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RORSCHACH DETERMINANTS OF CREATIVITY

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PREFACE

This psychological investigation has its origin and incentive in the keen interest aroused by Professor Austin E. Grigg in the Rorschach Test, chiefly through his courses in Clinical and in Projective Tests. He gave, moreover, of his time and experience in guiding this experiment through its successive stages. I wish to acknowledge Dr. Robert J. Filer's help in correcting and evaluating the statistical findings given in this paper. To Dr. Merton E. Carver I owe an inestimable debt. His kindly and sustained encouragement helped me to resume academic studies after so long a time, and to follow through in spite of many distractions. Lastly, I should like to thank my husband for his patience and understanding.

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INTRODUCTION

> Poetry is not, like reasoning, a power to be exerted according to the determination of the will. A man cannot say, "I will compose poetry." The greatest poet even cannot say it. For the mind in creation is as a fading coal which some invisible influence, like an inconstant wind, awakens to transitory brightness.

The quotation is from the poet Shelley, and is taken from an early investigation on the subject of creative imagination (35, p. 129). This evanescent quality spoken of by the poet, the fact that much of the labor of creative thought is carried on in the unconscious, and that the end product cannot, as in logic, be arrived at by conscious striving, accounts for both the diversity and vagueness of theory concerning creativity. To this may also be laid the meagreness of experiment, until the last decade, in seeking to isolate the factors, intellectual and temperamental, that make up the creative personality.

The subject of this experiment is such a search, by means of the Rorschach test. The factors to be established are the traits forming the personality pattern of the creative thinker

who finds his medium of expression in creative writing. A review of the publications on this subject indicate that such a search may be profitable. Not only are the forces that foster creativity ambiguous to the psychologist and educator. There is evidence (36) that our schools destroy rather than foster the inventive spirit. The remedy, as one of the foremost investigators in this field points out (18) is not mass liberalization in curriculum, which would in most cases encourage "piddling". A surer way is to weed out those of superior endowment and promise, and permit them to follow their original bent.

The field under investigation belongs to the non-utilitarian world of the Arts. However, here as with science and invention, research meets a practical as well as esthetic concern. Theorists agree, with some dissenting voices, that certain broad personality traits underlie creative work in widely differing fields, and are common to poet and inventor. Creative thinking in every field appears to have its inception in extreme sensitivity, sensitivity to the environment through the senses, or to problems, by reason of an enquiring mind, with the accompanying inhibition against closure, characteristic of the inventive mind. Motivational factors are present. As Diderot observed (9), enthusiasm spells the difference between the passive and active imagination. Whatever the specific traits, and the aptitudes and interests largely define these, there must be adequate drive, stemming from the affective

elements, to prepare the soil in the initial period of creation and to elaborate the finished design in the last stage. More important, this drive insures the tension needed to keep the unconscious at work during the uncertain period of incubation and without which no insight or invention would occur.

We may assume other traits in common. The independence of thought that Roe (32) found to be the most universal trait among the eminent scientists she tested, which stemmed in that instance from early childhood experiences, may be expected in the artist as well. Fluency and flexibility, temperamental traits more narrowly defined in a recent factor analysis (13) are held to be essential to creative work of whatever kind. Most fundamental and also most universal is the ability to reorganize, whether of the synthesizing, analyzing, or redefining kind. Still another universal is the seemingly high correlation with IQ; and the biologist's suggestion that perhaps a finer and more intricate neural pattern promotes creative thought. Finally, from the words of the best known authors, artists and inventors themselves (8), we know that the creative cycle with its four stages is never foreign to invention, though often the conscious work is minimized and the seemingly spontaneous moment of creation remembered.

However, the underlying similarities in all invention do not provide the only practical basis for an investigation of artistic creativity. The creative process is the process of change and of evolution. Today widespread changes are taking

place in all areas of live, and still more radical changes seem necessary to deter disaster. An understanding of the creative process may help to break old molds and yield the as yet untried solution. Our poets, as Wallas (35, p. 131) called to our attention, are the unacknowledged legislators of the world, for "they are able to make us feel that which we perceive and to imagine that which we know. They create anew the universe after it has been annihilated in our minds by the recurrence of impressions blasted by reiteration."

So rare a phenomenon is the creative person that of the whole human race since the beginning of recorded time only a scant two in a million have become distinguished (11). Yet as this same author observes, creativity may be studied as a continuum for everyone possesses a certain amount of the traits and abilities which produce originality. Indeed, we have no right to take up the time of the gifted, creative artist in testing until we have established, by experiments such as this one, what it is we are looking for.

The choice of the Rorschach test is justified on its multi-dimensional character (2, p. 101 ff.). Perception, organizing ability, temperamental traits, are involved, as well as the commonly accepted definition of original imagination and high IQ. Moreover, some of the factors most crucial to inventiveness have in all probability not been discovered (11). It requires a test that probes the personality depths, unconscious

and conscious, to trace the dual source (3, Vol. 2, p. 3) of inspiration. Two of the foremost textbooks of the Rorschach (3 & 20) agree on M* as indicating creative imagination. Both add a second factor as a minimum requirement for creativeness. Beck uses the symbol Z to denote this organizing ability, the same trait that Hutchinson (17) called executive talent. Klopfer and Kelley do not use a separate symbol but stress the several kinds of W, and look for a projection of creative ability in a ratio of M to W (20, p. 277). A comparison of these two categories, M and Z, was undertaken, using two groups of college upper-classmen, one defined operationally as creative by having produced imaginative works; the other, the control group composed likewise of English majors, correlated in overall scholastic ability, without recognized inventive ability. Since the experiment is largely exploratory the comparison was not confined to these two categories. Further possible clues suggested by Beck (3, p. 24, Vol. 2), and by other experiments (14 & 30), were followed in the search for significant differences between the two groups.

English rather than Art majors were used, and literary creativeness made the criterion, because it appears that in this field less than in any other, the learning of a highly specialized technique is a prerequisite to creative perform-

*All scoring symbols used in this paper are those established by Beck (3).

ance. This opinion is supported by Patrick's experiments comparing artists and poets (28).

HISTORY

The most plausible theory of creativity, which also explains its rarity, is found in Bergson's philosophical treatise (4). Reason and intuition are incompatible. In order to evolve the new, the untried, man must resort to intuition. But logic was necessary to self-preservation. In order to come to terms with his environment man cut it into static bits governed by logical syllogisms and forming a shut-in, rigid system. His formula for creativity is deliberate cultivation of the more fluid states, the use of images and feelings in place of words and ideas. Bergson is outdated and a metaphysician rather than a psychologist, yet modern psychology reiterates his prescription (36).

The theory of creative imagination has been drawn from a few classics, chief among them: Wallas' (35), Downey's (5), and Wertheimer's (38). The first is remembered primarily for the discovery and elucidation of the four steps incidental to all creative work. Downey, the most frequently quoted of the three, is a reference book on the various types of imagination,

from the eidetic memory of Coleridge, to the cartooning imagings of the insane. This author was one of the first to stress the large part played by the unconscious, so great in some works as to amount to autometic writing. Some writers, like E. White have claimed to discover their plots in a dream; or, like Masefield, to see whole poems engraved upon a metal plate from which he copied it. Others, like Poe, perhaps mistakenly, believe all composition to be conscious effort. In the main the emphasis in this analysis is on sensory equipment and individual differences. Of quite a different type is "Productive thinking" a clear expression of Gestalt learning with its emphasis on insight and part-whole relationships. This last idea is Wertheimer's greatest contribution to the subject under discussion. Recent experiments have confirmed his hypothesis (28). Another distinction drawn by this author is between summative thinking, so readily explained by associationism, and the thinking which grasps structural requirements and fits the peripheral into the fundamental. Perception is the basis upon which insight occurs, but he adds the plus of temperament and of motivation, holding that the desire for true structural improvement is strong in man. A real contribution to the theory of creation is this emphasis on the global nature of productive thought, involving attitude, interests, and emotions, as well as intellectual labor.

On the whole, this subject is one that has been shunned by

writers of psychological textbooks (11). Gardner-Murphy is an exception. In the chapter on Creativeness (25, p. 452) he engages in a common sense discussion of this elusive quality, lifting it from the never-never land of genius to make it the universal endowment of Everyman. In the artist this ability comes to fruition because of extreme sensitivity, visual and auditory, and sometimes involving muscle sense. The group is seen to play a large part in forming the artist for in one society he finds a ready audience, a school with which he may identify. In another he is left to starve in a garret. The question of frustration as a function of creative effort, so dear to the psychoanalysts, is decided in the negative. Drives may be intensified by thwarting, but maladjustment may not be held the clue to creativity. In the productive artist a general factor of intelligence must be added to sensitivity. There must be organizing ability, as well as special abilities to fit the medium of expression. Genius involves integration of the affective and the intellectual, and is rarely found in equal proportion.

We have been dealing with general theories underlying a still nebulous subject. Before engaging in a review of the experimental work on inventive personality, it is well to hear what the persons whom the world recognizes as creative have to say on the subject. A recent symposium (8) has brought together subjective records from the great in literature, art,

music, mathematics, and science. In a most instructive foreword the symposium is offered as a guide to struggling artists and inventors, and to those who would help them. Every type of creative thought is represented, but in spite of vast individual differences there is agreement on fundamental points: the unconscious plays a large role in the work of each; each, in relating the experience of composition or invention, validated the four step process; each was conscious of a compulsion to create. In some, as in Wolfe's turbulent nature, this compulsion appeared entirely of the emotions. He writes of his homesickness while living abroad, which caused him to remember in sharpest detail familiar persons and places. When he found his medium, the stories in which these familiar scenes came alive, he felt as if the "black cloud within him" (8,p.194) had become a river, carrying all of his emotions in a tide of release. He writes frantically and without let-up for the compulsion is so great that he feels that he is not the author but the instrument of the story which has possessed him and is writing itself (8, p. 198). The emotional drive is not so apparent in every account. It is always present and recognized at the moment of illumination. But in the cooler temperaments, such as Henry James', the vectors appear to belong to the intellectual category. In observing these creative minds at work it is impossible not to draw the conclusion that no <u>single</u> pattern of traits exists in any branch of original work.

These full and systematic descriptions of invention were intended by their compiler to be a textbook of case histories. This is evident in the Introduction, and also from the inclusion of a chapter written by a physician who translates into physiology essential theories of invention (8, p.236 ff.). He attempts to throw light in particular on the unconscious phases of creation: incubation and illumination. He notes that the brain is constantly throwing off electrical impulses whether awake or asleep, proving that the nerve cells are as incessantly active as the heart-beat. Closure (insight) is woven into the very fiber of the nervous system for an impulse, once started continues to act upon and be acted upon by the adjoining nerve fibers. We have a closed circuit with "excitations going round and round like a pinwheel and throwing off sparks of activity on each cycle," (8, p. 253). Insight is no different from more stupid learning. The former occurs more rapidly because preceded by subconscious work which spills over into consciousness when some threshold is reached. New neural connections are no problem when we envision the nervous system as a fluid, ever-changing pattern. He thinks that qualitative differences among creative thinkers may have a primarily physical basis: size of association areas, richness of fibers, level of vigor, etc. He concludes that no way has been found to cultivate unconscious imagination. However, the danger of stifling it in formal education is a real one. We have

reviewed this book in some detail as so much of the previous work had been vague and peripheral, more especially the Gestalt explanations, as Lewin's dictum that imagination depends upon the degree of development, position in personality make-up, and fluidity of levels of unreality and of reality (21, p. 224).

Creative personality, the underlying traits, the dynamics behind creativity, have taken up little space in modern psychological experimentation. Less than two-thirds of one per cent of the books and articles indexed in the "Abstracts" for the past twenty-five years treat of this subject (11). The early experiments are reviewed in articles appearing in '31 (15) and '35 (22). To mention the more important findings; Dearborn's discovery of the value of inkblots to test imagination; Spearman's positing of an identical basis for all creative thought; Cleeton's work on originality, the first factor analysis on this subject; Hargreave's faculty theory of the imagination; Kirkpatrick's use of Rorschach with children; Kilpatrick's analysis of creation through education. The compilers acknowledged these to be mere beginnings, the field as yet unploughed, and characterized by "rugged inaccessability."

In the same year that the second review came out, Patrick published her experiment on poetic composition. This experiment done on a large group of poets and non-poets was an analysis of the process of composition, step by step, from

the words of the artists as they worked. Findings were a confirmation of the Gestalt theory. In the majority of instances, creation proceeded from whole to parts. The four stages (35) were validated. The conclusion of this experimenter, after examining life histories of her subjects, was that artistic ability is not associated with maladjustment. Moreover, there seemed to be the normal amount of introverts and extroverts, and the act of composition was accompanied by no display of emotion in either group. This paper was followed by a like experiment on artists, reversing the procedure, the subjects sketching a landscape after reading a poem about it. The same general findings resulted, except that, because of technique necessary to the latter group, there was much more difference in the finished product of the artists than of the poets. A third paper appeared in '41 (28) comparing the results of these two experiments, and illustrating the marked similarity between the two types of creative work.

An experiment was done by Murray (26), using college students. He found negative results in regard to creative writing, the best writers in the group giving no better records on the T A T and sentence-completion tests than the poorest, and this in spite of the fact that two later became recognized authors. Rorschach was not used. Murray attributed the results to the time element, holding there was no incubation interval. Moreover, this test centered on content while

Patrick's was concerned with methodology.

In the late Forties Welsh undertook an experiment (37) requiring a group of professional artists to recombine familiar ideas according to four different patterns. The controls were college students. The results showed no significant difference in the two tests using words; the other two, using lines and blocks, differentiated significantly. A year later this test was repeated (7) using art majors and unselected students. Former findings were repeated; tests 1 and 3, requiring construction along literary lines, contrasted with 2 and 4 which differentiated significantly. This indicates that more specific factors underlie the general ability to reorganize ideas. A further finding appeared: performance was found to be related to the general intelligence of the art group.

In '50 the President of the American Psychological Association aroused fresh interest in creativity by his address on this subject (11). Enlarging on the social importance of discovering the inventive personality, he supposes that mass education is not producing it because we confound high IQ with originality. Interest, aptitude and temperament are also involved. He outlines a factorial research design, a project which is now being realized (13).

An article appeared the following year re-emphasizing the educational (36) side of the problem. Weiskopf's approach was

almost entirely negative, the "what's wrong with our colleges" being too much drill of the rigid type, too little time for unconscious enlargement; and the stifling of creative impulse by denying the emotional element. In the schools, she claims, the two most important steps, incubation and inspiration, have been left out.

At present the most important experimentation is that going on under the Office of Naval Research with the collaboration of Dr. Guilford. It is the Factor Analysis referred to above and is the second in a series*. Fifty-three novel tests were assembled and given to over four hundred Air Cadets. Nine factors of Creative Thinking were identified, as follows: closure; word fluency; associational fluency; ideational fluency; originality; adaptive flexibility; spontaneous flexibility; redefinition; sensitivity to problems. These tests were devised with the hypothecating of creative traits required for science, engineering, and invention, rather than for the liberal arts. Last year, originality as a factor was given more explicit definition (39). A description of the tests (13) to identify (1) uncommonness, (2) remoteness, (3) cleverness, with their results, was given. A continuum is assumed and originality is defined operationally, as statistically infrequent in the population tested. Since all three sub-tests had significant loadings, the generality of this factor, originality can be assumed with some confidence. However,

*"Reason" was the first.

validation against objective criteria is yet to be done.

Narrowing the field to the subject of this paper, the Rorschach test, the files show but three advances in recent years involving its use as predicative of inventiveness. The article attracting the greatest amount of popular attention was Roe's "A Psychologist Examines Sixty-four Eminent Scientists" (32). The Rorschach was incidental to a battery of tests, and, while no personality pattern emerged typical of the scientist in general, certain scoring categories were emphasized consistently by the various sub-groups, the Social Scientiest giving more R and H, the Biologists more F and C, the Physicists more Y and S and m.* It would appear from this experiment that in using the Rorschach as a guide to creativity the group tested should be an homogeneous one.

The second article to which I would call attention (14) covers the use of the inkblot test to select men for jobs high in the occupational hierarchy. The Rorschach was found to have higher predictive value than any other temperament or interest test, but because of the fixed framework of Rorschach scoring categories, ten new inkblots were devised, without color, and new scoring symbols invented. An objective criterion was used--patent records--and ten scoring categories on this, the I P P test, consistently differentiated the

* The scoring symbols used are those found in Beck (3)

creative from the non-creative group. Ample opportunity has been given to validate this ten-sign pattern and the results are striking; after a three-year interval, of forty for whom the prediction was "non-creative" only one had made a discovery; of nineteen for whom the prediction was "creative", thirteen had already established a patent record. The finding was that this projective test had high validity as predicting creative thinking along a highly specific line.

Finally, the study most pertinent to the subject under discussion is that undertaken by Louise Pedigo (30) in the attempt to answer the questions: (1) Are there significant correlations between responses to the Rorschach Test and creative imagination revealed in themes written to fulfil English assignments? and (2) Is there a relationship between levels of personal adjustment and creative writing? For the study, six samples of themes written for tenth-grade English classes and a record of responses to the Rorschach Test were secured from each of fifty high-school students. The themes were ranked by judges according to the amount of creative imagination revealed. Ranks of 1, 2, 3, and 4 were assigned the writers, Rank 1 representing the most, and Rank 4 the least, creative. The Rorschach responses of the seven Rank 1 writers were compared with those of the seven Rank 4 writers. No statistical findings were reported in the article, but it was stated that "six response categories showed fairly significant differences

in the group averages, while three other categories showed a tendency to differentiate." Rank 1 writers gave more responses, gave them more quickly, made greater use of small and unusual detail, gave more shading responses, more movement responses, and more originals. These Rank 1 writers showed a tendency to give more color responses, and their records also tended to include a greater number of populars. Rank 4 showed a tendency to give more "whole" responses. The twelve criteria of adjustment given by Klopfer and Kelley were applied, and "there was some indication" that writing level tended to correlate positively with degree of personal adjustment. In a later chapter these findings will be discussed more fully, in comparing them with the results of the present experiment.

A cursory glance at the literature covered in this review confirms the need for further experimentation and study. One may also conclude from this report on what has been attempted in identifying creativeness that the best tool is the projective test, more e specially the ink-blot test. Moreover, this use of the Rorschach in determining personality pattern has been empirically validated. A factor analysis isolating creative traits is being carried on elsewhere and is still a matter of research. It has not been objectively validated.

From the results of the I T P ink-blot test, and from Pedigo's findings, we may expect significant differences in

the mean of a creative and of a non-creative group, as the pattern evolves through the scoring categories of the responses to the Rorschach Test. These responses will be scored in the symbols devised and interpreted according to his technique.

Three hypotheses are advanced concerning the variable, creativeness: (1) the number of M, or movement responses, given by the creative group will be significantly higher than that given by the non-imaginative group; (2) the Z, or organization value, of the creative group will be significantly higher; (3) there will be other significant differences, or trends, distinguishing the creative from the non-creative group.

Chapter 3

PROCEDURE AND FINDINGS

In order to establish the independent variable, creative ability, two groups were chosen, these groups consisting of Junior, Senior, and Graduate students, English majors in Westhampton College and in the University of Richmond. Members of the English Departments in both schools collaborated in furnishing lists of students who had done the most imaginative work in English assignments. Grades of the "Creative Writing" course, and files of the University student publications were examined. Of the above list of English majors, only those were selected for the experiment who either had achieved high grades in the creative writing course, or who had contributed imaginative pieces to the college periodicals. This group was matched by a like number of English majors from among those who had not done imaginative writing of sufficient caliber to receive recognition, and who were considered factual and non-creative students by their instructors. Sex, year of advancement

in college work, and over-all grades from the preceding term, were matched in the two groups. Age was not closely controlled. Each group was composed of fifteen subjects, eight males and seven females.

The Rorschach Test was administered at a time of the subject's own choosing, and with the general and broad statement, by way of explanation, that Liberal Arts and Science Majors were being compared by means of the Rorschach. Identical instructions were given to each subject, and the test administred according to Beck's directions (Vol. 1, p. 22 ff.).

Each response record was then translated into Beck's scoring categories and will be found in Tables 1 and 2. Total results in the scoring categories of both groups were obtained and compared. These will be found in Table 3. Since sex was controlled, and since there were no differences observable in male and female totals from Tables 1 and 2, no separation of the sexes was followed throughout the experiment and the summative scores found in Table 4 represent the whole group, Experimental and Control.

An experienced Rorschacher reviewed the response records, checking for Originals, which are also listed in Tables 1 and 2, and also grading for adjustment.

The adjustment scores, together with the five-point system used for scoring, will be found in Table 3. No study was made of content as such, except for human and animal content responses, Originals, and for possible signs of maladjustment. However, it was evident that in the individual record summaries approximately as many associational content categories were encompassed by the control as by the creative group, indicating a like range of content in one as in the other.

With hypothesis 1 in mind, the expectation of more M responses in the creative group because of Beck's finding that "Producing M is, generically, the creative act" (Vol. 2, p. 25), the Mean, Sigma, and Critical Ratio of the two groups were obtained. These will be found in Table 5. For the creative group the mean score was found to be 11, for the non-creative, the mean score was 3.6. This difference proved statistically reliable, p being less than .03.

Further analysis was done on M scores, according to Beck's deductions. This was done first in regard to M in Dd, for this author states (3, p. 124):

> M in Dd is found in several groups, including the very imaginative.

Klopfer and Kelley also support this view (20, p. 264). The inventive group did produce more Dd M, the totals for the two groups being 16 to 3.

Another striking difference between experimental and control M sections was brought to light, verifying the finding:

> The more creative an individual in his calling, the more he calls on imagination in his planning and his decisions, the greater is the quantity of his original responses, and also the more unusual and rare the content; in fact, it attains in these individuals that highly subtle flavor which is in the realm of the alien, matched only by productions of schizophenics. M as original as these may thus represent a medium of autistic solutions, as also equipment for the most constructive creations. (3, Vol. 2, p. 24).

Of the 165 M produced by the creative subjects, 56 were found on analysis to be F, that is, they were so unusual they had not been listed in Beck's F+ or F- lists. On the other hand, the controls gave but 3 M that were F, of their total of 54. In addition the analysis revealed that no less than 20 of the M responses in the experimental group were of such "rare and unusual" content that they entered the lists of the Originals. This was true of but one M among the non-creative responses.

Support for hypothesis 2, regarding organizing ability, Z, as a token of creative talent, was next undertaken. This symbol, Z, owes its origin to Beck and was intended to clarify the ambiguity of the force behind both W and M, as it was conceived by the test's originator. Beck recognized in the Z score a prime source of creative ability (3, Vol. 1, p. 59):

The creative pe rson is also the one with the high abstracting and generalizing capacity. * * * The speculation is in order that a controlled study of these two reactions (W and M as found in Z) would yield information significant as to the mature of the creative activity up to and including that mystery that has been called genius.

The distributions on the Z score were found to be skewed so a logarithmic transformation was undertaken. This brought the distribution close to symmetry.

Mean, sigma, and critical ratio were established as noted in Table 5. The mean Z produced by the creative subjects was found to be more than twice that of the controls and the mean difference proved to be statistically reliable as p was less than .01 in each case.

As stated in the Introduction, comparison in scoring differences was not limited to M and Z scores, as the experiment was designed to be exploratory. In scanning summative scores found in Table 4, several facts stood out which lead to positive findings. First, the creative subjects were found to be more productive. Mean for these students in N, or number of responses was found to be 73.3, as contrasted with a mean of 53.3 as control response. Here, again, a logarithic transformation brought the skewed distributions close to symmetry. The breakdown on these figures is noted in Table 5. The difference is statistically reliable (p. is less than .01 in each case).

Creative subjects also underlined originality as a

differentiating factor, giving a mean of 3.2 originals per record to the control group's .33. For the reason already noted scores were translated into logarithms, and a statistical difference obtained. This difference was found statistically reliable (p was less than .01 in each case). Analysis of these figures will be found in Table 5.

Certain trends were also noted. The imaginative students gave more H, or human, responses at the rate of nearly 3 to 1, or a mean of 21.6 to 8.3. This was not a statistically reliable finding, however, for p was between .05 and .10.

An analysis of W indicated a slight trend, the creative group giving a mean of 16.6 to the non-creative's 9.6 W per record. No conclusions can be drawn, as p was greater than .10. An analysis of these statistics will be found in Table 6.

The slight tendency in the imaginative group to give a greater number of wholes did not carry over and establish a similar trend to emphasize in Approach. No conclusions can be reached in this scoring category, as six subjects gave a W! Approach; five subjects gave a Dd! Approach; and four subjects gave a D! Approach. In the non-creative group, four records gave a W! Approach; four

records gave Ddi; six gave Di; and one was perfectly regular, according to Beck's statistical definition of regularity (3, Vol. 1, p. 84).

Of adjustment ratings it can only be said that the creative person appears to have a slight superiority over the non-creative, as the records of four subjects in the latter group were rated below the standard of adequate adjustment. This differed from the ratings of the creative group whose records showed adequate or better adjustment. These ratings will be found in Table 3. This experiment gives no evidence that frustration causes or accompanies invention.

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Chapter 4

DISCUSSION

In seeking a composite personality profile typical of the creative writer of college age and experience, certain qualifying limits must be set. A typical profile cannot be drawn from the psychometric measurements of a group for in the individual profile different items will take on different weightings of importance. As Symonds (34) observed, the Projective test is primarily a personality X-ray, and a typical personality pattern may not, with more assurance, be deduced from the mean scores of the several Rorschach determinants, than can a satisfying composite picture be obtained by the superimposing of many X-ray pictures. This is true especially in the important zones of Approach and of Erlebnistypus, or Experience Type.

In the creative group all three emphases in approach were found. However, a bi-modal tendency was observed,

to either W! or to Dd!, for the D was in so many instances combinatory that it just missed being W. The creative group gave four D! records to the control's six, and the D in the former more closely resembled W as may be seen from the following typical responses:

Card 8: combining D 2, 4, and 5. "The golden chain binding Heaven and Hell, from Milton."
Card 9: combining D 3, 5, and 6. "Man stirring a fire with bellows."
Card 9: combining D 3, 5, and 6. "Holy Grail with nimbus of fire."
Card 9: combining D 1 and 5: "An arch set in a high wall with a monument seen in the distance thro the arch".

The bi-modal character of the Approach was more evident of course in the six W! and five Dd! records of the imaginative imaginative group. Here the Dd! subject may represent the descriptive, largely reproductive, writing that many of our novelists indulge in. Thomas Wolfe is typical. He tells us (8, p. 192 ff.) that his stories grew from assembled minutiae of remembered persons and places. On the other hand the W! approach may represent the more creative writer who does not draw so much upon memory as upon original idea and bizarre mood, and holds, as Allen Tate states in this same volume, that a literary work should be to the reader a fresh experience as vital as life itself. Like the W! subject, such a writer thinks in larger units and abstractions.

The bi-modal quality of the Experience Balance was

less obvious, the mean of M: sum of C being perfectly balanced 11:11. This did not give the true picture, for examination of individual records showed a preponderance of extroverts at the rate of nine to six. The control group gave a larger proportion of extroverts, ten, to two introverts, with three balanced equally.

A review of the findings on the Fantasy determinant, M, and on the Organizing ability, Z, requires little discussion. The first appears as "imagination" in all of the theoretical treatises on creativity listed in this bibliography. It belongs, probably, to the category of temperamental traits. The second factor, Z, appears to be an ability. Guilford (11) separates temperament and abilities in his discussion of the creative person, and holds that both are essential. This organizing ability appears in his factor analysis (13) as Factor F, Closure; Factor H, Associational Fluency; Factor I, Ideational Fluency; Factor M, Redefinition of Problems. That these four factors of the nine factors his investigation isolated are derivatives of the ability represented in Z is evident from the hypotheses upon which they are predicated and upon the tests designated to segregate the respective abilities. Both M and Z, in combination, appear to be essential to creative work. Without Z, the activity

represented by M, becomes the day-dream. Without the M quality, Z is the activity that makes up ninety-nine per cent of man's occupation: manipulation of his environment.

Passing from a validation of hypothesis 1 and 2, based on Beck's predictions, some elaboration of the findings and trends seems profitable. The first of the two other statistically significant findings, that creative subjects are more productive, may stem from interests closely related to the test activity: producing verbal images from unstructured material, as the writer does from unstructured recollections. Or it may have its cause in specific abilities, as Guilford's (11) word fluency, one of the basic factors isolated in creativity in the limited field of his factor analysis, that of science and engineering, and certainly of more essential nature in determining literary creativity.

The second statistically significant result: that the creative subjects gave more originals, is a logical corollary. To be creative is to be original. Three of the twenty-one hypotheses (ibid) dissecting inventiveness predicated this factor, originality; two of the three are rephrasings of the quality of these Originals: (1) Uncommonness of response; (2) Remote, unusual, unconventional associations.

This trait or ability, hypothecated in our O factor, added importance to another trend listed in the last chapter: that the creative group tended to see the ink blots more frequently as humans, than did the controls. The kind and content of the human responses, H, or Hd, a category found in larger number in the experimental group, was specific to this group. A large number referred to the fantasies of others, such as characters in plays, paintings, and stories. Whereas the H content found in the non-creative records referred to practical, everyday situations, such as waiters, dancers, etc. Following are samples of the fictional H found among the former:

Card 1: Lucifer, from "Paradise Lost."
Card 2: Toulouse Lautrec painting of a Can-Can dancer.
Card 9: The Countess from Mme. of Chaillot.
Card 10: Ichabod Crane.

These are representative. However, the control group gave but one fictional H:

Card 6: Monks from Canterbury Tales.

However, the creative student shows by the number of Populars he gives that he is able to think in terms of the known and the normal.

Originality also distinguished the W responses, which category, like the human content determinant, revealed a definite trend in a comparison of the creative

and non-creative subjects. Not only did the first group give more whole responses, that is, react to the whole blot, not to a detail, but the W was of a different kind. (It should be mentioned in passing that a higher score in either W or Z should not be attributed to greater number of total responses for a very recent experiment (7) with a mixed group indicated that these two determinants do not have a positive correlation with productivity.) The same factor or factors contained in the Z quality explain the preponderance of W, for the W in the creative subjects was combinatory, and revealed a synthesizing ability. This is true, of course, of only a portion of the experimental group W. Many were, like the control's W, of the instant or additive type. The W in the non-inventive group came chiefly from the cards, 1, 4, 5, and 6, in which W is most easily apprehended. We chose Card 10 responses to illustrate W reactions from the creative subjects, because Beck names this (Vol. 1, p. 16) as one of the two most difficult cards to organize into W:

Noah's Ark, with animals going in two by two, converging in the distance.
Siamese hat, with ear pieces and mask beneath.

The creative group gave 15 W to this difficult card; the controls gave 6 W, all of the "lazy" type:

Something from biology
Fireworks

A study of the W score fails to support Klopfer and Kelley's (30, p. 277) ratio of 2 W to 1 M, with a minimum of 3 M for the creative extrovert and the same ratio with a minimum of 5 M for the creative introvert.

The final trend listed in Chapter 3, that creative subjects tend to react more quickly upon presentation of the card, that is T/FR is lower, reflects a more readily available fund of psychic energy, quicker sensitivity, or the factor isolated in Guildford's search for creativeness above-mentioned labeled "flexibility." It may have the same basis as productivity for T/FR was found to correlate negatively with number of responses (6).

Another observed trend is interesting because it confirms the finding of one of our leading authorities in the Projective test: H. A. Murray. This experiment yielded a ratio of 2 to 1 CF in a comparison of that determinant in the two groups, the creative group giving the larger sum. Murray (26) using the TAT on a similar group, college students, English majors, came to the conclusion that the most creative in this group were characterized by egocentricity, and egocentricity appears to be the force in CF as compared to FC.

In summing up, we may expect to find the authors

of our best sellers in the next generation to be more imaginative, more productive, more original than their fellows. They will tend to see things as wholes and will probably be extroverts, with strong fantasy leanings.

In the experiment undertaken to discover the creative personality among high school sophomores using the Rorschach, the conclusions reached by Pedigo agreed with those just listed in certain major points: human movement, originality, productivity, all greater in the creative group. The disagreement was on three determinants which were found to be numerically greater in the previous experimental group, and not repeated as a finding in this investigation. Pedigo's inventive group emphasized the use of shading, small details, and average time of response. The trend in this experiment, although not statistically conclusive, is toward W instead of Dd. That the emphasis was to detail in the high school group may be explained on the basis of less maturity, for research indicates adolescents tend to stress detail in Rorschach responses, and are less apt for abstraction and generalization.* However, the effect of maturing

Lucena, J. "The Rorschach Test in a group of Adolescents". Psychological Abstracts, 1952, No. 4691.

on Rorschach determinants awaits fuller research. A further point of agreement in these two very similar experiments was in adjustment rating. The tendency in both creative groups was to good adjustment. Both experiments indicate, moreover, that the creative thinker is able, judging from the number of populars he gives, to think in terms of normal, everyday experiences, though he may give many Originals.

This corroboration of earlier findings on the Rorschach as a diagnostic tool leads to the suggestion that, for more general use, a shortened form of this test be explored. Many of the Rorschach determinants represent affective qualities. While these are essential to fire creation, they vary from individual to individual, and in the same person, from occasion to occasion. Testing the limits for human movement and for combinative W (the readiest source of Z)might well form the basis of a shortened test. Symonds (34) and Harris (14) rate the unstructured test the best indicator of creativity, but to meet the needs of industry devised an ink-blot test with ten specific signs. These ten determinants isolated, in a very high percentage of cases and with economy of effort and time, those chemists who possessed creative ability. With-

out discarding the Rorschach, as did Harris in the interest of expediency, may not certain weighted categories M, Z, Originals, Productivity, and other discriminating signs as they appear in future investigations, become through further experimentation, and after objective validation, the "signs" of literary invention?

--O--

Chapter 5

SUMMARY AND CONCLUSIONS

The experiment reported in this paper was designed to investigate the variable: creative ability along literary lines. To study this variable two groups of college upper classmen, all English majors, were chosen, one group consisting of students whose writing was of the imaginative kind, the other made up of those who tended to write factually. These groups were matched in number, sex, advancement in number of terms completed, and in scholastic grades. The Rorschach test was administered and individual response records analyzed according to Beck's scoring categories. An adjustment rating was secured, based on test responses. The response totals in all the categories were obtained and the two groups compared with special attention to M and Z scores. The results of this study are summarized in the following statements:

(1) The Rorschach Test does discriminate through its determinants between creative and non-creative thinkers of college age, creativity being interpreted as literary inventiveness.

(2) Creative writers give more M responses, a determinant reflecting inner fantasy.

(3) They give more responses per record.

(4) Their Z score is higher, reflecting organizing power. That is, they synthesize details into larger units more often than their less creative fellows.

(5) They give more Originals: they think in more unusual images which they translate into uncommon verbal symbols.

(6) Adjustment, as revealed through Rorschach determinants, appears to have no bearing on creativity.

(7) There are no significant findings on the affective side of temperament as it pertains to literary inventiveness, and as it is revealed in the Rorschach scoring categories.

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--APPENDIX--

Table 1

SUMMARY OF RORSCHACH RECORDS
Experimental Group

Male

Subj.	R	Z	W	D	Dd	M	FC	CF	C
a	110	98.5	7	98	5	19	6	5	1
b	68	74	14	50	4	4	9	3	2
c	87	86	7	63	17	9	7	8	4
d	74	180.5	38	34	2	20	7	3	3
e	59	60.5	10	45	4	4	4	5	0
f	76	149.5	35	32	9	1	10	8	0
g	52	97.5	18	29	5	11	3	6	0
h	48	33.5	5	40	3	4	7	3	1

Female

Subj.	R	Z	W	D	Dd	M	FC	CF	C
a	41	99.5	25	16	0	9	3	7	3
b	60	58.5	11	38	11	7	3	6	1
c	68	59	10	47	11	10	5	9	2
d	132	85	9	88	35	23	9	3	0
e	112	188	34	77	1	14	14	12	2
f	67	59	5	39	23	24	2	2	2
g	47	96	22	25	0	6	7	8	1

Table 1

(Continued)

Male

FY	YF	Y	FV	VF	T	F+	F-	F	H	Hd
12	0	0	0	0	2	48	6	13	22	13
6	1	0	1	0	0	27	10	6	6	5
5	3	0	0	0	1	34	3	14	11	8
8	1	1	5	0	1	17	7	7	22	0
6	0	0	1	0	0	27	5	7	3	6
18	2	0	1	0	1	28	2	8	2	11
4	0	0	0	0	0	17	3	8	14	1
5	0	0	1	0	0	26	1	1	12	5

Female

FY	YF	Y	FV	VF	T	F+	F-	F	H	Hd
3	1	1	1	0	1	10	3	0	9	1
6	3	0	0	0	0	22	1	11	7	7
4	1	0	1	0	3	28	3	5	10	4
8	1	0	1	0	0	59	6	23	49	28
19	0	0	2	0	3	38	8	12	14	7
4	0	0	3	0	0	21	1	8	27	14
7	1	0	2	0	0	12	2	3	7	0

Table 1

(continued)

Male

A	Ad	F%	F+%	A%	P	S	O	T/R*	T/FR*
37	2	61	88	35	11	3	5	49	17
18	14	63	73	44	6	0	2	32	10
19	7	58	92	29	9	0	2	48	12
10	0	42	70	13	8	5	4	56	4
17	12	66	84	49	10	0	1	40	13
26	11	50	93	48	10	0	4	47	7
11	5	53	85	30	6	6	4	42	13
15	6	58	96	43	9	0	0	21	3

Female

A	Ad	F%	F+%	A%	P	S	O	T/R*	T/FR*
11	1	31	77	29	6	6	5	59	11
17	6	56	95	38	9	11	1	66	5
17	12	53	90	42	6	7	2	52	14
26	12	66	90	28	5	10	4	36	4
23	7	48	80	27	9	6	5	20	4
11	1	44	95	18	6	2	7	31	14
13	1	36	85	29	2	6	2	31	3

*Seconds

Table 2

SUMMARY OF RORSCHACH RECORDS
Control Group

Male

Subj.	R	Z	W	D	Dd	M	FC	CF	C
a	29	76	16	3	0	2	2	4	2
b	77	56	15	47	15	2	10	4	2
c	42	23.5	7	32	3	0	7	0	0
d	70	21.5	7	51	12	3	4	1	0
e	58	31	3	42	13	8	5	4	0
f	125	70	15	91	19	7	11	1	0
g	54	29.5	9	42	3	2	11	1	0
h	45	54.5	13	30	2	7	5	9	0

Female

Subj.	R	Z	W	D	Dd	M	FC	CF	C
a	73	64.5	16	49	8	4	6	8	2
b	41	36.5	6	35	0	1	6	3	1
c	63	15.5	5	45	13	1	6	1	0
d	29	32	13	16	0	7	1	2	3
e	38	29.5	11	25	2	2	1	4	3
f	33	28.5	3	26	4	4	3	1	0
g	23	31	5	18	0	4	1	1	0

Table 2
(continued)

Male

FY	YF	Y	FV	VF	T	F+	F-	F	H	Hd
5	0	0	5	0	0	8	1	2	4	3
8	2	0	2	1	2	28	9	5	2	4
8	0	1	0	0	1	19	4	3	0	0
10	0	0	0	0	0	30	8	14	6	5
5	0	0	0	0	0	23	4	9	7	9
4	0	0	0	0	1	55	18	28	12	12
3	0	0	0	0	0	21	6	9	4	2
6	0	0	0	0	0	13	2	3	6	1

Female

FY	YF	Y	FV	VF	T	F+	F-	F	H	Hd
5	4	3	1	0	0	27	5	9	12	1
5	2	1	1	0	1	15	2	4	1	1
6	3	0	0	0	0	27	7	12	2	7
3	0	0	0	0	0	10	1	2	9	0
2	0	2	1	0	0	17	1	5	2	3
6	0	0	3	0	0	14	0	2	4	1
1	0	0	0	0	0	13	1	2	3	2

Table 2*

(continued)

Male

A	Ad	F%	F+%	A%	P	S	O	T/R	T/FR
4	1	38	88	17	2	4	0	49	17
13	9	54	75	28	9	6	1	32	10
21	10	61	82	74	7	0	0	48	12
14	14	72	79	40	7	5	0	56	4
18	13	62	85	53	9	0	0	40	13
34	17	80	75	40	11	22	2	47	7
23	6	64	78	53	5	6	0	42	13
13	2	40	86	33	5	2	0	21	3

Female

A	Ad	F%	F+%	A%	P	S	O	T/R	T/FR
19	4	56	84	31	4	2	2	59	11
9	8	51	88	41	6	0	0	66	5
21	4	73	80	39	5	8	0	52	14
6	1	44	90	24	4	1	0	36	4
13	5	60	94	47	9	0	0	20	4
9	0	57	100	27	4	0	0	31	14
9	3	69	92	51	8	0	0	31	3

*Symbols presented in the order used by Beck.

Table 5

ADJUSTMENT RATINGS*

Experimental	Control
4	3
2	3
3+	3-
4	3
3	3
3	2
3	3
3	3
3+	3
3	3
3	3
3	3-
3	3-
4+	3-
3	4

*Ratings used:

5. Superior record.
4. Warm but controlled; mature; realistic; productive.
3. Adequate adjustment.
2. Obvious disturbance but not incapacitating.
1. Mentally ill.

Table 4

DETERMINANT TOTALS

	Experimental	Control
R*	1101	800
Z*	1415	600
W	250	144
D	721	552
Dd	130	94
M*	165	54
FC	93	79
Cf	88	44
C	22	13
FY	115	77
Yf	14	11
Y	2	7
FV	19	14
VF	0	1
T	12	5
F+	414	320
F-	81	69
F	126	109
H	215	74
Hd	110	51
A	271	226
Ad	97	97

*Determinant totals so marked prove statistically significant.

Table 4

DETERMINANT TOTALS
(continued)

	Experimental	Control
F%**	52.3	58.8
F+%**	86.2	85
A%**	33.5	39.8
P	112	95
s	62	56
O*	48	5
T/R**	8.9 Sec.	15.2 Sec.
T/FR	42 Sec.	41.5 Sec.

*Determinant totals so marked prove statistically significant.

**Given in Mean scores.

Table 5

STATISTICALLY SIGNIFICANT DETERMINANTS

M Human Movement

	Experimental	Control
Mean	11	3.6
Sigma	.71	2.47
Critical Ratio	2.87	

Z Organization

	Experimental	Control
Mean	94.3	40
Sigma	.26* Log.	.19* Log.
Critical Ratio	3.68* Log.	

*A logarithmic transformation of the scores was necessary because of the skewed distributions.

Table 5

(continued)

R Number

	Experimental	Control
Mean	73.4	46.6
Sigma	.116* Log.	.188* Log.
Critical Ratio ..... 7.27* Log.		

Q Originals

Mean	3.2	.33
Sigma	.542* Log.	.266* Log.
Critical Ratio ..... 6.47* Log.		

*A logarithmic transformation brought the skewed scores close to symmetry.

Table 6

DETERMINANTS SHOWING A TREND

H Human Responses

	Experimental	Control
Mean	21.6	8.3
Sigma	17	5

Critical Ratio 1.52

W Whole Responses

	Experimental	Control
Mean	16.6	9.6
Sigma	4.4	5

Critical Ratio 1.04

T/FR Time of First R

	Experimental	Control
Mean	8.9 sec.	15.6 sec.
Sigma	4.8	13.5

Critical Ratio ..... .95

VITA

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