation to teacher efficiency indicate no unanimity of findings. Several have reported that there is a positive relationship. Steiner and Von Halden concluded that scholarship is a highly reliable objective measure of success in student teaching, and that high scholarship generally signifies commensurate possession of necessary teaching traits.<sup>36</sup> Anderson found that the best individual predictor of teaching success was total grade point average.<sup>37</sup> Jones reported that significant differences in academic ability indicated good and poor teaching.<sup>38</sup> Ryan showed that superior intellectual ability and above average achievement are two of several attributes applying generally to teachers judged by various kinds and sets of criteria to be outstanding.<sup>39</sup>

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<sup>36</sup>R.W. Steiner and H.I. Von Halden, "The Selection and Guidance of Teachers," Journal of Educational Research, XXXIII (January, 1940), 329.

<sup>37</sup>James Harold Anderson, "The Predictive Value of Selected Factors for Student Teaching Success at Western Carolina University," (Unpublished Ed.D dissertation, University of Tennessee, 1968), p. 178.

<sup>38</sup>Mary Lois Jones, "Analysis of Certain Aspects of Teaching Abilities," Journal of Experimental Education, XXV (December, 1956), 103-180.

<sup>39</sup>William J. Ryan, "An Evaluation of Letter Grades in Student Teaching," Continuing Education, XLI, No. 1 (October, 1969), 19-21.

It is asserted, however, that although many studies have shown positive correlations, these correlations have not been high enough to be considered a sole criterion for teaching success. Martin reported correlations of only .28 - .37 between student teaching grades and first, second, and third year marks.<sup>40</sup> Leavitt's investigation of two hundred sixty-six elementary teachers at a north-west university School of Education showed that a high relationship did not exist between G.P.A. and student teaching success; that, in general, students with good G.P.A.'s were no more or no less successful in student teaching than were those who received poor grades.<sup>41</sup> Merrill's research further showed that grades have most meaning within well-defined academic systems of higher education as predictors of other grades, but that only an incidental relationship exists between grades and success in one's actual work.<sup>42</sup>

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<sup>40</sup>Lycia O. Martin, The Prediction of Success for Students in Teacher Education (New York: Bureau of Publications, Teachers' College of Columbia University, 1944), p. 55.

<sup>41</sup>Jerome Edward Leavitt, "Personal Data and Prediction of Success in Student Teaching," Journal of Teacher Education, IV, No. 3 (September, 1953), 194-197.

<sup>42</sup>Edward C. Merrill, Professional Student Teaching Programmes (Danville, Illinois: Interstate Printers and Publishers, Inc., 1966), p. 47.

### Summary

This chapter gave a review of the literature related to the tests which were used in the study, and to research findings in the areas of creativity and student teaching; creativity and achievement; personality and achievement; creativity and the personal correlates of sex, personality, and background; grade point averages and student teaching achievement. The general conclusions from this literature were that creative thinking ability can accurately predict specified classroom behaviours; that creativity is not related to scholastic performance, but is related to success in work; that introversion is positively related to achievement; that although there have been no conclusive findings, it can be tentatively stated that creative people tend to be males, from urban areas, and introverted; and that grade point average is not an accurate predictor of success in work.

## CHAPTER III

### THE EXPERIMENTAL DESIGN

The purpose of this chapter is to present the hypotheses formulated on the basis of the conclusions reached by the studies reviewed, and to describe the sample, the instruments, and the testing procedures used in the study.

#### Statement Of Hypotheses

As the studies reviewed showed, creativity is related to success in work and can predict certain classroom behaviours in teaching. They also showed that creativity and convergent achievement are not related. Since, however, achievement in student teaching is not necessarily achievement of a convergent nature and is, therefore, evaluated by divergent indices, the relationship between creativity and student teaching achievement needs investigation.

Regarding the relationship between achievement and personality, the research showed that introversion is

positively related to achievement of a convergent kind. Investigations into the relationship between this dimension of personality and student teaching success are lacking.

The relationship of creativity to sex, extraversion, and background of the student has been the subject of many studies, and although there have been contradictory findings, the results generally have indicated that creative people tend to be male, introverted, and from urban areas. This study made no further investigation of this relationship, but was interested in interaction of these variables with creativity.

Although grade point average has not been found to be a good predictor of future success in work, it can accurately predict other grades. Whether this is so for student teaching grades (grades which can be regarded as a different kind of achievement) has not been investigated.

In the light of these findings, it was hypothesized that,

1. There is no significant difference among low, average, and high creative groups on scores of student teaching;
2. There is no significant difference between extraverts and introverts on scores of student teaching;

3. There is no significant interaction of creativity and sex of the student teacher;
4. There is no significant interaction of creativity and personality of the student teacher;
5. There is no significant interaction of creativity and background (urban-rural) of the student teacher;
6. There is no significant relationship between G.P.A.'s and student teaching scores.

#### The Sample

The sample used in the study consisted of all education students from Memorial University of Newfoundland and St. Bride's College who, in the winter term of the 1969-70 university year, were studying the student teaching courses, Education 0200, 0300, and 0400, and who, in the two weeks following the end of the term, participated in the practice teaching sessions arranged by the Student Teaching Division. The subjects were enrolled in all three levels--primary, elementary, and high school education--and were second, third, and fourth year students.

The student teaching courses taken by the students

were elective courses, so there were only one hundred and eight students enrolled in them. Of this one hundred and eight, ninety-eight were used in the study. Of the remaining ten, two withdrew from the courses, two did not participate in the student teaching sessions, and the remaining six were unable to attend the voluntary testing periods for practical reasons unrelated to the study itself.

Each student teacher was assigned to a cooperating teacher and was evaluated by that teacher on his teaching performance during the two week period. The evaluation was fifty percent. of the total evaluation of the student teacher. Although the cooperating teachers were given certain guidelines which they were to follow if they wished, there were no definite and uniform criteria by which all student teachers had to be evaluated.

### The Instruments

To obtain measures of the creative thinking abilities of the student teachers, the Torrance Tests of Creative Thinking were used. These tests were chosen because, having been developed in an educational context,

they were considered most appropriate for research in education. It has also been demonstrated that the tests are valid and reliable for all educational levels from primary school to graduate school. They are based on a view of creativity as a process of becoming sensitive to problems, deficiencies, gaps in knowledge, missing elements, disharmonies, and so on; identifying the difficulties; searching for solutions, making guesses, or forming hypotheses about the deficiencies; testing and retesting these hypotheses and possibly modifying and retesting them; and finally communicating the results. They are made up of activities which are models of the creative process; that is, each test is believed to bring into play somewhat different mental processes, but each requires the subject to think in divergent directions in terms of possibilities.<sup>1</sup>

There are ten tests grouped into a verbal and a pictorial battery. The verbal battery is labelled Thinking Creatively With Words; it is composed of seven (7) tests--ask questions, guess causes, guess consequences, product improvement, unusual uses, just suppose, and un-

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<sup>1</sup>E. Paul Torrance, Norms-Technical Manual, Torrance Tests of Creative Thinking (Princeton, N.J.: Personnel Press, Inc., 1961), p. 6.

usual questions. The pictorial battery is labelled Thinking Creatively With Pictures; it is composed of three (3) tests--picture completion and closed figures (circles).

In the verbal battery, the 'ask and guess' tests are to give opportunities for curiosity expression, and to give a picture of ability to develop hypotheses and think in terms of possible responses. The product improvement test is to provide opportunity for expressing what one would not ordinarily. The 'unusual' tests are really tests of ability to free one's mind of a well established set. In the figural or pictorial battery, the 'incomplete figures' test measures tendency towards structuring and integrating. The 'repeated figures' test measures ability to make multiple associations to a single stimulus. The 'circles' test measures tendency towards disruption of structure and serves to distinguish between good elaborators and productive original thinkers.

Each battery yields a total score in each of three traits: 1) Fluency, 2) Flexibility, 3) Originality. The figural battery gives an additional score--in elaboration. The Torrance tests assess creativity in terms of Guilford's divergent thinking factors--fluency, flexibility, originality, and elaboration. Fluency is defined as the total

number of relevant responses; relevance being defined in terms of the requirements of the tasks as set forth in the instructions. Flexibility is defined as the number of different categories, different approaches, or principles used in responding to the tasks. Originality is defined as the number of unusual responses. Elaboration is the number of additional details used to spell out or elaborate the question over and above what is necessary to communicate the basic idea.

To measure extraversion of the student teachers, the Eysenck Personality Inventory was administered. This trait, defined by the EPI as the outgoing, uninhibited, impulsive and sociable inclinations of a person, is measured by means of fifty-seven items which were selected on the basis of item and factor analysis, to which the examinee responds either "yes" or "no". Parallel forms are available; however, Form B was administered.

#### Validity and Reliability of Instruments

Since a person can behave creatively in an almost infinite number of ways, and since there are diverse definitions of creativity, it would be impossible to

produce for all research workers and potential users of the tests satisfactory evidence of validity. In fact, the concept of an overall validity coefficient for tests of creative thinking ability is grossly inappropriate. It is more meaningful to think in terms of a) a variety of kinds of criteria of creative behaviour, and of b) a variety of kinds of creative thinking. Validity studies on the Torrance tests are, however, not lacking.

The tests are adaptations of the Southern California Creativity Tests which were a by-product of Guilford's factor analysis of the nature of the intellect. They were developed within an educational context, as part of a long-term research programme emphasizing classroom experiences that foster and stimulate creativity. They are based on analyses of creative people, research into the nature of creative performance, research into the personalities of creative people, and research theory concerning the functioning of the human mind. To further insure content validity, a deliberate and consistent effort was made to keep the tests free of technical and subject material. It is accepted that it would be ridiculous to try to develop a comprehensive battery of tests of creative thinking that would sample any kind of universe of creative thinking ability and that there

can be no complete assessment of a person's potential for creative behaviour. However, it can be maintained that the Torrance batteries do sample a wide range of the abilities in such a universe.

Concurrent validity studies have showed a consistently significant relationship between scores on the Torrance tests and peer nominations for creativity, and between scores on the Torrance tests and teacher nominations for creativity.<sup>2</sup>

Construct validity studies have included correlations between creativity test scores and other measures, comparisons of the personality characteristics of persons achieving high scores on the tests with those with low scores, studies of growth of creative ability as measured by the Torrance tests resulting from exercise of those abilities through participation in creative activities of various kinds, correlations between creativity scores and preference for open-structure learning experiences, and actual classroom observation of pupil behaviour hypothesized to be related to creative ability. All showed significant relationships.

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<sup>2</sup>Ibid., p. 44.

A study by Torrance and Hansen found significant differences between the classroom questions asked by the creative students and the non-creative students, as identified by the Torrance tests.<sup>3</sup> Haven found a statistically significant, though relatively small, correlation coefficient between scores on the Torrance Verbal Battery and scores on a creative achievement inventory. The same study showed a significant relationship between Torrance originality scores and scores on the Aesthetic scale of the Allport Vernon Lindzey Study of Values.<sup>4</sup>

A number of test-retest reliability studies have been conducted on the Torrance tests. Goralski obtained reliability coefficients of .82, .78, .59, and .83 for fluency, flexibility, originality, and battery total.<sup>5</sup> Her subjects were student teachers who were tested with a ten week interval. Sommers has reported test-retest reliabilities for battery totals. They were .97 and .80 for his two samples of college students, also tested with a ten week interval.<sup>6</sup> Yamamoto obtained battery total

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<sup>3</sup>Ibid., p. 37.

<sup>4</sup>Ibid.

<sup>5</sup>Ibid., p. 21.

<sup>6</sup>Ibid.

reliability coefficients of .83 and .78 for his college seniors.<sup>7</sup> As well, there have been high reliability coefficients reported for separate tests within each battery.

Scorer reliability has also been well established. The mean Pearson product-moment coefficients between the scoring of trained scorers and untrained teachers for the verbal tests are: fluency, .99; flexibility, .95; originality, .91. For the figural tests they are: fluency, .96; flexibility, .94; originality, .86; and elaboration, .91.<sup>8</sup> In this study to establish reliability of scoring, a sample group of tests were re-scored after a three month interval. The two sets of scores were compared and correlation coefficients computed. The coefficients obtained were .90 for verbal creativity, .79 for figural creativity, and .99 for total creativity. All correlations were significant beyond the .01 level. In addition, t tests were computed on the means of the scores for each of verbal, figural, and total creativity. All ratios were non-significant at the .01 level of probability. Therefore, marker reliability was accepted.

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<sup>7</sup>Ibid., p. 22.

<sup>8</sup>Ibid., p. 19.

Factorial, construct, and concurrent validity studies have been carried out on the EPI and its validity has been established. Moreover, it is a further development of the Maudsley Personality Inventory for which validity has also been established. The many studies in which it has been used have made available direct evidence of its validity as a descriptive instrument of the behavioural manifestations of personality.

The reliability of the EPI has also been well documented. The test-retest reliability coefficient for extraversion has been quoted as .94; the split-half reliability coefficient is .84.<sup>9</sup>

#### Testing and Scoring Procedures

All student teachers were tested by the investigator towards the end of the winter term, approximately one month before they began their student teaching. The testing was carried out in their student teaching course class periods. However, attendance was voluntary and extra testing sessions were arranged for a number of students who were unable to attend at regular class hours.

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<sup>9</sup>J.J. Eysenck and Sybil B.G. Eysenck, Eysenck Personality Inventory Manual (San Diego, California: Educational and Industrial Testing Service, 1968), pp. 14-15.

The Torrance Verbal Battery was administered first. One week later the Figural Battery and the EPI were administered. The investigator strictly adhered to the instructions given in the testing manuals for the Torrance tests. Instructions for the EPI are printed in full on each of the tests. These were read aloud to the group of subjects, without amplification or alteration.

The Torrance batteries were scored by a person experienced in the scoring of the Torrance. Reliability of the marking was established. The reliability coefficients obtained when a sample group of tests were rescored were .90 for verbal creativity, .79 for figural creativity, and .99 for total creativity.

Scoring of the EPI was done by the investigator. This was done by the use of the hand overlay stencils provided. It is accomplished by merely aligning the appropriate key over the completed answer sheet and counting one point for each blackened answer space showing through the holes in the key. The score for the extraversion scale is the sum of these responses.

### Analysis Of Data

The analysis of data was done mainly by an analysis of variance technique and Pearson product-moment correlation. First, however, the raw scores obtained by the students on the Torrance Tests of Creative Thinking were, by a computer programme, normalized and transformed to T scores, with a mean of 50 and a standard deviation of 10. This procedure was necessary in order to combine the different test scores for a total verbal, a total figural, and a total creativity score. These scores were then used as a basis for grouping the student teachers into high, average, and low creativity groups for each of verbal, figural and total creativity.

On the basis of the EPI scores, the students were classified as extraverts or introverts. Because no norms for Canadian college students were available, the American college student percentiles were used. Students scoring above the 50th percentile were, for the purpose of the study, classed extraverts; those scoring below were classed introverts. This resulted in a 57 - 41 division.

The student teaching grades were treated as raw scores, and were, as is the procedure of the university, given in multiples of five.

The grade point average of each student was computed after all course grades for all students were received from the university. Here also, raw scores were treated.

Analysis of variance was applied to determine whether or not significant differences existed between the creative groups on scores of student teaching, between extraverts and introverts on scores of student teaching, and to determine whether or not interactions existed between any of the variables--sex, extraversion, background(urban-rural)--and creativity to influence student teaching achievement. The design for this analysis is shown in TABLE 1.

A Pearson product-moment correlation coefficient was computed between the student teaching grades and the G.P.A.'s of the subjects, to find what relationship existed between their regular course achievement and their achievement in student teaching.

A further statistical test, the Newman-Keuls test on pairs of means, was made necessary when the analyses of variance showed significant differences among low, average, and high creative groups in figural and in total creativity.

TABLE 1  
EXPERIMENTAL DESIGN<sup>a</sup>

I Subjects	Low Creativity	Average Creativity	High Creativity
Females	Student	Teaching	Scores
Males	Student	Teaching	Scores
II Subjects	Low Creativity	Average Creativity	High Creativity
Urban	Student	Teaching	Scores
Rural	Student	Teaching	Scores
III Subjects	Low Creativity	Average Creativity	High Creativity
Extraverts	Student	Teaching	Scores
Introverts	Student	Teaching	Scores

<sup>a</sup>Table shows cell divisions for analyses of variance for each of verbal, figural, and total creativity.

Although no statistical analyses were made, the distributions of males-females, urban-rural students, extraverts-introverts, and G.P.A.'s within the different creative groups were observed and noted.

### Summary

This chapter presented the hypotheses which were formulated on the basis of the conclusions reached from the literature review. A description of the subjects used in this study were given. The details of the construction, administration, and scoring of the Torrance tests and the EPI were explained. An outline of the statistical treatment of the data concluded the chapter.

## CHAPTER IV

### ANALYSIS AND INTERPRETATION OF DATA

This chapter will present an analysis of data in terms of the research statements outlined in Chapter 1. The data will be presented and treated in the following categories: a) distribution of subjects within creative groups; b) relationship between verbal creativity, figural creativity, and over-all creativity, and student teaching achievement, as shown by the analyses of variance on the complete group of subjects and by the analyses of variance on the two random samples; c) interaction of creativity and the other variables of personality, sex, and background, as shown also by the analyses of variance; d) relationship between student teaching achievement and G.P.A., as shown by the Pearson product-moment correlation. These findings will be discussed and interpreted. First, however, all test scores and grades obtained, and the grouping made will be described.

#### Creativity Scores

Three verbal creativity scores--fluency, flexibility,

and originality, plus four figural creativity scores--fluency, flexibility, originality, and elaboration--were obtained in the scoring of the creativity tests. Because the study was concerned only with total verbal, total figural, and a composite total of these two, the seven different tests scores were first normalized and converted to standard scores with a mean of 50 and a standard deviation of 10. The extreme differences in the means and the standard deviations of the individual tests before normalization, as shown in TABLE 2, justified this procedure.

On the basis of their total scores in verbal creativity, figural creativity, and their over-all creativity score, the students were divided into groups termed high, average, and low creative groups. This was done by taking the scores and dividing them into top, bottom, and middle thirds, and was done for each of verbal, figural and total creativity scores. Thus, a student could be in a different creative group for each of verbal, figural, and total creativity. This, as a basis for grouping students, was the only way in which creativity scores were used.

TABLE 2  
SUMMARY OF INDIVIDUAL CREATIVITY TESTS SCORES

Subtest Score		Mean	Standard Deviation
VERBAL	Fluency	62.25	21.61
	Flexibility	28.06	7.79
	Originality	28.76	11.51
FIGURAL	Fluency	14.08	6.31
	Flexibility	9.57	4.31
	Originality	20.02	11.08
	Elaboration	89.88	35.28

### Performance on Tests of Creative Thinking

When the individual tests scores were combined to obtain a total verbal creativity score, a total figural creativity score, and a gross creativity score for each student, the range of scores were as follows:

TABLE 3  
RANGE OF SCORES ON TESTS OF CREATIVE THINKING

Verbal Creativity	Figural Creativity	Total Creativity
78.04 - 227.19	116.02 - 260.28	219.31 - 485.11

There were individual discrepancies, for example, students scoring high on verbal creativity did not necessarily do so on figural creativity. This was expected because although people may be creative in both areas, it is possible and even highly likely that a person creative in one way might not be creative in the other.

### Eysenck Personality Inventory Scores

The raw scores received by the students on the Extraversion scale of the EPI were converted to percentiles,

using the percentile norms for American college students in the absence of existing norms for Canadian or Newfoundland students. Those scoring above the 50th percentile were, for the purposes of the study, classed extraverts; those scoring below were classed introverts. Here again, the only use made of the scores was as a means of grouping students.

#### Performance on the Eysenck Personality Inventory

Forty-one of the ninety-eight students scored above the 50th percentile; fifty-seven scored below. The raw scores ranged from 8 to 22; that is, from the 3rd to the 99th percentile. The mean raw score was 15 which is at the 49th percentile. Thus, the scores obtained closely approximated the test norms.

#### Grade Point Averages and Student Teaching Grades

The G.P.A. of all courses taken up to the beginning of the student teaching period was calculated, for each student teacher, after all course grades were received from the Registrar's Office of Memorial University.

The grades given the student teachers by their cooperating teachers were received from the Student Teaching Division after being converted from letter to

numerical grades. TABLE 4 shows the means, standard deviations, and range of the student G.P.A.'s and student teaching grades.

TABLE 4  
GRADE POINT AVERAGES AND STUDENT TEACHING GRADES

	Mean	Standard Deviation	Range
G.P.A.'s	65.3	6.8	44-84
Student Teaching Grades	74.6	8.8	40-90

In comparing G.P.A.'s and student teaching grades, it was noted that whereas there was only one 40 in student teaching grades, there were thirteen 90's; of these thirteen, not one student had a G.P.A. over 76. In fact, many of them had G.P.A.'s below 65; one actually had a 50 G.P.A.

#### Male-Female Groups

Of the ninety-eight student teachers, only twenty were males. This is not a reflection of the male-female distribution in the Faculty of Education, because of the 1848 students enrolled for the 1969-70 academic year, 871 (47.4 percent.) were males. It may be explained by

the fact that student teaching courses were electives, and by the fact that very few males register for primary or elementary teacher training.

The effects or possible effects of widely different numbers of subjects in different cells in the analysis of variance were avoided by random sampling within the female groups when the analysis of variance was computed for interaction of the sex variable with creativity. Two random samples of twenty females each were chosen and two analyses done. This latter procedure served to minimize the possibility of Type 1 error--finding significant differences where there are none.

#### Urban-Rural Groups

Thirty-six of the subjects were classed urban; sixty-two rural. This greater number of rural students can be explained by the fact that most of Newfoundland is rural and that a larger percentage of the students in the Faculty of Education come from rural areas.

#### Statistical Analyses

A two-way analysis of variance was used to investigate the significance of each variable. With the subjects divided into three creative groups--low, average, and high--, a two-way analysis of variance was carried out

first with the subjects further subdivided on the basis of personality, then on the basis of sex, and then on the basis of the urban-rural factor. This resulted in nine separate analyses of variance since the procedure had to be conducted for each of verbal, figural, and total creativity. Since two random samples of females were chosen, a further three analyses had to be made for the sex division. The level of significance used throughout was .05.

To investigate the relationship between the G.P.A.'s of the students and the grades they received from their cooperating teachers, a Pearson product-moment correlation coefficient was computed.

Although no statistical analyses were made to test the significance of any relationship between sex, personality, background, and G.P.A. and achievement on tests of creative thinking, the distribution of males-females, extraverts-introverts, urban students-rural students, and G.P.A. levels within the creative groups was computed by number and percent.

Where the F ratios showed significant differences among the three creative groups, a Newman Keuls-test of the means was made to determine where the differences actually lay.

Distribution Of Subjects Within Creative Groups

Extraverts-Introverts

TABLE 5 shows the number and percentage of extraverts and introverts in low, average, and high creativity groups.

TABLE 5

EXTRAVERTS-INTROVERTS IN VERBAL, FIGURAL, TOTAL CREATIVITY<sup>a</sup>

Personality		Verbal Creativity			Figural Creativity			Total Creativity		
		Lo	Aver	Hi	Lo	Aver	Hi	Lo	Aver	Hi
Extraverts	(N)	15	15	11	15	15	11	16	14	11
	(%)	37	37	26	37	37	26	40	34	26
Introverts	(N)	18	17	22	18	17	22	17	18	22
	(%)	32	30	38	32	30	38	30	32	38

<sup>a</sup>Responses list within cells distribution in terms of number and percent (N=41, 57).

The most interesting thing here is that the same situation exists for each of verbal, figural, and total creativity. Whereas the percentage of extraverts declines as the creativity scores increase, the opposite holds true for introverts. This distribution supports the claim made by researchers that creative people are inclined to be introverted.

## Males-Females

TABLE 6 shows the number and percentage of males and females in low, average, and high creativity groups.

TABLE 6

MALES-FEMALES IN VERBAL, FIGURAL, TOTAL CREATIVITY<sup>a</sup>

Sex		Verbal Creativity			Figural Creativity			Total Creativity		
		Lo	Aver	Hi	Lo	Aver	Hi	Lo	Aver	Hi
Males	(N)	6	8	6	12	3	5	10	5	5
	(%)	30	40	30	60	15	25	50	25	25
Females	(N)	27	24	27	21	29	28	23	27	28
	(%)	35	30	35	27	37	36	29	35	36

<sup>a</sup>Responses list within cell distribution in terms of number and percent (N=20, 78).

Interestingly enough, females were fairly evenly distributed in low, average, and high creative groups for all of verbal, figural, and total creativity. For figural and total creativity, one-half or more of the males were in the low creative group. This was much greater than the proportion of females in this group. This situation supported the random sampling procedure within the larger group of females for the analysis on the sex factor. It is certainly not apparent from this distribution that the females are less creative, even in verbal creativity.

## Urban Students-Rural Students

TABLE 7 shows the number and percentage of urban students and rural students in low, average, and high creativity groups.

TABLE 7

URBANS-RURALS IN VERBAL, FIGURAL, TOTAL CREATIVITY<sup>a</sup>

Back-ground		Verbal Creativity			Figural Creativity			Total Creativity		
		Lo	Aver	Hi	Lo	Aver	Hi	Lo	Aver	Hi
Urbans	(N)	6	11	19	10	13	13	10	9	17
	(%)	17	31	52	28	36	36	28	25	47
Rurals	(N)	27	21	14	23	19	20	23	23	16
	(%)	44	34	22	37	31	32	37	37	26

<sup>a</sup>Responses list within cell distribution in terms of number and percent. (N=36, 62)

A larger percentage of urban students than of rural students fell into high creative groups. This was especially so for verbal and total creativity. That the rural students tended to be less creative supports research done in the area and is in line with the general assertion that urban people have better social, cultural, and educational exposure so tend to be more creative.

# Low, Average, High Grade Point Averages

TABLE 8 shows the number and percentage of students who, with low, average, or high grade point averages, fell into low, average, and high creativity groups.

TABLE 8

GRADE POINT AVERAGE LEVELS, VERBAL, FIGURAL, TOTAL CREATIVITY<sup>a</sup>

G.P.A. Levels	Verbal Creativity			Figural Creativity			Total Creativity		
	Lo	Aver	Hi	Lo	Aver	Hi	Lo	Aver	Hi
44-59 (N)	7	7	4	10	4	4	9	7	2
(%)	39	39	22	56	22	22	50	39	11
60-74 (N)	23	24	24	20	26	25	23	22	26
(%)	32	34	34	28	37	35	32	31	37
75-84 (N)	4	2	4	3	3	4	1	5	4
(%)	40	20	40	30	30	40	10	50	40

<sup>a</sup>Responses listed in terms of number and percent.  
(N=18, 71, 10)

As could be expected, very few of the students who had G.P.A.'s below 60 fell into the high creative groups. However, only in figural creativity did a majority of them fall into the low creative group. A rather large percentage of students with high G.P.A.'s fell into the low groups of verbal and figural creativity. Those with average G.P.A.'s were fairly evenly distributed in the low, average, and high creative groups for verbal, figural, and total creativity.

Relationship Between Creativity and Student Teaching Grades

TABLE 9 shows the relationship between each of verbal, figural, and total creativity and student teaching achievement when the analysis of variance was carried out on the complete sample. Since, however, a two-way analysis of variance was conducted, the table also shows the relationship between extraversion and student teaching achievement, and the interaction of extraversion with creativity. This relationship will be dealt with in a later section.

As the table shows, a difference at .039 level of probability was found among the low, average, and high creative groups for figural creativity and at the .046 level of probability for total creativity. Since the probability level used for the study was .05, these differences were accepted as significant. Since, however, there were three groups used in the analysis of variance, it was impossible to determine which group or groups did significantly better until a further test of the means had been made. No significant difference was found for verbal creativity.

To determine between which groups the difference in figural and in verbal creativity existed, a Newman-

TABLE 9

VERBAL, FIGURAL, AND TOTAL CREATIVITY AND STUDENT ACHIEVEMENT<sup>a</sup>

Source		SS	DF	MS	F	P
VERBAL	SSA	96.97	1	96.97	1.319	0.254
	SSB	149.35	2	74.67	1.016	0.366
	SSAB <sup>b</sup>	364.65	2	182.32	2.480	0.089
	Error	6764.19	92	73.52		
FIGURAL	SSA	97.19	1	97.19	1.321	0.253
	SSB	492.82	2	246.41	3.349	0.039
	SSAB	16.93	2	8.47	0.115	0.891
	Error	6768.44	92	73.57		
TOTAL	SSA	133.02	1	133.02	1.810	0.182
	SSB	467.39	2	233.69	3.181	0.046
	SSAB	51.05	2	25.53	0.247	0.707
	Error	6759.75	92	73.48		

<sup>a</sup>Responses listed in terms of two-way analyses of variance results--SS (sum of squares), DF (degrees of freedom), MS (mean squares), F (F ratio), P (probability level).

<sup>b</sup>SSA--A is variable of extraversion; SSB--B is variable of creativity.

Keuls test of the means was computed. The results of this test when carried out on both the figural and the total creativity means are shown in TABLE 10.

The test of the figural creativity means showed that the only significant difference was between the low creative group and the average creative group. The high creative group was not found to be significantly different from either of the other two groups. In student teaching achievement, then, the students who have high creative thinking ability were not distinguished from the student teachers who were classed as having average or low creative thinking ability. The students with average creative thinking ability did, however, achieve significantly better than those of low creative thinking ability.

The test of the total creativity means showed that the average and the high creative groups did significantly better than the low creative group. However, the high creative group was not distinguished from the average creative group. Thus, in student teaching, students with average or high creative thinking ability did achieve better.

Further analyses, however, did not confirm all of

TABLE 10

NEWMAN-KEULS TEST OF STUDENT TEACHING GRADE MEANS, FIGURAL AND TOTAL CREATIVITY GROUPS

	Figural Creativity			Total Creativity		
	Lo	Hi	Aver	Lo	Aver	Hi
Ordered Means	71.36	75.30	75.56	71.51	75.47	76.21
Range		2	3		2	3
Critical Values of Means		4.18	5.03		2.53	3.04
Actual Means		3.94	5.20 <sup>a</sup>		3.96 <sup>a</sup>	4.70 <sup>a</sup>
			1.26			.74

<sup>a</sup>Means showing significant differences.

these findings. Because of the uneven distribution of males and females, an analysis of variance was carried out on two random samples of twenty females from the complete group of subjects and the total number of males. This was done to look for an interaction of sex and creativity, but the analysis also showed the relationship between creativity and student teaching achievement. That relationship, as shown in the first random sample, is presented in TABLE 11. TABLE 12 gives the results of the analysis when conducted on the second random sample. The findings are given for verbal, figural, and total creativity. These tables also show the results of the investigation of sex-creativity interaction, but that will be dealt with in a later section.

As in the complete sample, no significant differences were found for verbal creativity in either of these analyses. Although the student teaching grade means of the average creative group indicated a slightly higher achievement in student teaching for that group when the analysis was done on the complete number of subjects, over the three analyses there was not even a consistent tendency for any one group to do better than another. The means of the student teaching grades ob-

TABLE 11

SEX SAMPLE 1--VERBAL, FIGURAL, AND TOTAL CREATIVITY AND STUDENT ACHIEVEMENT<sup>a</sup>

Source		SS	DF	MS	F	P
VERBAL	SSA	428.54	1	428.54	5.369	0.027
	SSB	113.54	2	56.77	0.711	0.498
	SSAB <sup>b</sup>	82.84	2	41.42	0.519	0.600
	Error	2713.63	34	79.81		
FIGURAL	SSA	250.68	1	250.68	3.365	0.075
	SSB	331.56	2	165.78	2.225	0.124
	SSAB	45.50	2	22.75	0.305	0.739
	Error	2532.94	34	74.50		
TOTAL	SSA	231.27	1	231.27	3.340	0.076
	SSB	356.71	2	178.35	2.576	0.091
	SSAB	198.98	2	99.49	1.437	0.252
	Error	2354.31	34	69.24		

<sup>a</sup>Responses listed in terms of two-way analyses of variance results.<sup>b</sup>SSA--A is variable of sex; SSB--B is variable of creativity.

TABLE 12

SEX SAMPLE 2--VERBAL, FIGURAL, AND TOTAL CREATIVITY AND STUDENT ACHIEVEMENT<sup>a</sup>

Source		SS	DF	MS	F	P
VERBAL	SSA	498.81	1	498.81	6.362	0.017
	SSB	232.99	2	116.50	1.486	0.241
	SSAB <sup>b</sup>	126.06	2	63.03	0.804	0.456
	Error	2665.94	34	78.41		
FIGURAL	SSA	240.81	1	240.61	2.820	0.102
	SSB	313.67	2	156.83	1.838	0.175
	SSAB	15.12	2	7.51	0.088	0.916
	Error	2901.31	34	85.33		
TOTAL	SSA	277.52	1	277.52	3.887	0.057
	SSB	567.59	2	283.79	3.975	0.028
	SSAB	30.04	2	15.12	0.210	0.811
	Error	2427.38	34	71.39		

<sup>a</sup>Responses listed in terms of two-way analyses of variance results.<sup>b</sup>SSA--A is variable of sex; SSB--B is variable of creativity.

tained by the low, average, and high creative groups are presented in TABLE 13.

TABLE 13  
STUDENT TEACHING GRADE MEANS OF VERBAL CREATIVITY GROUPS

Sample	Low	Average	High
Complete Sample	72.72	75.30	75.15
Random 1	72.50	70.00	75.00
Random 2	70.88	71.25	75.45

The significant differences among the low, average and high creative groups in figural creativity were not confirmed when the analyses were done on the two random samples. Therefore, these differences must be regarded as marginal. The student teaching grades means of the figural creativity groups, shown in TABLE 14, indicate that the students of average creative thinking ability tended to do a little better, even if not significantly so.

TABLE 14  
STUDENT TEACHING GRADE MEANS OF FIGURAL CREATIVITY GROUPS

Sample	Low	Average	High
Complete Sample	71.36	76.56	75.30
Random 1	68.33	76.43	75.67
Random 2	68.75	74.44	75.91

For total creativity, the analysis of the first random sample showed none of the significant differences found when the analysis of variance was carried out on the total number of students.

In the second random sample, the analysis yielded the same results as were found when the analysis was done on the complete group; that is, a significant difference was found among the low, average, and high creative groups. However, since the findings of both random samples did not confirm the findings of the complete group analysis, it could not be claimed that any significant differences were found. The student teaching grade means of the total creativity groups, shown in TABLE 15, do indicate that the average group tended to do better than the low group, and that the high group did slightly better than the average group.

TABLE 15

## STUDENT TEACHING GRADE MEANS OF TOTAL CREATIVITY GROUPS

Sample	Low	Average	High
Complete Sample	71.52	75.47	76.21
Random 1	67.50	73.33	76.79
Random 2	67.35	75.45	76.25

### Personality, Creativity, and Student Teaching Grades

The study was interested in both the existing relationship between extraversion and student teaching achievement, and in possible interaction of extraversion and creativity. These findings are presented in TABLE 9, page 65. The means of 75.48 (extraverts) and 73.58 (introverts) showed that extraverts did achieve slightly better. However, these differences were not significant.

No interaction of the personality factor--extraversion--with creativity was found. However, in the verbal creativity analysis a  $F$  ratio of 2.480 and a probability level of 0.089 show an almost significant interaction.

### Sex, Creativity, and Student Teaching Grades

Although the study was interested only in seeing whether the variable of sex interacted with creativity to influence student teaching achievement, not in whether males or females did better in student teaching, the analyses to find interactions did show the difference between male and female achievement. These findings are presented with the interaction findings in TABLES 11 and 12, pages 69 and 70. Two sets of results have been given

because two random samples were used.

In neither of the analyses was a significant interaction found. In fact, the  $F$  ratios and probability levels do not suggest even a possibility of such an interaction.

A significant difference between males and females in student teaching achievement was found, although no hypothesis had been made concerning the relationship between sex and achievement in student teaching. This difference was found for both samples, when the groups were divided on the basis of verbal creativity, and indicated a higher score for females. In figural and in total creativity, the probability levels were verging on significance, and again the females achieved higher grades, as the means in TABLE 16 show.

TABLE 16

MALE AND FEMALE STUDENT TEACHING GRADE MEANS

Sample	Males	Females
1	69.00	76.00
2	69.00	75.50

Even though the student teaching grade means of males and females were the same in all analyses, a significant difference between male and female student teaching achievement was found only when the analysis also considered the variable of verbal creativity. This would indicate that the influence of verbal creativity on the relationship between sex and student teaching achievement was different from that of figural and total creativity.

#### Background, Creativity, and Student Teaching Grades

Here again, although the study was not concerned with the relationship of the background factor--urban-rural--with student teaching success, it is shown in the findings of the analysis made to investigate a possible interaction of this factor with creativity. The findings on this relationship and on the interaction are shown in TABLE 17.

No significant interaction of background with creativity was indicated by the analysis.

Although the mean student teaching grade of the rural students was slightly higher than that of the urban students (74.84 - 73.61), it was not significantly so, as the significance levels (.316, .355, .279) show.

TABLE 17

VERBAL, FIGURAL, AND TOTAL CREATIVITY, BACKGROUND AND STUDENT ACHIEVEMENT<sup>a</sup>

Source		SS	DF	MS	F	P
VERBAL	SSA	91.07	1	91.07	1.187	0.279
	SSB	194.25	2	97.13	1.266	0.287
	SSAB <sup>b</sup>	76.56	2	38.28	0.499	0.609
	Error	7058.19	92	76.72		
FIGURAL	SSA	63.58	1	63.58	0.865	0.355
	SSB	510.01	2	255.01	3.471	0.035
	SSAB	59.67	2	29.84	0.406	0.667
	Error	6759.31	92	73.47		
TOTAL	SSA	73.73	1	73.73	1.017	0.316
	SSB	458.92	2	229.46	3.164	0.047
	SSAB	197.77	2	98.89	1.363	0.261
	Error	6672.31	92	72.53		

<sup>a</sup>Responses listed in terms of two-way analyses of variance results.<sup>b</sup>SSA--A is variable of background (urban-rural); SSB--B is variable of creativity. 76

The significant differences shown in TABLE 17 are among low, average, and high creative groups in figural and total creativity, and are merely a repeat of the findings presented in TABLE 9, page 65.

#### Grade Point Averages and Student Teaching Grades

A Pearson product-moment correlation coefficient was computed between the G.P.A.'s of students and their student teaching grades. The required correlation for significance at the .05 level of probability was .199, so the .200 correlation obtained was considered barely significant.

This low correlation was hardly surprising, since achievement in course work can be considered very different from achievement in student teaching, especially in terms of the achievement indices which are used.

#### Summary Of Findings

Hypothesis 1: There is no significant difference among low, average, and high creative groups on scores of student teaching.

There was no question about accepting this hypothesis for verbal creativity. None of the analyses indicated even a near significant difference. That no

significant relationship was found between verbal creativity and student teaching achievement may be explained in part by the fact that the elaboration score, which tends to be more achievement oriented, was not included in the verbal creativity scores.

For figural creativity, there were conflicting findings. When the analysis was carried out using all of the student teachers, a significant difference among low, average, and high creative groups on scores of student teaching was found. Subsequent analysis--a Newman-Keuls test of the means--showed that this difference lay between the low and average groups, that the average creative group achieved significantly better in student teaching, but the high creative group was not distinguished from either of the other two groups. However, when the analyses were made on the two random samples of subjects, no significant relationship between figural creativity and student teaching achievement was found. Because the analyses on these two random samples did not confirm the findings of the analysis on the complete group, it could not be claimed that significant differences existed. Therefore, the null hypothesis was also accepted for figural creativity.

Essentially the same situation existed for total creativity as for figural creativity. When the first analysis of variance was made, a significant difference was found among low, average, and high creative groups on scores of student teaching. A Newman-Keuls test of the means showed that this difference existed between low and average creative groups and between low and high creative groups, with the average and high groups achieving better.

The findings of the analyses on the complete group of subjects were not confirmed by the two analyses on random samples of students. The analysis on the first random sample indicated no significant relationship between total creativity and student teaching achievement. The analysis on the second random sample, however, yielded the same results as the analysis on the complete group of subjects; that is, low, average, and high creative groups achieved significantly different in student teaching. Since the findings of the first analysis were not borne out by the findings of both random samples, the differences found had to be regarded as marginal. Therefore, the hypothesis was again accepted for total creativity.

Hypothesis 2: There is no significant difference between extraverts and introverts on scores of student teaching.

Although the mean student teaching grade of extraverts was slightly higher than that of introverts, it was not significantly so. Therefore, it was concluded that there was no significant relationship between the personality factor of extraversion and student teaching success. The hypothesis was accepted.

Hypothesis 3: There is no significant interaction between creativity and personality of the student teacher.

The analysis of variance showed that creativity and the personality factor of extraversion did not interact to influence student teaching grades. This was so for verbal, figural, and total creativity. Therefore, this hypothesis was also accepted.

Hypothesis 4: There is no significant interaction between creativity and sex of the student teacher.

Although the analysis showed that females definitely achieved better than males in student teaching, it did not show any interaction of sex with creativity--verbal, figural, or total--to influence that achievement. The hypothesis was accepted.

Hypothesis 5: There is no significant interaction between creativity and background of the student teacher.

Here again, although the urban students tended to do better, the background factor (urban-rural) did not significantly interact with either of verbal, figural, or total creativity, so the hypothesis was accepted.

Hypothesis 6: There is no significant relationship between G.P.A.'s and student teaching scores.

This hypothesis was rejected because a significant correlation was found. However, it was noted that although significant, the correlation was very low and barely so.

## CHAPTER V

### SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

This chapter will present the findings and conclusions of the study, describe the limitations of these findings, discuss the implications for teacher education and student teacher evaluation, make recommendations concerning the evaluation of student teachers, and suggest areas where further research may be pursued.

#### Summary Of Findings

In reiteration of Chapter IV, the findings of the study are here summarized.

#### Creativity and Student Teaching Grades

Regarding the relationship between these two variables, it was found that,

1. In verbal creativity, no significant differences among low, average, and high creative groups on scores of student teaching existed.
2. In figural creativity, a significant difference existed between the average creative group and the

low creative group when the analysis was made on the total number of students, but this finding was not confirmed by the analysis of the two random samples.

3. In total creativity, the average and the high creative groups achieved significantly better than the low creative group according to the findings of the analysis of the complete group, but only one of the analyses of the random samples confirmed this.

#### Personal Factors and Student Teaching Grades

Regarding the relationship between extraversion, sex, and background and student teaching achievement, it was found that,

1. There was no significant interaction of either of extraversion, sex, or background (urban-rural) with creativity.
2. Personality and background were not significantly related to student teaching grades, although extraverts and rural students tended to receive higher grades.
3. Sex was significantly related to student teaching achievement, with females being the higher achievers. This difference was found only when the students were divided on the basis of verbal creativity scores.

### Grade Point Averages and Student Teaching Grades

An investigation of the relationship between the student's achievement in regular course work and his achievement in student teaching showed that,

1. Student teaching grades and grade point averages were significantly correlated at the .05 level of probability, but this correlation was extremely low (.2).

### Distribution of Subjects Within Creative Groups

When the distribution of the subjects within the low, average, and high creative groups of each of verbal, figural and total creativity was calculated, it was found that,

1. Highly creative students tended to be more introverted, female, and from urban areas.
2. There was no tendency for the high creatives to have high grade point averages.

### Limitations Of Findings

Before any generalizations can be made from the findings of this study, the following points must be considered.

1. The investigation was carried out on a group of student teachers who had undergone a particular system of teacher education and had studied student teaching courses which are not necessarily the same as those of other schools or faculties of education.
2. The evaluation by the cooperating teacher was made on the basis of only two weeks' observation of the student teacher's performance in the classroom. It might be noted, however, that this is less a reflection on the findings of the study which made an attempt to investigate the evaluation system as it is than a reflection on the actual system.
3. The study did not investigate the effect of the variables of experience of student teacher, the programme level or the year of university he was pursuing, yet it is recognized that these may have been confounding factors.
4. No investigation of higher level interactions was made, yet these may have existed.
5. No data is available on the reliability of the ratings.

### Conclusions

The study, on the basis of its findings, concluded that,

1. The student teachers who score high on the tests of creative thinking ability are not being identified as superior in the evaluations of them by the cooperating teachers. Whether this is due to failure of the cooperating teachers or due to unreliability in the ratings has not been established.
2. In light of the first conclusion, the criteria by which the cooperating teachers evaluate student teachers need investigation.
3. The procedures by which cooperating teachers are selected need re-examining, to insure that the teachers chosen are those who will encourage each student teacher to teach at his own creative best.
4. It is possible that the student teachers who scored high on tests of creative thinking did not achieve significantly better because they did not perform creatively in the classroom. This, then, raises two very serious questions. Why did they not realize their creative potential? What is there in the stu-

dent teaching environment which prevents or inhibits them from doing so? In either case, the student teaching division must be prepared to look very carefully at its system of evaluation of student teachers.

### Implications

The findings and conclusions of the study raised certain implications for student teaching programmes.

These are:

1. In order to insure that the creative student teachers are recognized, rewarded and retained, the encouragement of creative potential should be made a prime consideration of the teacher education programme, and therefore of the student teaching programme.
2. Cooperating teachers must be selected who share this philosophy, who are aware of it as a major purpose of student teaching, and who are capable of evaluating the student teachers in such a way as to achieve the objective. This involves selection of cooperating teachers who, even though they may be traditional in their own approach, do not demand tightly structured, manual centred approaches by the student teachers with whom they work.

3. When selecting supervising or cooperating teachers, the student teaching division must also consider the ability of these people to provide the climate essential to creative development. This climate is one in which the student teachers feel the "psychological safety" which is essential for creative expression, where the atmosphere is permissive enough not to inhibit the creative students from realizing their potential, from employing their creative talent, and where reinforcement is given to spontaneous and original behavior.
4. The provision of a climate conducive to creativity raises a further question about the student teaching experience. Is there not a basic conflict between the purposes of this experience and the fact that to the student teacher the evaluation is a grade he receives? The student teacher may see the cooperating teacher only as the person who evaluates him. This could prevent them from having the good relationship necessary for this experience to be a growth period which allows the student teacher not only to demonstrate, but to improve, his resourcefulness in a real school setting.
5. As to the actual evaluation itself, there appears to be a trend towards the abandonment of grades. How-

ever, the answer is more likely to be in making the evaluation more than mere assignment of grades. If the student teaching period is to be a critical point of examining and attesting to the competency of student teachers, the evaluation of it must be less haphazard. A two week student teaching period seems hardly adequate for more than an evaluation which is based on a "general impression." However, "less haphazard" does not mean that the cooperating teacher has to follow prescribed forms more closely. In fact, if student teachers are to have the opportunities to realize their creative potential, the cooperating teachers must not follow set formulae or prescriptions for "good teaching". Instead, they must accept what the student teachers offer, encourage creative endeavours, and evaluate them in terms of their effects in the classroom.

A less haphazard evaluation system does mean one which reflects implementation of basic principles instead of mere appraisal of specific techniques or measurement of teacher competency. It must consider the student teacher as an individual, his subject matter knowledge, his actual teaching performance,

his effect on the children's behavior and learning. The essential thing, however, is that the evaluation be an ongoing process, not just a grade at the end, that it contain constructive criticisms, make definite suggestions for next steps, identify need areas of the student teachers and encourage self-evaluation.

6. The results of the evaluation of student teachers should serve as a basis for programme modification for them, and as a basis for giving guidance to the student teachers on their choice of teaching area. This guidance should extend even to advising students to leave the teaching profession, if their evaluation shows that they are ill-fitted for it. Only when such an evaluation and evaluation procedures are in effect, can it be expected that any true differentiation will be made between the teachers, and that creative student teachers will be recognized.

### Recommendations

In light of the findings, conclusions, and implications, thus far presented, the following recommendations were formulated:

1. The fostering of creativity development must be clearly

stated as an objective of the student teaching programme, and must be clearly evident in the procedures of the programme.

2. The ability to encourage creativity must be considered by the student teaching division as an absolutely vital characteristic of the cooperating teachers it chooses.
3. Inasmuch as the student teaching division feels that it can predict which factors are indicative of good teaching (since it does make a list of criteria by which cooperating teachers can evaluate student teachers), it should identify by research these characteristics indicative of creative teaching, if it is to make the fostering of creativity an essential part of its programme.

#### Suggestions For Further Research

The results of this study indicate that research is needed in various areas.

1. The area where research would appear to be most badly needed is that of devising predictors of creativity in student teaching, and therefore, developing a system of evaluation where creativity is consciously and deliberately considered.

2. A study which could develop from this one is one of investigating the relationship between achievement in student teaching and the individual scores of creativity--fluency, flexibility, originality, and elaboration--to see which aspects of creativity are better predictors of success.
3. Research could be conducted to determine the appropriateness of the whole teacher training programme to teacher performance in the classroom.
4. As well, any number of investigations could be carried out to study the effects of various other variables--previous teaching experience, university level, age, subject major, programme level, sex and qualifications of cooperating teachers, and role expectations of the student teachers and the cooperating teachers--on the relationship between creativity and success in student teaching.

#### Concluding Statement

The study was mainly concerned with whether there was any relationship between the creative thinking abilities of student teachers and their achievement in student teaching, whether the more creative student teachers were being

recognized and rewarded. To determine this and to determine the effect of various other factors on this relationship, hypotheses were set up, testing carried out, and analyses made. The study concluded that the more creative student teachers were not being recognized, and recommended that modifications be made in the student teaching programme, particularly in the evaluation aspect of it, to insure that the development and encouragement of creativity is a prime consideration in it.

## APPENDIX I

### EVALUATION OF STUDENT TEACHER

## APPENDIX I

## EVALUATION OF STUDENT TEACHER

Student Teacher \_\_\_\_\_ Date \_\_\_\_\_  
School \_\_\_\_\_ Subject/Grade \_\_\_\_\_  
Cooperating Teacher \_\_\_\_\_

Directions: Please evaluate the competence of the student teacher under your supervision. On the blank provided after each item place the appropriate rating.

A - Outstanding      C - Acceptable but weak  
B - Good              D - Unsatisfactory  
X - Impossible to assess

Where necessary use a plus sign or a minus sign with each of the first four letters to indicate more precisely the degree of competence within the category.

PERSONAL QUALIFICATIONS

1. PERSONAL APPEARANCE  
Exhibits good taste and neatness in dress; is \_\_\_\_\_  
clean; has no distracting mannerisms; is refined  
and cultured.
2. SOCIAL QUALITIES  
Is at ease with pupils and adults; is interested \_\_\_\_\_  
in pupils; has an appropriate sense of humor; is  
tactful.
3. MENTAL HEALTH  
Is emotionally stable and mature; poised, not \_\_\_\_\_  
easily distracted; patient.
4. MENTAL ALERTNESS  
Adjusts easily to new situations; thinks clearly; \_\_\_\_\_  
is enthusiastic; shows initiative.
5. VOICE AND SPEECH  
Is clear and distinct; is fluent; is free from  
irritating mannerisms; uses correct pronunciation.

PROFESSIONAL QUALIFICATIONS

6. GENERAL KNOWLEDGE  
Is well informed in number of areas; has a \_\_\_\_\_  
broad understanding of the social scene.
7. KNOWLEDGE OF SUBJECT MATTER  
Has working knowledge of content in his teach- \_\_\_\_\_  
area(s); is alert to current developments in  
his teaching area(s).
8. PROFESSIONAL ATTITUDE  
Is punctual; does work beyond minimum requirements; \_\_\_\_\_  
observes professional ethics.
9. PROFESSIONAL ZEAL  
Is interested in teaching; takes steps towards \_\_\_\_\_  
self-improvement; is an enthusiastic worker.

10. UNDERSTANDING OF PUPILS' NEEDS, INTERESTS AND \_\_\_\_\_  
BEHAVIOR  
Recognises that pupils are different in general;  
provides for pupil differences.
11. UNDERSTANDING OF EDUCATIONAL PURPOSES  
Knows the objectives of the school and class; \_\_\_\_\_  
identifies objectives to be achieved during  
teaching.
12. INTEREST AND COOPERATION  
Accepts suggestions for improvement; is willing \_\_\_\_\_  
to accept criticism; cooperates with associates.

### TEACHING EFFECTIVENESS

13. PLANNING  
Comes to class well prepared; relates day's work \_\_\_\_\_  
to immediate and long range objectives.
14. ORGANIZATION OF LEARNING SITUATIONS  
Selects and organizes material effectively; has \_\_\_\_\_  
general mastery of method, obtains adequate  
pupil response; provides for individual differences.
15. USE OF UNPLANNED SITUATIONS  
Adapts to unforeseen learning opportunities; even \_\_\_\_\_  
in unexpected events which clash with plans.
16. ATTENTION TO MOTIVATION  
Uses adequate motivation to stimulate and main- \_\_\_\_\_  
tain pupil interest; uses a variety of teaching  
aids and techniques; stimulates pupil participation  
and response.
17. INDUCING ADEQUATE PUPIL PROGRESS  
Makes assignments well; uses effective practice \_\_\_\_\_  
and review techniques.
18. STIMULATING PUPIL GROWTH  
Develops pupil initiative and responsibility; \_\_\_\_\_  
builds wholesome attitudes.

19. MANAGING THE CLASSROOM

Is fair and just in dealing with pupils; handles \_\_\_\_\_  
behavior problems tactfully and effectively;  
establishes good rapport with pupils.

20. EVALUATING PUPIL PROGRESS

Uses adequate measurement techniques; measures \_\_\_\_\_  
in accordance with objectives.

Please supplement the ratings in the previous section with comments concerning the student teacher's strengths and weaknesses.

Number of sessions student teacher was absent \_\_\_\_\_

Overall Rating \_\_\_\_\_ (Indicate by a letter as on  
previous pages)

Signature \_\_\_\_\_

## APPENDIX II

### THE TORRANCE TESTS OF CREATIVE THINKING

# Thinking Creatively With Words

## Booklet B

Name \_\_\_\_\_ Age \_\_\_\_\_ Sex \_\_\_\_\_

School \_\_\_\_\_ Grade \_\_\_\_\_

City \_\_\_\_\_

Date \_\_\_\_\_



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### Activities 1-3: ASK-AND-GUESS

The first three activities will be based on the drawing below. These activities will give you a chance to see how good you are at asking questions to find out things that you don't know and in making guesses about possible causes and consequences of happenings. Look at the picture. What is happening? What can you tell for sure? What do you need to know to understand what is happening, what caused it to happen and what will be the result?



**Activity 1. ASKING.** On this page, write out all of the questions you can think of about the picture on the page opposite this one. Ask all of the questions you would need to ask to know for sure what is happening. Do not ask questions which can be answered just by looking at the drawing. You can continue to look back at the drawing as much as you want to.

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**Activity 2. GUESSING CAUSES:** In the spaces below, list as many *possible* causes as you can of the action shown in the picture on page 2. You may use things that might have happened just before the things that are happening in the picture, or something that happened a long time ago that made these things happen. Make as many guesses as you can. Don't be afraid to guess.

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**Activity 3. GUESSING CONSEQUENCES:** In the spaces below, list as many possibilities as you can of what might happen as a result of what is taking place in the picture on page 2. You may use things that might happen right afterwards or things that might happen as a result long afterwards in the future. Make as many guesses as you can. Don't be afraid to guess.

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#### Activity 4: PRODUCT IMPROVEMENT

In the middle of this page is a sketch of a stuffed toy monkey of the kind you can buy in most dime stores for about one to two dollars. It is about six inches tall and weighs about six ounces. In the spaces on this page and the next one, list the cleverest, most interesting and unusual ways you can think of for changing this toy monkey so that children will have more fun playing with it. Do not worry about how much the change would cost. Think only about what would make it more fun to play with as a toy.



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### Activity 5: UNUSUAL USES (Tin Cans)

Most people throw their tin cans away, but they have thousands of interesting and unusual uses. In the spaces below and on the next page, list as many of these interesting and unusual uses as you can think of. Do not limit yourself to any one size of can. You may use as many cans as you like. Do not limit yourself to the uses you have seen or heard about; think about as many possible new uses as you can.

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### Activity 6: UNUSUAL QUESTIONS

In this activity, you are to think of as many questions as you can about tin cans. These questions should lead to a variety of different answers and might arouse interest and curiosity in others concerning tin cans. Try to think of questions about aspects of tin cans which people do not usually think about.

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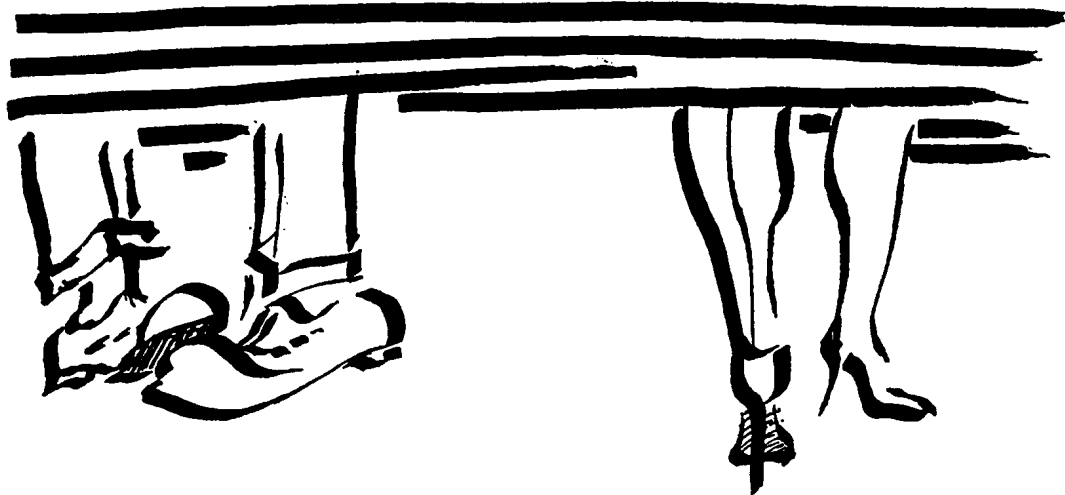
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### Activity 7: JUST SUPPOSE

You will now be given an improbable situation—one that will probably never happen. You will have to *just suppose* that it has happened. This will give you a chance to use your imagination to think out all of the other exciting things that would happen IF this improbable situation were to come true.

In your imagination, *just suppose* that the situation described were to happen. THEN think of all of the other things that would happen because of it. In other words, what would be the consequences? Make as many guesses as you can.

The improbable situation—JUST SUPPOSE *a great fog were to fall over the earth and all we could see of people would be their feet.* What would happen? How would this change life on the earth? List your ideas and guesses on the next page.



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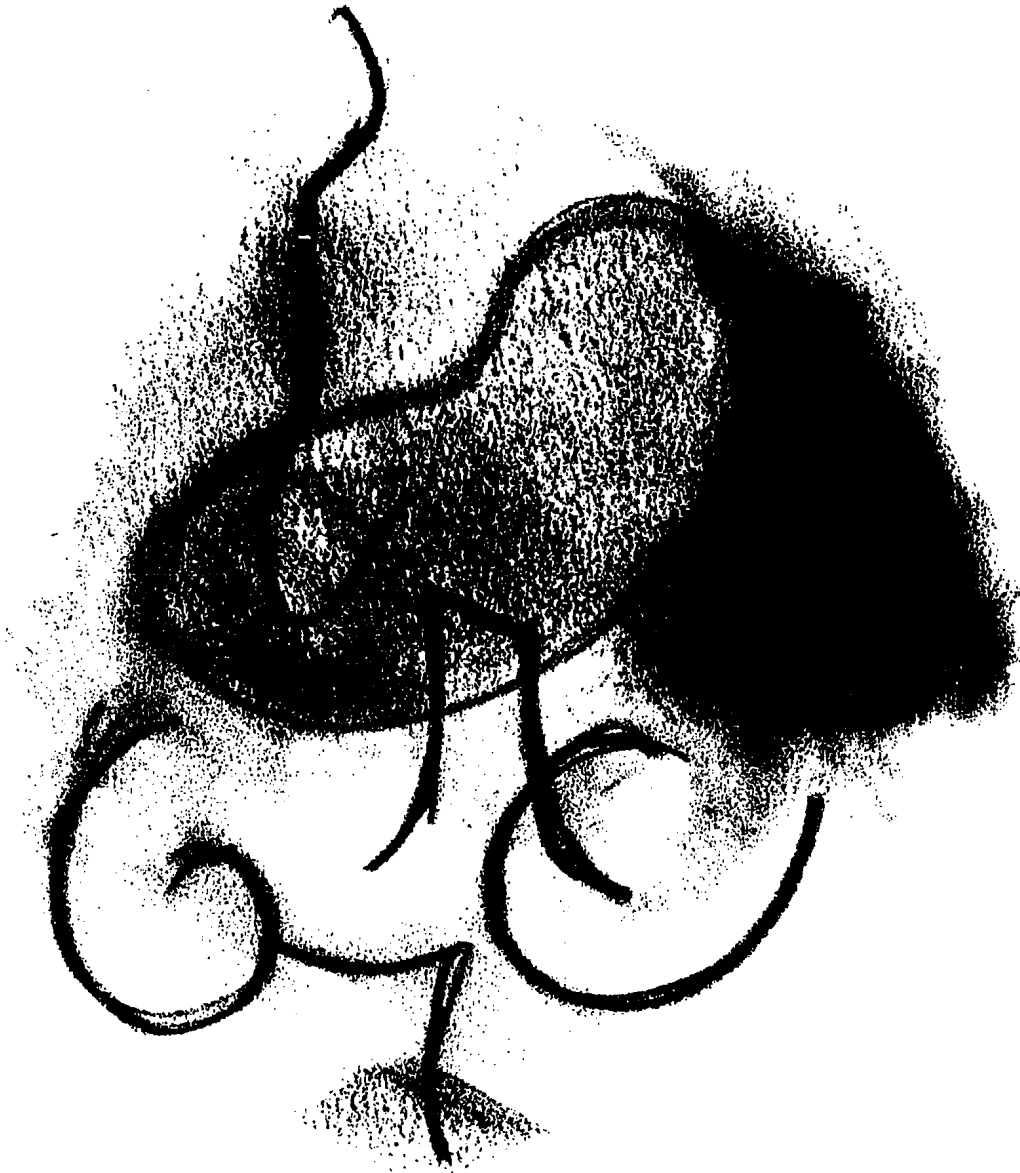
# Thinking Creatively With Pictures

By E. Paul Torrance

Booklet B

Name \_\_\_\_\_ Age \_\_\_\_\_ Sex \_\_\_\_\_ Grade \_\_\_\_\_

School \_\_\_\_\_ City \_\_\_\_\_ Date \_\_\_\_\_



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### **Activity 1. PICTURE CONSTRUCTION**

Below is a piece of colored paper in the form of a curved shape. Think of a picture or an object which you can draw with this piece of paper as a part. On the back of these shapes you will find a thin layer of paper that can be peeled away. Look. Now you can stick your colored shape wherever you want it to make the picture you have in mind. Stick yours on the next page where you want it and press down on it. Then add lines with your pencil or crayon to make your picture.


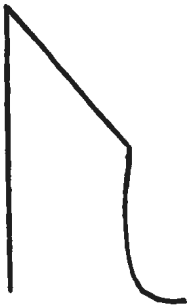


Try to think of a picture that no one else will think of. Keep adding new ideas to your first idea to make it tell as interesting and as exciting a story as you can.

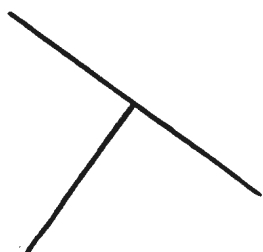
When you have completed your picture, think up a name or title for it and write it at the bottom of the page in the space provided. Make your title as clever and unusual as possible. Use it to help tell your story.

**YOUR TITLE:**\_\_\_\_\_

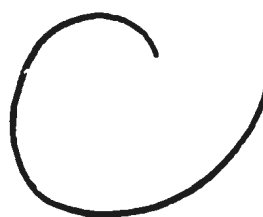
## Activity 2. PICTURE COMPLETION

By adding lines to the incomplete figures on this and the next page, you can sketch some interesting objects or pictures. Again, try to think of some picture or object that no one else will think of. Try to make it tell as complete and as interesting a story as you can by adding to and building up your first idea. Make up an interesting title for each of your drawings and write it at the bottom of each block next to the number of the figure.

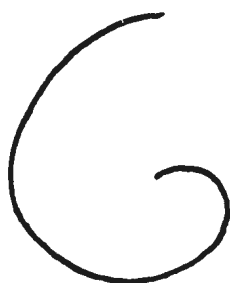
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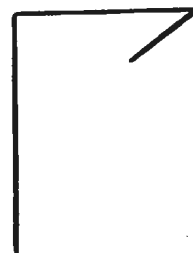
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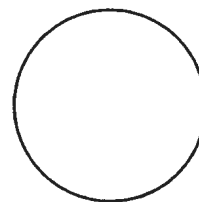
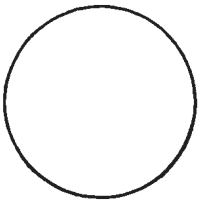
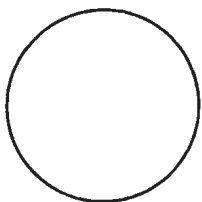
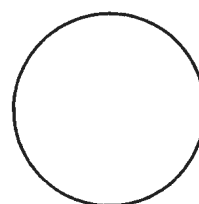
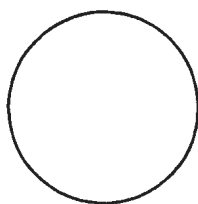
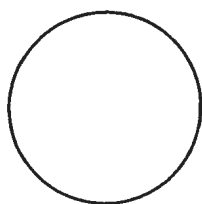
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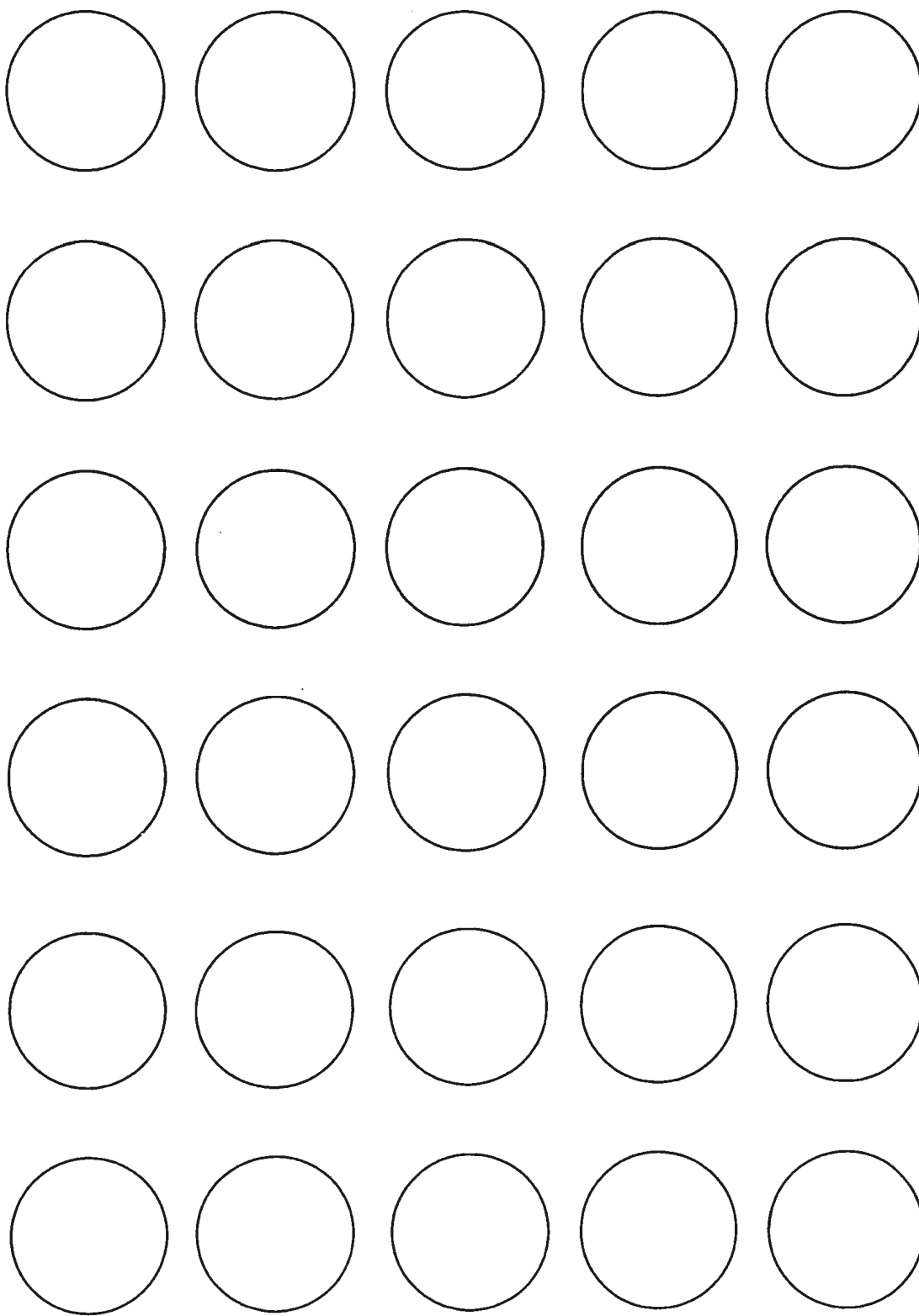


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### Activity 3. CIRCLES

In ten minutes see how many objects or pictures you can make from the circles below and on the next page. The circles should be the main part of whatever you make. With pencil or crayon add lines to the circles to complete your picture. You can place marks inside the circles, outside the circles, or both inside and outside the circles—wherever you want to in order to make your picture. Try to think of things that no one else will think of. Make as many different pictures or objects as you can and put as many ideas as you can in each one. Make them tell as complete and as interesting a story as you can. Add names or titles below the objects.





## APPENDIX III

### EYSENCK PERSONALITY INVENTORY

## APPENDIX III

## EYSENCK PERSONALITY INVENTORY

Instructions

Here are some questions regarding the way you behave, feel and act. After each question is a space for answering "Yes," or "No."

Try to decide whether "Yes," or "No" represents your usual way of acting or feeling. Then blacken in the space under the column headed "Yes" or "No."

Work quickly, and don't spend too much time over any question; we want your first reaction, not a long drawn-out process. The whole questionnaire shouldn't take more

Section of Answer  
Column Correctly  
Marked

Yes No

☒ ::

Yes No

:: ☒

than a few minutes. Be sure not to omit any questions. Now turn the page over and go ahead. Work quickly, and remember to answer every question. There are no right or wrong answers, and this isn't a test of intelligence

or ability, but simply a measure of the way you behave.

### Questions

1. Do you like plenty of excitement and bustle around you?
2. Have you often got a restless feeling that you want something but do not know what?
3. Do you nearly always have a "ready answer" when people talk to you?
4. Do you sometimes feel happy, sometimes sad, without any real reason?
5. Do you usually stay in the background at parties and "get-togethers".
6. As a child did you always do as you were told immediately and without grumbling?
7. Do you sometimes sulk?
8. When you are drawn into a quarrel, do you prefer to "have it out" to being silent hoping things will blow over?
9. Are you moody?
10. Do you like mixing with people?
11. Have you often lost sleep over your worries?
12. Do you sometimes get cross?
13. Would you call yourself happy-go-lucky?
14. Do you often make up your mind too late?
15. Do you like working alone?
16. Have you often felt listless and tired for no good reason?
17. Are you rather lively?

18. Do you sometimes laugh at a dirty joke?
19. Do you often feel "fed-up"?
20. Do you feel uncomfortable in anything but everyday clothes?
21. Does your mind often wander when you are trying to attend closely to something?
22. Can you put your thoughts into words quickly?
23. Are you often "lost in thought"?
24. Are you completely free from prejudices of any kind?
25. Do you like practical jokes?
26. Do you often think of your past?
27. Do you very much like good food?
28. When you get annoyed do you need someone friendly to talk to about it?
29. Do you mind selling things or asking people for money for some good cause?
30. Do you sometimes boast a little?
31. Are you touchy about some things?
32. Would you rather be at home on your own than go to a boring party?
33. Do you sometimes get so restless that you cannot sit long in a chair?
34. Do you like planning things carefully, well ahead of time?
35. Do you have dizzy spells?
36. Do you always answer a personal letter as soon as you can after you have read it?
37. Can you usually do things better by figuring them out alone than by talking to others about it?

38. Do you ever get short of breath without having done heavy work?
39. Are you an easy-going person, not generally bothered about having everything "just-so"?
40. Do you suffer from "nerves"?
41. Would you rather plan things than do things?
42. Do you sometimes put off until tomorrow what you ought to do today?
43. Do you get nervous in places like elevators, trains or tunnels?
44. When you make new friends, is it usually you who makes the first move, or does the inviting?
45. Do you get very bad headaches?
46. Do you generally feel that things will sort themselves out and come right in the end somehow?
47. Do you find it hard to fall asleep at bedtime?
48. Have you sometimes told lies in your life?
49. Do you sometimes say the first things that comes into your head?
50. Do you worry too long after an embarrassing experience?
51. Do you usually keep "yourself to yourself" except with very close friends?
52. Do you often get into a jam because you do things without thinking?
53. Do you like cracking jokes and telling funny stories to your friends?
54. Would you rather win, than lose a game?
55. Do you often feel self-conscious when you are with superiors?
56. When the odds are against you, do you still usually think it worth taking a chance?
57. Do you often get "butterflies in your stomach" before an important occasion?

## BIBLIOGRAPHY

### Books

- ANASTASI, Anne. Psychological Testing. London: Collier-MacMillan Limited, 1968.
- ASCHNER, Mary Jane and BISH, Charles E., eds., Productive Thinking in Education. New York: Carnegie Corporation, 1968.
- ASSOCIATION FOR STUDENT TEACHING. Professional Growth In-Service for the Supervising Teacher. Forty-ninth Yearbook of the Association for Student Teaching. New York: Yearbook Writing Committee, 1966.
- BARRON, Frank. Creative Person and Creative Process. New York: Holt, Rinehart & Winston, Inc., 1969.
- BENNIE, William A. Cooperation for Better Student Teaching. Minneapolis: Burgess Publishing Company, 1966.
- BRIM, Orville G.; CRUTCHFIELD, Richard S.; and HOLTZMAN, Wayne M. Intelligence: Perspectives 1965. The Therman-Otis Memorial Lectures. New York: Harcourt, Brace & World, Inc., 1966.
- BROADBENT, D.E. Perception and Communication. London: Pergamon Press, 1958.
- COLER, Myron A. and MCGHEE, Paul A. eds., Essays on Creativity in the Sciences. New York: New York University Press, 1963.
- CONANT, James B. The Education of American Teachers. New York: McGraw-Hill, 1963.
- CROPLEY, A.J. Creativity. London: Longmans, Green and Company, Limited, 1967.

- EYSENCK, J.J. The Scientific Study of Personality.  
London: Routledge & Kegan Paul Limited, 1952.
- EYSENCK, J.J. and EYSENCK, Sybil B.G. Eysenck Personality Inventory Manual. San Diego, California:  
Educational and Industrial Testing Service, 1968.
- FREEMAN, JAMES; BUTCHER, H.J.; and CHRISTIE T. Creativity: A Selected Review of Research. London: Society  
for Research into Higher Education, Limited, 1968.
- GETZELS, J.W. and JACKSON, P.W. Creativity and Intelligence. New York: John Wiley and Sons, 1962.
- GRUBER, H.E.; TERRELL, Glenn; and WERTHEIMER, M. Contemporary Approaches to Creative Thinking. New  
York: Atherton Press, 1964.
- GUILDFORD, J.P. Intelligence, Creativity and their Educational Implications. San Diego, California:  
Robert R. Knapp, Publisher, 1968.
- HAEFELE, John W. Creativity and Innovation. New York:  
Reinhold Publishing Corporation, 1962.
- KAGAN, J. Creativity and Learning. Boston: Houghton  
Mifflin Company, 1967.
- KNELLER, George F. The Art and Science of Creativity.  
New York: Holt, Rinehart & Winston, Inc., 1965.
- LAMB, Rose. The Student Teaching Process in Elementary Schools. Columbus, Ohio: Charles E. Merrill  
Books, Inc., 1965.
- MACCOBY, Eleanor E. The Development of Sex Differences.  
Stanford, California: Stanford University Press,  
1966.
- MARTIN, Lycia O. The Prediction of Success for Students in Teacher Education. New York: Bureau of  
Publications, Teachers' College of Columbia  
University, 1944.
- MEARNS, Hugh. Creative Power: The Education of Youth in the Creative Arts. 2nd rev. ed. Danville,  
Illinois: Interstate Printers and Publishers,  
Inc., 1958.

- MERRILL, Edward C. Professional Student Teaching Programs. Danville, Illinois: Interstate Printers and Publishers, Inc., 1966.
- MICHAEL, William B. Teaching for Creative Endeavor. Bloomington: Indiana University Press, 1968.
- MIEL, Alice. ed., Creativity in Teaching. Belmont, California: Wadsworth Publishing Company, Inc., 1961.
- MOONEY, Ross L. and RAZIK, Taher A. Explorations in Creativity. New York: Harper and Row, Publishers, 1967.
- MOUSTAKAS, Clark. Creativity and Conformity. Toronto: D. Van Nostrand Company (Canada) Limited, 1967.
- NELSON, Lois and PSALTIS, Betty. Fostering Creativity. New York: Educational Association Services Corporation, 1967.
- OSBORN, Alex F. Applied Imagination. New York: Charles Scribner Sons, 1963.
- PARNES, Sidney J. and HARDING, Harold F. A Sourcebook for Creative Thinking. New York: Charles Scribner Sons, 1962.
- ROGERS, Carl. Client Centered Therapy. Boston: Houghton Mifflin Company, 1957.
- RYANS, David G. Characteristics of Teachers. Washington: American Council on Education, 1960.
- SHUMSKY, Abraham. Creative Thinking in the Elementary School. New York: Appleton-Century Crofts, 1965.
- SMITH, James A. Setting Conditions for Creative Teaching in the Elementary School. Boston: Allyn and Bacon, Inc., 1966.
- STRATEMEYER, F.B. and LINDSEY, M. Working with Student Teachers. New York: Bureau of Publications, Teachers' College of Columbia University, 1958.

TAYLOR, Calvin W. ed., Creativity: Progress and Potential.  
Toronto: McGraw-Hill, Inc., 1964.

\_\_\_\_\_. Widening Horizons in Creativity. Proceedings  
of the 5th Utah Creativity Research Conference.  
New York: John Wiley & Sons, Inc., 1964.

TAYLOR, Calvin W. and BARRON, Frank. eds., Scientific  
Creativity: Its Recognition and Development.  
New York: John Wiley & Sons, Inc., 1963.

TORRANCE, E.P. Norms-Technical Manual, Torrance Tests  
of Creative Thinking. Princeton, N.J.: Per-  
sonnel Press, Inc., 1961.

\_\_\_\_\_. Guiding Creative Talent. Englewood Cliffs,  
N.J.: Prentice-Hall, Inc., 1964.

\_\_\_\_\_. Education and the Creative Potential.  
Minneapolis: University of Minnesota Press, 1963.

\_\_\_\_\_. Rewarding Creative Behavior. Englewood Cliffs,  
N.J.: Prentice-Hall, Inc., 1965.

WALLACH, M. and KOGAN, N. Modes of Thinking in Young  
Children. Toronto: Holt, Rinehart & Winston,  
1965.

ZIRBES, Laura. Spurs to Creative Teaching. New York:  
G.P. Putnam's Sons, 1959.

#### Articles

ANTLEY, Elizabeth Martin. "Creativity in Educational  
Administration." Journal of Experimental  
Education, XXXIV, No. 4 (Fall, 1965), 21-27.

ARCHAMBAULT, Reginald D. "Education and Creativity."  
Journal of General Education, XVIII, No. 3  
(October, 1966), 191-205.

BAKAN, P. "Extraversion-Introversion and Improvement  
in an Auditory Vigilance Task." British  
Journal of Psychology, L, pt. 4 (1959), 325-332.

- BENDIG, A.W. "Extraversion, Neuroticism and Student Achievement in Introductory Psychology." Journal of Educational Research, LIII, No. 7 (March, 1960), 263-267.
- BOND, Jesse A. "Analysis of Observed Traits of Teachers Rated Superior in Demonstrating Creativeness in Teaching." Journal of Educational Research, LIII, No. 1 (September, 1959), 7-12.
- BROWN, George J. "A Second Study in the Teaching of Creativity." Harvard Educational Review, XXXV, No. 1 (1965), 39-54.
- BUTCHER, J.J.; AINSWORTH, J.; and NESBITT, E. "Personality Factors and School Achievement." British Journal of Educational Psychology, XXXIII, No. 3 (1963), 266-285.
- CICIRELLI, V.G. "Form of the Relationship Between Creativity, I.Q. and Academic Achievement." Journal of Educational Psychology, LVI (1965), 303-308.
- \_\_\_\_\_. "University Supervisors' Creative Ability and Their Appraisal of Student Teachers' Classroom Performance: An Explanatory Study." Journal of Educational Research, LXII, No. 8 (April, 1969), 275-278.
- COOPER, R. and PAYNE, R. "Extraversion and Some Aspects of Work Behavior." Personnel Psychology (1967), 45-57.
- "Creative Teachers: Encouraged or Discouraged?" Clearing House, XLIII, No. 3 (November, 1968), 150-153.
- DENTLER, Robert A. and MARKLER, Bernard. "Originality: Some Social and Personal Determinants." Behavioral Science, IX (1964), 1-7.
- EDWARDS, M.P. and TYLER, L.E. "Intelligence, Creativity, and Achievement in a Nonselective Public Junior High School." Journal of Educational Psychology, LVI, No. 2 (1965), 96-99.
- EISNER, Eliot E. "Research in Creativity: Some Findings and Conceptions." Childhood Education, XXXIX (April, 1963), 371-375.

- FARLEY, F.H. "Introversion and Achievement Motivation." Psychological Reports, XIX (1966), 112.
- FELDHUSEN, J.F. et. al. "Anxiety, Divergent Thinking and Achievement." Journal of Educational Psychology, LVI (1965), 40-45.
- FLESCHER, Irvin. "Anxiety and Achievement of the Intellectually Gifted." Journal of Psychology, LVI (October, 1963), 251-263.
- GETZELS, Jacob W. and JACKSON, Phillip W. "The Meaning of Giftedness: An Examination of an Expanding Concept." Phi Delta Kappan, XL (November, 1958), 75-77.
- GRISPINO, Frank D. "Crises Concerning Creativity." School and Community, LVI, No. 3 (November, 1969), 80-81.
- HAVEN, G.A. "Creative Thought, Productivity and Self-Concept." Psychological Reports, XVI (1965), 750-752.
- HELSON, Ravenna. "Generality of Sex Differences in Creative Sytle." Journal of Personality, XXXVI (March, 1968), 37-47.
- HENJUM, Arnold. "A Study of the Student Teacher's Personality Characteristics." Journal of Teacher Education, XX, No. 2 (Summer, 1969), 143-147.
- HOLLAND, John L. "Creativity and Academic Performance Among Talented Adolescents." Journal of Educational Psychology, LII, No. 3 (June, 1961), 136-147.
- JONES, Mary Lois. "Analysis of Certain Aspects of Teaching Abilities." Journal of Experimental Education, XXV (December, 1956), 103-180.
- JUNELL, Joseph S. "Abolish Letter Grades for Student Teaching Activities." Education, LXXXIX, No. 3 (February-March, 1969), 255-256.
- KLAUSMEIER, J. and WIERSMA, W. "Relationship of Sex, Grade Level and Locale to Performance of High I.Q. Students on Divergent Thinking Tests." Journal of Educational Psychology, LXV (1964), 114-119.

- LEAVITT, Jerome Edward. "Personal Data and Prediction of Success in Student Teaching." Journal of Teacher Education, IV, No. 3 (September, 1953), 194-197.
- Lynn, R. "Two Personality Characteristics Related to Academic Achievement." British Journal of Educational Psychology, XXIX (1959), 213-216.
- LYNN, R. and GORDON, I.E. "The Relationship of Neuroticism and Extraversion to Intellectual and Educational Achievement." British Journal of Educational Psychology, XXXI (1961), 194-203.
- MacKINNON, Donald. "The Nature and Nurture of Creative Talent." The American Psychologist, XVII, No. 7 (July, 1962), 484-495.
- MARTIN, Warren Bryan. "Targets for Creativeness-Achieving a Quality Education for the Age of Concern." Journal of Secondary Education, XXXVIII, No. 3 (March, 1963), 157-168.
- McAULEY, J.D.M. "How Much Influence Has a Cooperating Teacher?" Journal of Teacher Education, XI (March, 1960), 79-83.
- MEHDI, Bager. "A Survey of Research in the Area of Creativity and Implications for School Practices." Indian Educational Review, I, No. 1 (June, 1966), 48-63.
- MONTAG, Betty Jo. "Creativity or Mediocrity: The Principal Sets the Climate." Journal of Secondary Education, XLIV, No. 2 (February, 1969), 65-68.
- MORGAN, J.C. and WOERDEHOFF, F.J. "Stability of Student Teachers' Behaviors and their Relationship to Personality and Creativity Factors." The Journal of Educational Research, LXII, No. 6 (February, 1969), 251-254.
- OHNMACHT, Fred W. "Achievement, Anxiety, and Creative Thinking." American Education Research Journal, III (1966), 131-138.
- PRICE, Robert D. "The Influence of Supervising Teachers," Journal of Teacher Education, XII, No. 4 (December, 1961), 471-475.

- RAINA, M.K. "A Study of Sex Differences in Creativity in India." Journal of Creative Behavior, III, No. 2 (Spring, 1969), 111-119.
- RYAN, William J. "An Evaluation of Letter Grades in Student Teaching." Continuing Education, XLI, No. 1 (October, 1969), 19-21.
- SIMMONS, Gayle, "A, B (and Lack of) C's in Grading Student Teachers." School and Community, LI, No. 27 (1964), 44-45.
- SIMPKINS, Ruth and EISENMAN, Russell. "Sex Differences in Creativity." Psychological Reports 1968, XXII (1968), 999.
- SNYDER, B. "Creative Students in Science and English." Universities Quarterly, XXI, No. 2 (1968), 215-218.
- STEINER, R.W. and VON HALDEN, H.I. "The Pretraining Selection and Guidance of Teachers." Journal of Educational Research, XXXVIII (January, 1940), 321-350.
- TRIMMER, Russell L. "Student Teacher Talks Back." Journal of Teacher Education, XI, No. 4 (December, 1960), 537-538.
- WALLACE, H.R. "Creative Thinking: A Factor in Sales Productivity." Vocational Guidance Quarterly, XIII (Summer, 1961), 222-226.
- WHITE, Winifred Wiseman. "Student Teacher, Too, Must Have Chance to be Creative." Indiana Teacher, CIX, No. 4 (March-April, 1965), 233.
- WILK, Roger E. "An Experimental Study of the Effects of Classroom Placement Variables on Student Teacher Performance." Journal of Educational Psychology, LV (1964), 375-380.
- WILLIAMS, Frank E. "Intellectual Creativity and the Teacher," Journal of Creative Behavior, I, No. 2 (Spring, 1967), 173-180.
- YAMAMOTO, Kaoru. "Role of Creative Thinking and Intelligence in High School Achievement." Psychological Reports, XIV (1964), 783-789.

- \_\_\_\_\_. "A Further Analysis of the Role of Creative Thinking in High School Achievement." Journal of Psychology, LVIII (1964), 277-283.
- \_\_\_\_\_. "Validation of Some Tests of Creative Thinking: A Review of Some Studies." Exceptional Children, XXXI (1965), 281-290.
- TORRANCE, E. Paul and ALIOTTI, Nicholas C. "Sex Differences in Levels of Performance and Test-Retest Reliability on the Torrance Tests of Creative Thinking Ability." Journal of Creative Behavior, III, No. 7 (Winter, 1969), 52-56.
- \_\_\_\_\_. and HANSEN, Ethel. "The Question-Asking Behavior of Highly Creative and Less Creative Basic Business Teachers Identified by a Paper-and-Pencil Test." Psychological Reports, XVII (1965), 815-818.

#### Articles in Collections

- ALM, Kent G. "Can Student Teachers Be Creative?" Readings in Student Teaching. Edited by J. Johnson and Floyd Perry. Dubuque, Iowa: Wm. C. Brown Book Company, Inc., 1967.
- BOYKIN, Leander L. "Principles of Evaluation in Student Teaching." Evaluating Student Teachers: A Forward Look at Theories and Practices. Thirty Ninth Year-book of the Association for Student Teaching. Association for Student Teaching, 1960.
- DAVIES, Don. "Student Teaching." Encyclopedia of Educational Research (1969), 1376-1384.
- GETZELS, Jack. "Creativity." Encyclopedia of Educational Research (1969), 267-275.
- GETZELS, Jacob W. and JACKSON, Phillip W. "The Teacher's Personality and Characteristics." Handbook of Research on Teaching. Edited by N.L. Gage. New York: Rand McNally, 1963.
- HEIST, P. "Creative Students: College Transients." The Creative College Student: An Unmet Challenge. Edited by P. Heist. San Francisco: Jossey-Bass, 1968.

HERMANOWICZ, Henry J. "The Pluralistic World of Beginning Teachers." The Real World of the Beginning Teacher. National Education Association, 1966.

KINNEY, Lucien B. "A Criterion for the Appointment of Student Teachers: The California Definition." Evaluating Student Teachers: A Forward Look at Theories and Practices. Thirty Ninty Yearbook of the Association for Student Teaching. Association for Student Teaching, 1960.

SLEEPER, Wm. R. and TELFER, Harold E. "Evaluation: The Heart of Student Teaching." Readings in Student Teaching. Edited by Jim Johnson and Floyd Perry. Dubuque, Iowa: Wm. C. Brown Book Company, Inc., 1967.

#### Unpublished Materials

ANDERSON, James Harold. "The Predictive Value of Selected Factors for Student Teaching Success at Western Caroline University." Unpublished Ed.D dissertation, University of Tennessee, 1968.

IRON, Jerry Lee. "Creative Thinking Abilities of Rural and Urban Elementary School Students." Unpublished Ph.D. dissertation, East Texas State University, 1967.

MATHIAS, David Hershey, Jr. "The Terminal Evaluation of Student Teachers." Unpublished Ed.D dissertation, University of Colorado, 1966.

TORRANCE, E. Paul. "Creativity Research and Higher Education." Paper presented to the Annual Meeting of the American Association for the Advancement of Science, Boston, Massachusetts, December 29, 1969.







