ADAPTIVE REGRESSION, DOGMATISM, AND CREATIVITY

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ADAPTIVE REGRESSION, DOGMATISM, AND CREATIVITY

By

IRWIN H. COHEN

AN ABSTRACT

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ABSTRACT

The study was undertaken to provide an empirical test of the theory of adaptive regression as it functions in creative artists. An operational measure of adaptive regression suggested by Holt in relation to the Rorschach test was utilized as the measuring instrument and hypotheses were generated from the work of Rokeach regarding the relationship of dogmatic thinking to adaptive regression and from the work of Holt, Kris, Bellak and others regarding the relationship of adaptive regression to creativity.

Twenty advanced undergraduate art students judged as highly creative by their professors served as the "creative" group, and were compared with 20 randomly selected undergraduate art students with the same degree of art training.

The Rorschach and Dogmatism Scale were administered individually to all subjects. The Rorschach protocols were then scored according to a manual which contains specific directions and categories for evaluating the extent to which primary process is manifest and control features associated with primary process production. The inter-scorer reliability for the over-all score derived from this system was shown to be .945, significant beyond the .005 level. Intra-subject reliability of the same measure was .562, significant beyond

the .01 level, using the split-half method.

The operational measure of adaptive regression is given by the formula

$$ARS = (DD \times FL + DC_1 + DC_2 + DC_3 \ldots DC_n)$$

where the ARS is the Adaptive Regression Score, DD the rating assigned to each response indicating the amount of primary process material contained, FL the form-level of the response, and $DC_1 \ldots DC_n$ the control features of the response. The right hand portion is summed for all responses up to a maximum of six responses per card, this limit set arbitrarily by the experimenter prior to the experiment.

It was hypothesized that the two groups would not differ in the amount of primary process material produced. The creative group did produce more responses scorable for primary process, but this difference was not significant when the total number of responses was co-varied out. The hypothesis was therefore accepted. It was also hypothesized that the creative group would have a higher mean Adaptive Regression Score, as an indication that these subjects were better able to utilize the primary process material produced. This hypothesis was accepted, the mean difference being significant at beyond the .05 level, with number of responses and number of primary process responses co-varied out through the technique of multiple analysis of covariance.

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Further analysis of the ARS score reveals that the form-level score is the only factor which differentiates the two groups. The two groups do not differ significantly on the factors DD or DC. It was proposed that the FL score may be acceptable as an operational measure of adaptive regression in itself, since it reflects the degree to which perceptual accuracy is maintained during the production of primary process material. This proposal is substantiated by the finding that the form-level score of responses not scorable for primary process does not differentiate the two groups.

It was hypothesized that the creative group would have a significantly lower mean Dogmatism Scale score than the control group. This hypothesis was accepted. It was further hypothesized that, regardless of classification as creative or control, subjects scoring high and low on the D measure would not differ on amount of primary process material produced. This hypothesis was also accepted. Finally, it was hypothesized that, regardless of classification as creative or control, there would be a negative relationship between the measure of adaptive regression and dogmatism. Although the correlation between ARS-D is negative, it is not significantly different from zero. The same result is found for the relationship between FL-D. Further analysis of the relationship for the control and creative groups

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suggests that the Dogmatism measure is positively related to adaptive regression for the creative group, and negatively related for the control group. Possible explanations for such results are given, but further research is needed to provide more conclusive answers to the questions raised.

The major conclusion drawn from the study is that the form-level score (FL) is a useful diagnostic measure worthy of further investigation, both in the study of creativity with acknowledged artists, and as a diagnostic instrument in clinical research and practice. Some suggestions are given for possible research studies with the score.

Analysis of the results of scoring the Rorschach records by a traditional scoring method reveals no significant differences of any of 28 variables, although four variables are differentiating before equating the two groups for number of responses produced.

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CHAPTER I

INTRODUCTION

Creativity is a much discussed, much written about, but little understood phenomenon. To substantiate this statement, one need only draw attention to the multiplicity of approaches used by experimenters and theoreticians alike in their attempts to isolate, either empirically or speculatively, variables operating in the creative person.

As Stein and Heinze (1960) have pointed out in their recently completed summary of more than 300 articles and books dealing with creativity,

> The most striking features of the literature on creativity are the variety of approaches that investigators have followed, the variety of results that have been obtained, and the numerous factors about which suggestions and speculations have been made . . . . Creativity has been studied in the arts and in the sciences, and a variety of personality characteristics and factors motivating creative individuals in these fields have been pointed out. One person or another has argued for the importance of pregenital drives, defense mechanisms, defenses against defenses, insanity, sanity, the desire for immortality, the need for order, the significance of sublimation, and the importance of self-actualization . . . . Indeed the reader will find as many points of disagreement as of agreement among the authors covered here (pp. 1-2).

The study of the creative individual has drawn a great deal of attention in the second part of the twentieth century. Since 1955, when the first University of Utah Research Conference on the Identification of Creative Scientific Talent was held, six major conferences have been held in various parts of the country, producing 66 papers

addressed to various aspects of the problem (Gordon, 1956; Gordon and Bruner, 1957a; Gordon and Bruner, 1957b; Newell, Shaw, and Simon, 1958; Anderson, 1959; Smith, 1959).

However, it is not only of late that the area has drawn the attention of investigators, and the introspections of those involved in creative process itself. Ghiselin (1952) points to the fact that both Plato and Aristotle wrote on the creative process, and that early in the nineteenth century interest in it increased as evidenced by the works of Blake, Wordsworth, Coleridge, Shelley, and Keats (p. 11). Ghiselin's presentation of the introspective efforts of 38 painters, scientists, authors, composers, psychologists, and philosophers again bears testimony to the degree of interest in the topic.

However, despite the criticisms of Hutchinson (1931), Markey (1935), Guilford (1950), Burchard (1952), and others to the effect that very little in the way of experimental work has been done to systematically validate the numerous hypotheses proposed concerning the creative artists, very little work has appeared since their writings. Even less is available if one limits one's search to studies in which projective techniques are utilized. Burchard (1952), for example, reports in his presidential address to the Society for Projective Techniques that he was "unable to discover a single published research study in which any projective technique other than the Rorschach has been successfully used, and

the Rorschach, by the most generous count, has been used in only eight studies" (p. 421). He also deplores the fact that of these eight studies, only four dealt with persons whose creativity could be unequivocally demonstrated by an outside criterion. Since 1952, a search of the literature reveals only five works in which projective tests have been used to study the creative artist (Eiduson, 1958; Hersch, 1958; Pine, 1959; Pine and Holt, 1959; Myden, 1959). If one includes experimental studies utilizing other than projective techniques, the number rises to ten (Eindhoven and Vinackey, 1952; Munsterberg and Mussen, 1953; Drevdahl, 1954, 1956; Rosen, 1955; Berlin, et al., 1955).

While experimental studies have been relatively few, theoretical contributions abound. In the previously quoted review (Stein and Heinze, 1960) 84 per cent of the more than 300 works covered are concerned with one theory or another. What seems needed at the present time is empirical verification (or disproof) of the hypotheses generated from the vast amount of introspection and speculation invested in the basic question: What are the particular psychic constellations operating within creative artists which differentiate them from those artists with similar training who are not recognized as creative? It is this facet of creativity upon which the study seeks to throw light.

The present study is based in part on the psychoanalytic theoretical approach of Freud (1950a, 1950b, 1938), as later

expanded on by Hartmann (1951), Kris (1952), Bellak (1958) and operationalized by Holt (1954, 1956, 1959), and in part on the cognitive theory set forth by Rokeach (1960). I shall attempt here to determine whether it is possible to empirically differentiate a group of art students judged by their professors as highly creative from a group of randomly selected students upon whom no judgment has been made, and whether this differentiation can be made on the basis of the degree to which the artist is able to utilize "primary process" which, for the most part, is usually suppressed in our society; further, that the more creative artists are characterized by a degree of "open-mindedness" (Rokeach, 1960) which exceeds that of the randomly selected group.

Finally, I shall attempt to determine whether a relationship exists between the degree of "open-mindedness" and "primary process" utilization. In the course of describing the methods used in the study, both "primary process" and "open-mindedness" will be operationally defined.

CHAPTER II

THEORETICAL CONSIDERATIONS AND REVIEW OF LITERATURE

In this chapter I will review those theoretical works dealing with the concept of adaptive regression as it pertains to the creative process, theoretical and experimental works dealing with the psychology of artistic production, and present a formulation of the relationship between dogmatism, adaptive regression, and creativity.*

Theoretical Formulations: Regression and Creative Thought

In the seventh chapter of The Interpretation of Dreams, Freud (1938) distingushes three uses of the term "regression." These three uses follow from his discussion of his theory of dreams, and the model of a psychic apparatus which he utilizes to explain the coming to consciousness and eventual motor discharge of impulses originating on the unconscious level.

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*No attempt will be made here to comprehensively cover the literature in the field of creativity. The reader who is interested in a more complete review of creativity as it has been explored in music, literature, science, mathematics, and poetry is referred to Stein and Heinze (1960), who have annotated more than 300 works appearing since 1900, and to the following bibliographical coverages: Terman and Chase (1920), for a summary of works completed from 1914-1920; Cleeton (1926), Hutchinson (1931), Markey (1935), Venning and Polder (1954) who extend coverage through October, 1953. For a sampling of current theoretical viewpoints on the processes involved in creative thought and production, the reader is referred to the recently published works of Anderson (1959), and Smith (1959).

I will attempt here to briefly review Freud's theory as proposed in the chapter cited, and then describe the theories which have resulted from one of his uses of the term "regression."

The model upon which Freud bases his theory of psychic activity is taken from physiological theory, the core concept of which is the reflex act. Briefly, a motor response occurs as the last part of a chain reaction which starts with the stimulation of sensory receptors. Nerve impulses originating in the sensory receptors travel to the spinal cord where they make connection with nerve fibers leading to effector fibers, usually muscles. Freud believed that psychic activity too could be explained using this model, the important aspects being the "direction" which impulses followed in their course from perception to motility, and the notion of energy which moved along the prescribed pathways. He was quite explicit in his use of the physiological model. "The reflex act remains the type of every psychic activity" (Freud, 1938, p. 489).

Rather than attempt to localize the psychic process in the anatomy, Freud preferred to speak of his concepts in terms which in modern terminology would be called "intervening variables." "We shall wholly ignore the fact that the psychic apparatus concerned is known to us also as an anatomical preparation, (referring here to its localization in the brain) and we shall carefully avoid the temptation to determine the psychic locality in any anatomical sense" (Freud 1938, p. 488).

His intention was to establish a definite sequence of events through which psychic activity passed, and based on the physiological model, he proposed that "All our psychic activities proceed from (inner or outer) stimuli and terminate in innervations. We thus ascribe to the apparatus a sensory and a motor end; at the sensory end we find a system which receives the perceptions, and at the motor end another which opens the sluices of motility. The psychic process generally runs from the perceptive end to the motor end" (Freud 1938, p. 488). A number of modifications are then introduced into this simple framework of a sensory and a motor end of the psychic apparatus. At the sensory end he proposes that the first stage is a memory system which receives the stimuli of perception, but retains nothing of them. This leaves the first memory stage free to receive new perceptions. Following the first stage is a second system which "transforms the momentary excitation of the first into lasting traces" (Freud 1938, p. 489). These memories are unconscious, although they may be made conscious given certain conditions. The first stage perceptions, however, are not unconscious. What is retained in the first stage are the sensory qualities of the original perceptions. "The P-system, which possesses no capacity for preserving changes, and hence no memory, furnishes a consciousness the complexity and variety of the sensory qualities . . . when memories become conscious again they show no sensory quality, or a very negligible one in comparison with the perception"

(Freud 1938, p. 490). At the other end of the apparatus is postulated the "systems" of unconsciousness and preconsciousness. These refer to blocking or "criticizing" functions through which impulses must pass before attaining consciousness or motility.

This model is then used to explain the dream process, and in the course of this explanation, the nature of "regression," in the sense in which we shall be using it, becomes clear. Freud was troubled by the "hallucinatory" quality of certain dreams he had heard. By hallucinatory, he refers to the fact that these dreams were not experienced as dreams, but seemed to be reality itself to the dreamer. In this sense, the dream seemed to be a first stage perception rather than a memory which has achieved consciousness by passing through the preconscious. He says:

> Experience teaches us that the path leading through the preconscious to consciousness is closed to the dream-thoughts during the day by the resisting censorship. At night they gain admission to consciousness; the question arises, "In what way and because of what changes?" If this admission were rendered possible to the dream thoughts by the weakening, during the night, of the resistance watching on the boundary between the unconscious and the preconscious, we should then have dreams in the material of our ideas, which would not display the hallucinatory character that interests us at the present (Freud 1938, p. 492).

Thus, if the dream process were the usual, progressive one, the dream material would be subject to awareness as a dream. This follows from the positing of the function of consciousness that of making rational decisions and comparing ideation with reality factors ("secondary process thinking").

The fact that the dream has a hallucinatory character to it led Freud to posit the "regressive" nature of the dream process. However, this regression is of a different kind than a regression of behavior. The individual in no way behaves or feels as he did at an earlier stage of development. It is the thought process itself which is involved in this regression, and in this sense the energy flow is reversed from its usual course, i.e., from original perceptions through the memory stages, the unconscious, the preconscious, to the conscious or awareness state. Freud states it as follows:

> What takes place in the hallucinatory dream we can describe in no other way than by saying that the excitation follows a retrogressive course. It communicates itself not to the motor end of the apparatus, but to the sensory end, and finally reaches the system of perception. If we call the direction which the psychic process follows from the unconscious into the waking state progressive, we may then speak of the dream as having a regressive character (Freud 1938, p. 492).

Freud was aware that this "regressive" shift also occurred to a degree during waking states, and spoke of intentional recollection as involving such shifts. However, he felt that during the waking state, the regression was incomplete, involving a return to one of the memory-image stages only. Therefore, in waking states, the regression would be incapable of producing the hallucinatory revival of the perceptual images.

It does not seem important to become involved with Freud's concern with the extent of regression in our present discussion. The important facet of his proposal is the theory

that the direction of the psychic process may, under certain conditions, be reversed, and that more primitive processes of thought might be used in an attempt to return to previously recorded memory-images. That this form of regression would not of necessity also involve a total primitivization of functioning was also pointed out by Freud. "We may therefore distinguish a threefold species of regression: (a) a topical one, in the sense of the scheme of the (psychic)-systems here expounded; (b) a temporal one, in so far as it is a regression to older psychic formations; and (c) a formal one, when primitive modes of expression and representation take the place of the customary modes" (Freud 1938, pp. 496-7).

It is (a), the topical, later called topographical (Freud, 1950a, pp. 137-151) regression which is important for the present discussion. In later papers, Freud makes more explicit the essential differences between the topographical and temporal forms of regression. The temporal forms he viewed as characteristic of psychotic behavior, as in schizophrenia, whereas topographical regression seemed much more a part of normal behavior, and of dream formations. He states (in topographical regression) "there is free communication between (pcs) word-cathexes and (ucs) thing-cathexes, while it is characteristic of schizophrenia that this communication is cut off . . . . In (schizophrenia) the actual language in which the preconscious thought was expressed becomes the subject of elaboration by the primary process; in dreams, it

is not the words, but the concrete ideas into which the words have been resolved. A topographical regression takes place in dreams, but not in schizophrenia" (Freud 1950a, p. 144). I would interpret this to mean that in schizophrenia the conscious ego process loses its control over unconscious drives, whereas in topographical regression, contact is maintained between conscious ideas and the more irrational thought processes. Therefore, the regression takes place not because the impulses are so strong as to overcome realistic thinking (drive-dominated thought), but as a more voluntary process in which the ego can control the degree of regression through its undefended contact with the primary process. Another quote from Freud may make this somewhat clearer. In 1915, some 15 years following the original presentation of the formulation in The Interpretation of Dreams, Freud's paper on "The Unconscious" (Freud 1950b, pp. 98-136) contains a formulation which is later elaborated on by Kris in his paper "On Preconscious Mental Processes" (Kris 1952), in which the concept of creative "regression in the service of the ego" is presented. In discussing the relationship between conscious and unconscious impulses, Freud states that

> Co-operation between a preconscious and an unconscious impulse, even when the latter is subject to a very strong repression, may be established if the situation permits of the unconscious impulse operating in harmony with one of the controlling tendencies. The repression is removed for the occasion, the repressed activity being admitted as a reinforcement of the one intended by the ego. In respect of this single constellation the unconscious becomes ego-syntonic, falls into line with the ego,

> without any change taking place in the repression otherwise. The effect of the unconscious in this co-operation is unmistakable; the reinforced tendencies reveal themselves in spite of all--they make possible achievements of special perfection, and they manifest a resistance in the face of opposition similar to that of the obsessional symptoms (Freud 1950b, p. 127).

This is clearly not a return to previously satisfying modes of behavior due to external threat or an escape from the intensity of internal impulses. It is, rather, a syntonic process, in which impulses and the conscious reality testing process are blended. The phrase, "make possible achievements of special perfection" was extended by Kris;

> Topographically, ego regression (primitivization of ego functions) occurs not only when the ego is weak--in sleep, in falling asleep, in fantasy, in intoxication, and in the psychoses, but also during many types of creative processes. This suggested to me years ago that the ego may make use of the primary process and not only be overwhelmed by it . . . . However, the problem of ego regression during creative processes represents only a special problem in a more general area. The general assumption is that under certain conditions the ego regulates regression, and that the integrative functions of the ego include voluntary and temporary cathexes from one area or another to regain improved control . . . . The clinical observation of creators and the study of introspective reports of experiences during creative activity tend to show that we are faced with a shift in the cathexis of certain ego functions (Kris, 1952, pp. 312-313).

Kris posits that one of the functions of the ego is that of controlling the degree of regression. He states, "When the artist creates during inspiration, he is subject to an ego-regression, but it is a partial and temporary ego-regression, one controlled by the ego which retains the function of establishing contact with an audience." Kris feels that the creative artist produces his works of art in

an attempt to communicate his inner feelings to others, whereas psychotic productions have as their goal the transformation of the external world to conform to the needs of the creator.

Integrating Freud's formulations with those of Kris, then, one might formulate artistic creation as follows. In the creative, audience-communicating artist, raw memory stage material is utilized in the production of his art. He is able to gain access to this material by suspending his critical function temporarily (regressing), and then organizing the memory stage material by submitting it to the critical function as it takes shape on the canvas or on paper. He gains feedback from the production as it goes along, and is able to change it to conform to what he wishes to communicate. In the more pathological process, the regression does not have this oscillating character, and the regression follows more the model proposed by Freud for his explanation of the dream. The unconscious material is not transmitted to consciousness through the preconscious and motility, but follows a retrogressive course and becomes "real" to the individual as a hallucination, a new reality at the sensory or perception stage. It is not submitted to realistic evaluation, nor does any feedback occur. The perceptions themselves are acknowledged as reality without any elaboration on the secondary process level, and as such are subject to formal thought deviations such as dreams are, i.e., condensation, displacement, disregard for time and space, symbolization, etc.

Kris furthered Freud's suggestion of the tie-up between primary thought processes and secondary processes in the creative act by integrating Hartmann's (1951) conception of the "neutralization" of impulses. Neutralized energies would be those which manifest themselves as socially directed attempts at problem solving, i.e., rational thinking. Non-neutralized energies are impulses which have not been subjected to this focusing process. Kris states:

> The ego, we assume, has two kinds of bound energy at its disposal: neutralized energy, and libido and aggression in their non-neutralized form. Fantasic, freely wandering thought processes tend to discharge more libido and aggression and less neutralized energy; purposeful reflection and solving problems, more neutralized energy. In fantasy the processes of the ego are largely in the service of the id . . . . The content of freely wandering fantasies is extended over the pleasure-unpleasure continuum; hence the probability that in this kind of process, the discharge of nonneutralized libido and aggression will be maximized. In reflective thinking the contrary is likely. Reflective thinking, according to Freud (problem solving, we would prefer to say), serves to a higher degree the autonomous ego interests. Discharge of libido and aggression is therefore likely to be minimized, and that of neutralized ego energy to be of greater relevance (Kris 1952, 311-2).

This conception, described by Rapaport as "The single most important contribution to the understanding of the difference between the primary and the secondary process since Freud's statement of these concepts" (Rapaport 1951, p. 487), has been operationalized in a scoring manual for the Rorschach by Holt (1954, 1956, 1959) (also see Chapter III of this work). Such an operationalized procedure makes possible the testing of Kris' hypothesis that creative individuals tend

to be able to operate over a greater range of the primary-secondary process continuum, i.e., they are able to regress to a type of thought which utilizes libidinal and aggressive impulses in non-neutralized form, this being the phase of inspiration and phantasy, and also able to discharge the neutralized energy relating to purposeful reflection, integration and reality testing.

Schafer, working with the Rorschach, proposes that this projective technique holds promise for demonstrating what he terms "shifts in the level of psychic functioning" (Schafer, 1954). By "shifts," Schafer has reference to the primary-secondary process continuum, and location of thought manifestations along such a continuum. He points to four aspects of the Rorschach testing situation which, he feels, allow the subject to demonstrate the level at which he is operating. First, the instructions suggest to the subject that his responses should fit the configurations and properties of the blots. This is the secondary process or reality testing factor. Second, that only a resemblance or approximation is called for. This encourages relaxation of self-critical striving for objectivity. Third, since the blots are clearly not pictorial, the testing procedure asks the subject to "summon up consciously his images of things and to rely heavily in forming responses on his reorganizations of these images and of the stimulus field." The instructions therefore allow for an element of "subjectivity, imagination and fantasy."

Fourth, the instructions reinforce the "inward-turning, imaginative orientation stimulated by the non-pictorial stimuli and by the need to search for approximations and resemblances." Schafer summarizes his presentation by stating,

> By encouraging the intensive interplay and intermingling of imagination and perception, the instructions also tend to obscure somewhat the line between subject and object, self and not self, or image and percept. As a result, the instructions tend to evoke subtle, complex, transitory shifts in the patient's level of psychic functioning . . . the level of functioning may range from the developmentally advanced, realistic, differentiated and hierarchically organized to the developmentally primitive, physiognomic, autistic, diffuse and syncretic: or as Freud conceptualized the difference, from thinking characteristic of the "primary process" (Shafer 1954, p. 77).

In terms of the adaptive regression hypothesis, the creative process would then involve a temporary relinquishing of the defensive and adaptive ego functions in favor of discharge of instinctual impulses (a shift to primary levels), with a second phase following in which adaptation occurs (a return to secondary levels). Schafer, like Kris, makes a differentiation between this adaptive regression and psychotic functioning: "This creative regression, when it is truly creative and not predominantly a disguise for psychotic trends or for unsocialized daydreams, remains essentially under the control of the ego. It is primarily or largely an <u>active</u> process of taking imaginative liberties and not an altogether <u>passive</u> process of being overwhelmed by alien forces." The sequential aspect is also emphasized by Schafer: "Its active rather than passive nature is demonstrated by the fact that

the creative regression is always accompanied or succeeded by critical, reality oriented and communication-oriented evaluation and modification of the primary process material. The creative process thus involves a more or less oscillating and partial abandonment and re-instatement of higher level controls and critical attitudes" (Schafer 1954, p. 80).

This oscillating or sequential process is emphasized more recently in a paper by Bellak (1958) in which he states:

> It might be useful to reformulate "regression in the service of the ego" as "a brief, oscillating, relative reduction of certain adaptive functions of the ego in the service of (i.e., for the facilitation of) other, specifically, the "synthetic" ego functions." What happens is that the cognitive, selective adaptive functions are decreased; this weakens the sharply defined boundaries of figure and ground, of logical, temporal, spatial, and other relations, and permits them to reorder themselves into new configurations with new boundaries, under the scrutiny of the again sharply functioning adaptive forces . . . regression in the service of the ego will not be useful unless there is a frequent oscillation to increased acuity, reality testing, and a good measure of organizational capacity as well as frustration tolerance (Bellak 1958, p. 367-69).

Bellak places greater emphasis on this phase following regression, i.e., the adaptive phase. He talks of the "nine-tenths hard work" involved in achievement, and attempts a psychoanalytic interpretation of the inspirational phase of creative achievement vs. the sustained effort phase. He posits, like Kris, that the inspirational phase may be related to the oral phase of development (passive acceptance of impulses) and that the sustained effort phase may be related to anal traits; ("cleaning up, attention to small detail, high

frustration tolerance"). Bellak feels that in the second phase of oscillation (the integrative, adaptive phase) cognitive and synthetic functions may even be increased above the normal operating level of the individual (Bellak 1959). Addressing himself to the question of whether this form of regression involves solely a topological process (i.e., "a change from the conscious to the preconscious or unconscious) or a temporal regression (i.e., "regression to earlier, childhood legels of functioning"), Bellak concludes that, "The distinction cannot be made quite definite since, by definition, nonconscious thinking involves primary process thinking of infancy and childhood. It will be more precise to say that a topological regression of the adaptive, cognitive processes (as one ego function) takes place which involves simultaneously a temporal regression to primary process levels; the synthetic function does not regress at all but remains, or rises in fact, to optimal levels" (Bellak 1958, pp. 367-368).

Born (1945) also points to the role of unconscious processes in artistic production, and suggests that the unconscious provides the basic principles of design, while the consciousness provides the formative processes.

Bychowski (1951) formulates the process in essentially the same manner.

> The extent to which it (the artistic mind) draws on the primary processes and utilizes symbolism is a sufficient proof that it operates closer to the system of the unconscious. Moreover, like the dreaming ego, the creative ego operates through the medium of topical

> regression which also demonstrates a mobility of cathexis unparalleled by an "ordinary" mind . . . . Artistic creativity is therefore an expression of the power of the ego to bind energy released from the unconscious.

Bychowski also points to the fact that this formulation was expressed quite independently of psychoanalytic theory by Dewey (1934), who quoted Keats' description of the process of artistic creation as the ". . . innumerable compositions and decompositions which take place between the intellect and its thousand materials before it arrives at that trembling, delicate and snail-borne perception of beauty."

To summarize, then, the authors quoted are in basic agreement that creative thinking, i.e., thinking involved in the creation of original productions, involves a shift in the thought process from that of reality oriented, critical, evaluative thinking to that which Freud has described as thinking characteristic of the dream process, i.e., a return to the original memory images, a disregard of time and place, thinking which allows for fusion of images, discharging of unsocialized impulses of a libidinal or aggressive character and free interplay of associations. Kris has suggested, and Schafer and Bellak developed, the hypothesis that this "return" is but part of an oscillating process in which the primary process stage is followed by a critical, or super-critical phase in which the material "liberated" by the decrease in defensive operations is evaluated, integrated, and made communicable to others. Some question is raised as to whether

the regression described is similar to, either in quality or kind, the kind of regression involved in psychotic functioning. The key differentiation seems to be in the voluntary nature of creative regression, as contrasted with regression forced by the perception of internal or external threat. Creative regression seems to be a process which the ego utilizes for its own purposes, i.e., the production of something new, rather than one to which the ego involuntarily submits.

Finally, lest the impression be given that the theory of controlled, psychic regression is so well accepted that it has escaped criticism, two works bear mentioning.

Jung (1952), although agreeing that "the creative work arises from unconscious depth," feels that the conscious ego forces play a limited role in the regression which facilitates creative production.

> Whenever the creative force predominates, human life is ruled and molded by the unconscious as against the active will, and the conscious ego is swept along on a subterranean current, being nothing more than a helpless observer of events (Jung, 1952, p. 222).

Schactel (1959) criticizes Kris' notion that the genesis of the work of art is in a regression to primary process thought. Schactel feels that "the seeming similarity (between regression due to ego weakness and regression in creativity) emphasized by Kris is deceptive, and regression to primary-process thought is not typical of the creative process." His point is that the early stages of the creative process may resemble primary thought process in that both involve a freedom from

"the rules and properties of the accepted, conventional, familiar everyday world." The difference, he maintains, is that "primary-process thought uses freely displaceable cathexes in the unrestrained tendency toward full discharge of the tension of id drives by the path of (fantasied or hallucinated) wish fulfillment, that is, in the service of striving to return to a tensionless state," whereas creative process centers on the particular object, idea, or problem which is the focus of the creative endeavor. He concludes, "what distinguishes the creative process from regression to primary-process thought is that the freedom of the approach is due not to a drive discharge function but to openness in the encounter with the object of the creative labor."

To Jung's point there is little to be said. There seems to be sufficient evidence, both logical and empirical, to refute the possibility that the ego is overthrown during the creative process. Schactel's criticism seems more justified in response to Jung's theory than to Kris', for Kris, Bellak and others have repeatedly emphasized the "oscillating" nature of the process which does not strive towards discharge of id drives, but strives toward communication of the artist's formulation to others. This communication is certainly an ego function which could not be executed if the ego was overthrown, or if the goal was one of full discharge of instinctual tension. Freud himself makes this differentiation (see page 10 of the present review) which Schactel has apparently

overlooked.

The Artist and Creativity: Empirical Studies

The first empirical work to appear in the literature is that of Patrick (1937). She reports the results of an intensive study of 50 artists and 50 non-artists equated for sex, age, race and vocabulary level. The study is of particular interest because it is one of only two (see also Eindhoven and Vinacke (1952) discussed below) in which artists are studied in the process of producing the work of art. Each subject was observed while he painted a picture that was stimulated in him after reading Milton's L'Allegro. Records were kept of their introspections while working, and although the artists' productions were judged to be of a better quality than that of non-artists, both groups gave evidence that the creative process consisted of four stages. These stages were labelled preparation, incubation, illumination, and verification. It should be noted here that the conception of a series of stages through which the artist proceeds is a widely accepted one. Similar conceptions are found in the works of Hutchinson (1949) who talks of the stages of preparation or orientation, frustration, moment of insight and verification; Wallas (1926), from whom Patrick took her four stages, Vinacke (1952), and Gordon (1956), who theorizes that involvement-detachment, speculation, deferment, autonomy, purposiveness, and use of the commonplace are the stages through which both individuals

and groups proceed in the formulation of a creative product. Feibleman (1945), in addition to proposing that the motivation for artistic productivity is unconscious, divides the process into four stages also: that of gathering and selecting impressions, revision and reconstruction by the unconscious, flash of insight, and expression of result. Portnoy (1949) propounds the theory that "artistic creation begins in sensory perception: the impressions and memories received through the senses undergo a period of unconscious elaboration; after which the latent material rises to a conscious level in response to an external stimulus, or the artist may willfully indulge in reflection and introspection with the purpose of evoking an emotional mood conducive to artistic creation. The artist then symbolizes his feelings in a concrete art form" (p. 266).

Eindhoven and Vinacke (1952) invited 13 artists and 14 non-artists to produce a painting after listening to an excerpt from the poem Night by Charles Peguy. As in Patrick's study (see above), the subjects introspected while working, and the groups were compared with respect to time relationships, characteristics of the products, processes followed while painting, and individual patterns of creative thought. As opposed to all previous conceptions of a series of stages operating, the authors conclude that "an artificial and incomplete conception of creative activity results from the view that it is divisible into four successive stages. Rather,

creativity is a dynamic whole in which the processes which have been labelled "stages" are interwoven in a complex and continuous fashion."

A study by Prados (1944) represents the first appearance of an attempt to utilize projective techniques with artists. Prados administered the Rorschach to 15 men and 5 women, all of whom were professional painters. The findings are not subjected to statistical analysis, although tables are provided showing the frequency distributions of the Rorschach scores. The author evaluates his findings in a clinical fashion:

> There exists a mental approach characterized by an overemphasis in W and an underproduction of V with an average use of other locations. The F% is high but entirely normal, with signs of good refined control. There is a high number of M which outnumbers FM. The ratio FC:CF is decidedly in favor of the color-form type with an almost complete disregard for the form-color response. The relationship of W and M shows a tendency to W over production but within limits of optimum efficiency (p. 182).

Two years later, Roe (1946) published a study which also utilized the Rorschach. As a part of her study of creative artists and alcohol for the Section of Alcohol Studies at Yale, she obtained Rorschach protocols from 20 successful painters, all acknowledged as creative by virtue of their accomplishments in the field of art, i.e., membership in the National Academy of Design, paintings in permanent collection of Metropolitan Museum of Art, etc. The Rorschach and TAT were administered to each painter, and the Rorschach

was then scored using the Inspection Technique Score developed by Monroe. Roe concluded, on the basis of the "marked prevalence of color shock and shading shock, and over production of responses with sexual content . . . frequent use of vague or poor forms . . . tendency toward excessive movement in general," and other characteristics which we would now call intrusion of primary process into the thought process, that "few of them (the painters) could, by any criteria commonly used, be called the records of 'creative' personalities." To check on her impression, Roe had Klopfer, a recognized Rorschach expert, analyze the protocols "blind," and he too evaluated them as lacking in evidence for conclusion of creative productivity. Roe concluded, "Certainly, however, in the light of these results, no one is justified in counseling any subject against pursuit of a creative profession on the grounds that his Rorschach does not show creative ability. Few men have attained as much success as painters as these, yet for a number of them no Rorschacher would have predicted any creative ability at all. Study of the lives of these men brings me to the conclusion that 'creativeness' is based in much deeper levels of the personality than we have yet been able to approach by anything but deep analysis and not always then."

Roe's study is of particular importance here since it appears that the very material which so disturbed her (presence of primary process, "overproduction of responses with

sexual content," etc.) combined with the adequacy of popular responses and "unusually great W" are some of the same variables which present theory holds are determining factors for creative productivity.

Steiner (1947) studied the Rorschach responses of commercial artists in a large industrial organization and found that these subjects were characterized by the large number of original responses given. These results differed from those of Prados (1944) who found no marked tendency to original responses among successful non-commercial artists. This discrepancy is noted as a paradox by Burchard (1952), "Since serious creative artists, according to Rorschach, should greatly exceed in originality the primarily commercial artists." Harrower and Cox (1947), also studying commercial artists via the Rorschach, report that they tend to seek whole effects and regard details as quite incidental. The authors also note that the artists' mental approach is undisciplined.

Drevdahl (1956), using Cattell's Sixteen Personality Factor Questionnaire, Thurstone's Primary Mental Abilities Test, and Guilford's tests taken from his Factor Analytic Study of Creative Thinking, studied a group of 64 graduate and undergraduate art and science students who were rated on a 7-point scale of creativity by their professors. Results suggested that the more creative students are superior to the less creative in their verbal facility, fluency, flexibility, and originality. They are also more withdrawn and quiescent.

The creative artists, however, are more radical and self-sufficient than either the creative scientists or the less creative in both the science or arts groups. The author concludes that the art group is more sensitive emotionally, and more "bohemian" than any of the other groups studied, regardless of classification as more or less creative.

Eideson (1958) also reports the results of a comparative study of artists and non-artists. Using a 50-item rating scale by which three expert judges globally rated the Rorschach and TAT, Eideson compares 65 subjects divided into three groups. Fifty of the subjects were tested in an out-patient psychiatric clinic to which they had been referred for psychiatric treatment. Twenty-five of these were successfully employed in the arts, and twenty-five in various business fields. The remaining 15 subjects were successful artists who had never been in the clinic. The author concludes that "it is primarily in their ways of thinking and perceiving that artists show the most marked differences from non-artists." The results also suggest that artists search for ways of thinking which are unusual, their interests are wider, and they "accept reality but perceive it in a way which is different from the non-artists." The conclusion which seems most germane to the persent study is that the artists were "able to tolerate ambiguity in perception and have the ability to loosen or relax their thinking without accompanying personality disorganization." Hersch (1958) reaches similar conclusions on the basis

of Rorschachs administered to 20 eminent artists, 20 non-artists and 20 schizophrenics. Hersch divided the Rorschach scoring categories into Mature indications (M, integrations and Form Dominant Responses) and primitive indications (Form subordinate responses, physiognomic and primitive thought processes). The artists as compared to normals are reported to have greater M, greater form dominant responses, primitive thought responses and physiognomic responses. On the basis of the results the author concludes that the primitive functioning of the creator is manifested differently than that of the normals or schizophrenics. "Creators have control functions more readily available than either non-creative normals or schizophrenics."

A study which sheds additional light on the control factor mentioned by Hersch is that of Berlin, et al. (1955). These authors studied four artists of national prominence in an experiment "designed to ascertain whether the action of Mescaline and Lysergic acid would manifest itself in a unique manner in persons with their specially cultivated visual perceptions and skills, and to assess the effect of the agents upon their creativity." The results of this introsepctive report are most interesting for our purposes here, for the artists report that "short of their infrequent visual hallucinations of sparkling colored lights, they had on previous occasions without the drug periods of heightened visual awareness while engaged in their work which approached

those experienced during the action of the agent." The authors report that although the subjects reacted by an inhibition or depression of their usual regulated activities, their creations while under the drugs were of a greater aesthetic value according to a panel of fellow artists. This was associated with the relaxation of control in the execution of lines and employment of color, so that both colors and line were freer and bolder. However, "the benefits derived from these agents were offset by the difficulty these subjects had in mobilizing their perceptions and energies in the pursuit of creative art."

Finally, two studies are of relevance to the report to follow. Pine and Holt (1959) investigated a number of hypotheses relative to the relationship between creative productivity and the use of primary process material. They administered a number of different tests to 13 male and 14 female undergraduate students who had been selected to participate in an on-going research project. The subjects were selected on the basis of approximate indications on the MMPI of emotional stability and for intelligence (upper 60% of entering college freshmen) on the Ohio State Psychological Examination. The subjects were not selected for any particular excellence in creative arts or science. All subjects were given the TAT, which was rated on a number of attributes for literary quality; a science test in which they were asked to resolve scientific dilemmas, the quality of the theory being rated;

a humor test in which captions for cartoons were to be devised, the quality of the captions then rated; an animal drawing test, in which a "fantastic" animal was to be drawn, and then rated for drawing ability and originality; Guilford's brick uses test, Guilford's Consequences test, and the Rorschach, which was scored using a system devised by Holt. (See Chapter III of this paper.) Both individual ratings and an over-all creativity rating was then correlated with the amount of primary process material, the effectiveness of control, and a score for adaptive versus maladaptive regression, all derived from the Rorschach scoring. The results confirmed the hypothesis that the amount of primary process expression is statistically independent of the effectiveness of control exerted over such expression. Also, the hypothesis was confirmed that the degree of expression <u>per se</u> is independent of the quality of the individual's created productions, i.e., amount of primary process available to the individual does not in itself constitute creativity. The major hypothesis, that quality of creative productions is related to both the effectiveness of control over primary process material and to a combined indicator of expression and effectiveness of control, was confirmed in both cases for the male sample and for control only in the female ($r = .80$ and $.90$ for males; $.52$ for females). The authors conclude, "these results give general support to the hypotheses of the study, and they indicate further that Kris' concept of regression in the service of

the ego can be subjected to empirical study--that predictions generated by this psychoanalytic concept can be studied with operationally defined scores and quantitative techniques."

Goldberger and Holt (1958) attempted to experimentally investigate the relationship between ability to creatively regress and behavior in a perceptual isolation setting. They administered the Rorschach and other tests to a group of 14 male college students several weeks prior to their participation in the isolation experiment. Observational ratings were then made on each subject according to a predetermined set of variables. The variables included degree of unpleasant affect shown, pleasant affect, stimulus bound thought, free secondary process ("the amount of thinking devoted to logical, relatively sustained and directed reflection on topics other than the immediate situation"), impaired secondary process thought, controlled primary process thought, poorly controlled primary process thought and other behavior ratings, e.g., restlessness, etc. Goldberger and Holt predicted that those subjects who rated as high on mature handling of the primary process on the Rorschach (adaptive regression) would also be rated highly on the variables of controlled, anxiety free manifestation of primary process during isolation; also would be rated highly on amount of pleasant affect shown in isolation, and would not be the subjects who prematurely quit during the experiment (i.e., be unable to handle the primary process material which invariably becomes manifest during such

experiments). The results were all consistent with the hypotheses; adaptive regression scores correlated .47 with pleasant affect, .54 with controlled primary process thought, -.38 with quitting, .45 with free secondary process thought, -.36 with impaired secondary process thought. The authors conclude, "Finally, this predictive success contributes to the construct validation of our method for measuring the amount of primary process manifestations in the Rorschach test and the effectiveness with which it is controlled. The way has been opened up to the predictable laboratory production and systematic study of the primary process, a concept and phenomenon hitherto approachable only in the clinical psychoanalytic situation" (Goldberger and Holt, 1958, p. 8).

The Relationship between Dogmatism, Adaptive Regression, and Creativity

There are many dimensions along which personality structure can be described. Hall and Lindzey (1957) list 18 dimensions along which current personality theory may be evaluated. Crucial to most of the current theories is the concept of the differentiation of the total personality into structural parts. Freud emphasized the structural inter-relationship of the conscious and unconscious structures, disregarding for the most part the specific "content" of the structure except as it was necessary for operationalizing the concepts. Lewin was perhaps the most emphatic among current

personality theorists who developed the idea of a structural approach to conceptualizing personality, and his "topological" representations of the differentiated and relatively non-differentiated personality have been the basis for a number of experimental investigations. Lewin conceptualized the personality as being made up of a number of "regions" or tension systems which could communicate with one another if the barriers between them were fairly flexible, or were kept from communication if the barriers were rigid and unyielding. More recently, Rokeach (1955, 1956, 1960) has developed the theory of communication between regions of the personality, making more explicit, for operational purposes, the nature of the content of the regions. Rokeach believes that the personality structure can be conceptualized in terms of that which the individual accepts as true in his world (beliefs), and that which the individual accepts as false (disbeliefs). Like Freud and Lewin, Rokeach does not emphasize the importance of the specific <u>content</u> of the beliefs or disbeliefs, but is more interested in the <u>structure</u> of the systems which contain the beliefs and disbeliefs. He posits a distinction between a personality structure which allows for free communication between beliefs and disbeliefs and one in which there are barriers between beliefs or disbeliefs held. The former he calls "open," to differentiate it from a relatively "closed" structure. From this basic differentiation, Rokeach goes on to develop the correlates

of closed and open systems, and makes a specific distinction between persons called "rigid" and those called "dogmatic." Briefly, rigid people are those who maintain strong boundaries between specific beliefs, or who approach specific tasks in a preconceived or set way. Dogmatic individuals, on the other hand, are in part characterized by having a structure which is marked by a lack of communication between whole systems of beliefs and disbeliefs: "Thus, dogmatism is seen as a higher-order and more complexly organized form of resistance to change" (Rokeach, 1955). Dogmatic individuals, therefore, possess a structure which prohibits the evaluation and comparison of inconsistent beliefs, and therefore are posited as unable to synthesize such beliefs into a more realistic whole.

Rokeach has demonstrated that relatively low dogmatic individuals as measured by the Dogmatism Scale have been shown to more easily remember facets of problems they are attempting to solve, able to transfer solutions from one task to another more easily than high dogmatic individuals, more frequently find ingenious, creative solutions to problems, have greater speed of perceptual synthesis on a cognitive task, have greater tolerance for new musical systems, and show fewer anxiety themes in their TAT stories. Placement on the scale seems to be unrelated to intelligence measures (Rokeach 1960).

The over-all impression one gains from the research

completed to date is that the Dogmatism Scale is a reliable, sensitive instrument which has shown a great deal of construct validity relative to the theory put forth. Much of the research has been concerned with the performance of subjects on what may be termed "cognitive" tasks, i.e., tasks involving the use of powers of reasoning, judging, and learning ability rather than in areas traditionally called "emotional" or affective. Rokeach is not unaware of this, however, for he

> regards the distinction between what is cognitive and what is emotional as a convenient one but by no means a necessary one. It is possible to conceive of all emotional states as having their representation in the cognitive belief-disbelief system (and vice versa) . . . in closing the gap between what is emotional and what is cognitive a way is paved for the more objective study of complex, value-laden social phenomena which can be more easily attacked by examining a person's cognitions than his emotions. For all things a person <u>feels</u> (and <u>wants</u>) must surely be represented by what he believes and knows about the world he lives in. In line with these ideas, we are presently entertaining the notion that a full description of a person's belief-disbelief system is also a full description of his personality (Rokeach, 1956).

The Dogmatism Scale, then, is presented as an instrument capable of measuring not only the cognitive aspects of the personality structure, but the personality structure <u>per se</u>. Even if one does not grant Rokeach's lack of differentiation between the cognitive and the affective, research with the scale suggests that it is sensitive to picking up not only differences in cognitive performance, but to affective components also. Although Rokeach feels that the affective and cognitive can be operationalized as one and the same thing, he does

discuss the effects of an "open," i.e., non-dogmatic, structure in fairly affective terms. He states that one of the characteristics of an open system is that it allows the individual to evaluate information received from the external world on "its own intrinsic merits, unencumbered by irrelevant pressures arising from within and from without." By irrelevant pressures we may assume that he means "impulses," or affective intrusions into the cognitive processes. Granting this assumption, we may posit that if structural openness and closedness of the personality system is related to the degree to which drive intrusion dictates testing of reality factors, then it should follow that persons scoring high on the Dogmatism Scale ("closed" persons) will also show more drive intrusion in their thought processes relative to performance on the Rorschach measure. However, it is possible to make a further differentiation among those people who show a high degree of drive intrusion, i.e., those who utilize it effectively (adaptively regress) and those who do not (non-adaptive regression). Therefore, it would appear logical that individuals who are characterized as being able to "adaptively regress" should score lower on the Dogmatism Scale than those who are characterized as being unable to "adaptively regress." Such a hypothesis takes into account Rokeach's assertion that it is the inability to synthesize which characterizes the highly dogmatic person, for it is the secondary process (effectiveness of ulitization) which is

involved in the synthetic function, and consequently it is on the secondary process level that the high and low dogmatic should be differentiated even though both may have primary process material intrude into their productions. In the less dogmatic, this material is utilized for creative tasks; in the more highly dogmatic, it is not utilized for this purpose but intrudes despite attempts to defend against it. The hypothesis also extends Rokeach's theory from what I choose to call the horizontal dimension, i.e., the degree to which communication exists between existing beliefs at the same level of consciousness. However, the results of a study reported by Rokeach (1960) suggest that more highly dogmatic subjects manifest greater anxiety and produce a "greater existence of threat themes" in their TAT stories. Such results lead to the suggestion that the Dogmatism Scale also measures a vertical dimension in the thought process, i.e., that the communication barriers between unconscious, primary process expression, and conscious, rational secondary process integration functions may also be measured using the scale.

CHAPTER III

METHODOLOGY AND PROCEDURE

The basic design of this study involves the comparison of a group of 20 art students judged by their professors as highly creative with a group of randomly selected students. The comparisons are made on a number of variables delineated from the Rorschach and Dogmatism Scale administered individually to each subject.

Subjects

Forty subjects were selected as follows: three professors in the Department of Art at Michigan State University were each asked to independently submit the names of 15 students who most met and 15 students who least met the following criteria:

> The student is a creative person, i.e., is able to reorganize existing facts and his perceptions into new and meaningful arrangements, and is able to communicate these arrangements to others; is able to perceive new solutions to problems; is not bound by previous judgments to the extent that known solutions hamper his desire to find better solutions; is able to interpret his perception of reality to others through a medium, e.g., painting, ceramics, design, sculpture, etc.

(See Appendix A, for a sample of the rating sheet used.)

Each professor was requested to choose from those advanced students, i.e., juniors and seniors, known to him personally. The criterion of advanced students was decided upon for two reasons. First, to increase the possibility

that a given student would be known by judges other than one submitting his name, and secondly, to decrease the heterogeneity of the sample in terms of art experience. What was needed was a sample of students differing on judged creativity, with little or no difference in training or experience. Analysis of the 27 names appearing on the "most meeting the criterion" lists submitted revealed that ten of the 27 names appeared on two professors' lists, but that no name appeared on all three professors' lists. Only two names appeared on more than one list of those least meeting the criteria.

Since the three judges were in only partial agreement on those who most met the creativity criteria, and in very little agreement as to those students least meeting the criteria, it was decided to submit the names of the 27 students appearing on the three "most meeting the criteria" lists to a larger group of judges for a rating, using the same criteria. Accordingly, these 27 names were given to each member of the Art faculty, and each was asked to rate the name appearing along a five point scale if they were acquainted with the student, and to indicate "no information," if they were unacquainted with the student. The instructions given asked that a student be rated "five" if he, in the judgment of the rater, met the requirements of the criterion to a greater extent than the average student with whom the rater had contact. Similarly, to rate "one" if the student met the requirement to a lesser degree than the average student,

and to rate "three" if the student met the requirement no more and no less than the average student. In this way 11 additional judges submitted ratings, and 23 students were selected from the 27 names originally submitted. Inclusion in the final selection was determined as follows:

1. Rating by at least three raters other than the three originally submitting names.
2. An average rating of higher than "three."
3. No rating below three by any rater.

The 23 students finally selected were all juniors or seniors, and all had been accepted into the advanced Art program.

The Control Group

A conference with the three original judges revealed that they all had found it difficult to select students least meeting the criterion. Such students usually were not remembered as were the more talented ones. For the most part, the judges tended to dichotomize their students into two groups: outstanding ones who might someday achieve eminence, and the average students. Since it appeared unlikely that agreements could be reached on a group of students least meeting the criterion, it was decided to make a more stringent test of the hypotheses by comparing the experimental group with a random selection of all other non-mentioned advanced Art students. Lists were obtained from the Art Department of

such students, and names drawn randomly from cards prepared from the lists. Since the experimental group as finally constituted consisted of 20 students equally divided among males and females, it was decided to similarly constitute the control group. Therefore, ten males and ten females were drawn. No other criterion was utilized in selecting this group other than admission into the advanced Art program of the University.

After selection of the samples, each student was contacted individually and asked to participate in a "general study of creativity in the fine arts." Twenty of the 23 experimental subjects were located and agreed to participate, and 41 names were eventually drawn from the control pool before the 20 students needed for the control group agreed to participate. There were many reasons for the difficulty in final selection of the control group. Of those originally selected and thereafter, 14 could not be located or contacted, one had changed her major from Art to Sociology, and three agreed to participate but later declined. Of the 23 experimental subjects, two were student teaching and no longer in the vicinity of the University, and one could not be located. All of the others agreed to participate. The final 20 control subjects were selected from a pool of 127 students.

Testing

Each student was seen individually for a period ranging from two to three hours, this depending mostly on the time required for administration of the Rorschach. In each case, the first ten to 20 minutes was spent in establishing rapport by discussing the general concept of creativity and eliciting any ideas or theories the subject had about the concept. None of this information was recorded, and none used in the study. The discussion time was solely a means of establishing contact with the subject and eliciting his or her cooperation. Following the brief discussion, the student was asked to fill out an information sheet consisting of identifying data and art background. (See Appendix B.) This sheet was then coded according to a prearranged random assignment of numbers from one to 40 for all subjects which served to mask whether the protocol was produced by a creative or a control subject. All of the test data utilized this code number. After the subject filled out the information sheet, the Rorschach was administered following Klopfer's (1954) system of obtaining free associations to all ten cards, and then obtaining an inquiry of the associations produced. One major change in Rorschach administration was made. All subjects were limited to producing a maximum of six responses per card. This limitation was imposed following a trial period in which the first ten subjects were allowed to produce an unlimited number of responses. A count of responses produced

by these ten subjects revealed that the average number of responses per record was 56.9, with a range from 33 to 154. The time of administration for some of these longer records approached three hours for the Rorschach alone. Since the subjects had been assured at the time of contacting them that they would only be required to contribute two to two and one-half hours for the entire testing, it was necessary to cut down the time of administration. This was done by adopting as a limit the average number of responses produced by the first ten subjects. Succeeding subjects were then asked to return each card after they had produced six responses, and only the first six responses to each card were scored for all subjects. It was not always necessary to do so, however, as indicated by the average number of responses produced by all subjects in the experiment (mean = 39.1).

Limiting the number of responses is a fairly standard technique in clinical practice. Schafer (1954) provides the rationale for doing so.

> Much of the difficulty . . . begins with the tester's assumption that every response is to be valued, and that a patient should never be stopped in the midst of a stream of responses. "Who knows," he may wonder and hope, "the twenty-third response to the Rorschach may express something of basic significance that was avoided in the 22 that came before?" This is, of course, a vain hope. An average of 10 responses per card provides more than enough material for description of the major personality characteristics and problems of the patients. Of fine trends there is no end anyway, whether they are seen in the test results or not (Schafer, 1954, p. 15).

Klopfer also notes,

> For the busy clinician, the Rorschach test reaches a point of diminishing returns after so many responses. It may be necessary, under these circumstances, to point out to the subjects that we are not particularly interested in seeing how many responses he can give, but more in the first few impressions that he gets. In extreme cases, it may be even necessary to limit the subject to a certain number of responses per card (Klopfer, 1954, p. 8).

After the Rorschach was obtained, the 40 item Dogmatism Scale was administered (see Appendix C for a copy of the Dogmatism Scale used).

Reliability of the Dogmatism Scale

As reported by Rokeach (1960, pp. 87-88) the Dogmatism Scale had always been administered with "filler" items from other scales interspersed. Since the scale utilized in this study was administered without such items, it seemed desirable to test the reliability of the "unfilled" scale with a "filled" scale. A new scale was constructed using the original Dogmatism Scale interspresed with 22 items of the Gough-Sanford Rigidity Scale (Rokeach, 1960, pp. 418-419) and 14 items taken from the "L" scale of the MMPI (Hathaway and McKinley, 1951) interspersed. This was then mailed to all subjects approximately one month after each had participated in the study. (See Appendix D for a copy of the revised Dogmatism Scale and instructions.)

Scoring of the Rorschach: Reliability

Since the author had had no prior experience with the system of scoring developed by Holt (1956, 1959) and Mayman (1959) which contains some 113 categories dealing with various aspects of primary process manifestations, controls, defenses, and form level designations, it seems necessary to establish the fact that the manuals provided could be used with a degree of reliability which would insure that the scores attained were consistent with the manual specifications. To establish this, the efforts of a second scorer, also unfamiliar with the manuals, were obtained. Both scorers read the manuals, and, through discussion, and scoring of a number of non-experimental protocols, became familiar with the scoring procedure. Communication with Holt resolved a number of points not immediately clear and, at one point, a Rorschach record was scored jointly and forwarded to Holt, who rescored it with comments about the scorer's errors. Up to this point none of the experimental protocols were utilized.

To determine the reliability of scoring, 14 experimental protocols were scored independently by each scorer, noting the scores given by each and resolving differences by discussion. For the first seven protocols an "agreed on scoring" was determined and this scoring utilized in the study. For the remaining seven protocols, as well as the other 26 scored solely by the author, the author's scoring was used for the study. The reliability coefficient, based on

the total adaptive regression score (ARS) assigned independently by each scorer, was .945 for 14 protocols, suggesting that both scorers were scoring the protocols in essentially the same manner. This result led the author to assume that he was justified in scoring the remaining protocols himself.

Holt Versus Klopfer Scoring

A scoring procedure such as that proposed by Holt and utilized in this study requires much more time than the usual procedure followed by Klopfer (1954), Beck (1950) and others. That the author found this so is probably in part due to his unfamiliarity with the system, but it is also due to the nature of the scores themselves. Whereas the traditional procedures call for determining the locations, determinants, and content of a response, the Holt procedure requires a more extensive evaulation of the process by which the response was produced. This is more true of the Formal Thought Property Scores and the Control and Defense scores than of the content scores. (See below.) For the purposes of a study such as this, we may ask the question as to whether such extensive procedures are necessary, i.e., is it necessary to increase the time of administration and scoring for a record which could be administered and scored more quickly by a simpler method? Would the simpler method also differentiate the two groups under consideration and provide much the same information? To answer such questions all records were scored

using the Holt procedure and also scored using Klopfer's system of scoring with form level determined from Hertz's frequency tables (Hertz, 1951). The Klopfer scoring was done following completion of scoring all records for the Holt procedure, and with all protocols still coded to mask their identity.

Instrumentation and Scoring

It is assumed that the reader is familiar with basic practices of Rorschach administration and traditional scoring. For a description of the historical background of the Rorschach test, the reader is referred to Ellenberger (1954), and for a detailed description of administration and scoring procedures, to Beck (1950), Klopfer et al. (1954), or Piotrowski (1957), each of whom elaborates on his own differences in scoring from that proposed originally by Rorschach.

Description of the scoring procedure used in the present study.

The following is adapted from Holt (1956, 1959).

Form-level.

Every response is scored for form quality. The scoring follows the system of form-level scores described in a manual provided by Mayman (1959). The manual contains examples of the form-level score for every location on each

card. The Defensive contribution (see below) of each form-level has been added by Holt (1959, p. 58), and is referred to in the present study as the Form Level score (FL) (see Appendix H for a descriptive statement of each form level designation).

Primary process.

Each response is examined for indications of primary process manifestation. Such manifestation may be in the content of the response, in its formal qualities, or in both. If a response contains neither content nor formal indications, it is assumed that it is mainly determined by secondary process thinking, and is not scored for other than form quality. (See examples below under Content and Formal categories.

Content.

Twenty-five different categories are used in the scoring of content. These are divided into ideational and affective drive derivatives. The latter consist of instances where a display of affect occurs instead of a response. Thus, the following is a scoreable example: "All I can say is it looks like a horrible mess to me." Ideational drive representations are divided into libidinal (anal, oral, sexual, exhibitionistic-voyeuristic, homosexual), aggressive, and a residual group, anxiety, "which is presumed to be a reaction to instinctual threat even when its libidinal or

aggressive nature cannot be discerned" (Holt, 1959, p. 2). Each of these is further subdivided into two levels, and the libidinal and aggressive categories are further differentiated qualitatively. The two levels (Level 1, Level 2) refer to points on the primary to secondary process functioning continuum and are based on two criteria.

> First, there is involved a primitive versus civilized dimension: the more that the type of drive-expression described or implied is socialized and discussion of it is appropriate to social communication between strangers in a professional situation, the more the thinking concerned is secondary and we score Level 2. Conversely, the more direct, intense, raw or blatant the drive-expression, the closer to the primary process, and we score Level 1. The second criterion has to do with the degree to which the response focuses on the drive-relevant aspect of a larger percept, such as a particular organ (Holt, 1956, p. 19).

Thus, an example of Oral, Level 1 is "an open mouth," whereas "two people kissing" is Oral, Level 2. Similarly, "intercourse" is sexual Level 1, whereas "a bride and groom standing, holding hands" is sexual Level 2 (Holt, 1956, p. 19). (A list of the content categories is given in Appendix E).

Formal.

Thirty-four categories are provided for scoring the formal thought indications of primary process. Holt reports that, "they attempt to measure deviations from the logical, orderly thinking grounded in experience with the real world that characterizes the secondary process" (Holt, 1956, p. 21).

No attempt will be made here to describe further the rather complicated categories for formal thought deviations. A list of the categories used is given in Appendix E and for further description the reader is referred to Holt (1956).

Controls and defenses.

Each response scoreable for primary process manifestation is also considered with respect to the kind of control or its absence that goes along with it. There are 40 such categories, many of which are subdivided into positive and negative categories, depending upon whether their use indicates an effective or ineffective use of the instinctual derivative contained in the response. Contained in these scores are a series of categories dealing with the sequential aspects of scoring given to a particular card. For example, scores are given to indicate a response scoreable for primary process representation which is followed by, or follows, a non-scoreable response. Again no attempt will be made to further describe these categories. The reader is referred to the Appendix F for a complete list of the control and defense categories used, and to Holt (1956).

Over-all scores derived from the system for each response.

1. Defense Demand. (DD) Each response is rated on a scale which reflects "the degree to which the very nature of the underlying idea or (in the case of the formal variables),

the way it emerges, demands that some defensive and controlling measures be undertaken in order to make it a sociably acceptable communication" (Holt, 1959, p. 47). The scale runs from one to six, with ratings at the upper end usually given to blatant sexual or aggressive content, extreme formal aspects, or a massing of content and formal aspects in one response. The manual sets the demand for each category scored, developed ad hoc on the basis of the "primitive-versus-civilized dimension" described in connection with the Level 1-Level 2 delineation of content categories (see page 49).

Examples of typical defense demands from 1 - 6:

DD : 1 : Mud or dirt as an indication of anal libidinal drive representation. (Level 2 Anal)

DD : 2 : Blood, or persons or animals with parts missing as an indication of aggressive drive representation. (Level 2 Aggressive)

DD : 3 : Breasts, when seen as part of a person and emphasized, as an indication of oral libidinal drive representation (Level 2 Oral)

DD : 4 : Any reference to excretory organs, defecation or feces, as an indication of anal libidinal drive representation. (Level 1 Anal)

DD : 5 : Position response, e.g., "The North Pole, because it was at the top," as an indication of Autistic Logic, a formal thought deviation.

DD : 6 : No one aspect of a response is rated 6

in and of itself. However, a combination of two ratings of "5" would justify the entire response being rated at 6.

2. Defensive Contribution. (DC) Each response produces a number which is the algebraic sum of the numbers assigned to each defense or control utilized in connection with that response. These sub-defense contributions for each control or defense are set by the manual, and are based on the belief that certain defensive operations are more effective in controlling drive representation than others.

Examples: Placing the theme of a response in terms of humans (DC of 0); animals (DC of +1); plants (DC of +1.5); inanimate objects (DC of +2). The defensive contributions in these instances reflecting the idea that "if an unacceptable impulse is expressed in a response, it may be made more acceptable if S puts distance between himself and the response, by making the latter remote in time, place, person, or level of reality" (Holt, 1959, p. 37). Denying that a response was given (DC of -2); modifying a percept so that it becomes unscoreable, whereas previous to the modification it would have been scored a Level 1 manifestation (DC of +1.5). (See Appendix F for a complete list of all defense and control categories and the defensive contribution for each.)

3. Adaptive regression score (ARS). The adaptive regression score for each response is the product of the total defense contribution for each response and the defense demand assigned to that response. For the purposes of this

study, the total defense contribution for each response has been broken down into its two major parts: the DC's for each control and defense used, and the rating given for form level (FL). The Adaptive Regression score for each response may then be represented as

$$ARS = DD \times (DC_1 + DC_2 + DC_3 + \ldots . DC_n + FL)$$

and the total ARS for the protocol (see below) is the sum of the right hand portion of the formula for all responses scored.

This represents a change from the formula suggested by Holt (1959, p. 58), although it does not change the ARS score. Holt's original suggestion is that ARS = DD x DC. As in the present study, the DC is determined as the sum of the DC's for each control and defense used, and the rating for form-level. I have broken the DC down here for the purposes of statistical evaluation of the contribution of DC and FL to the ARS score (See Chapter V, pp. 73-77).

High positive ARS scores, in this system, will indicate adaptive regression (i.e., a response which is highly suggestive of drive representation combined with a good deal of positive controls and defenses) and high negative ARS scores will indicate maladaptive regression (i.e., a response which is highly suggestive of drive representation with a good deal of negative controls and defenses).

4. Total adaptive regression score (Total ARS). The adaptive regression scores for each response are algebraically

summed to provide a total adaptive regression score. This score may be positive or negative.

5. Number of primary process responses. Since only a portion of the responses produced will be scoreable for primary process manifestation (the others are assumed to be a function of secondary process functioning) it is possible to sum the numbers of responses containing primary process and express this either as an entity in itself, or as a percentage of the total number of responses. For the purpose of this study, the former was done with a covariance technique used to control for the number of responses given.

It is very difficult to communicate to the reader more than the bare essentials of a system as complex as this without reproducing the entire manual and examples of each of the categories used. Since this is impractical, the manual consuming a total of 79 single spaced typewritten pages, an example of one response scored for its appropriate categories will be given. For a more extensive description of the historical background of the system and categories, the reader is referred to Holt (1955, 1956, 1959).

Example: Response to card 2 (upside down) "without these things (upper red) it looks like Japanese duelers, looks like Japanese prints of men fighting a duel." (Inquiry) "It's very stylized--nobody will get hurt 'cause it's just a game--it's a kind of dance--they're wearing kimonos."

Scoring.

Form level--Fo (popular and near popular forms; fixed list in manual) (Mayman, 1960) defensive contribution + 2 (Holt, 1959, p. 58) (Also see Appendix H for the writer's changes in the defensive contribution for Form Level designations).

Content. Aggression Level 2 (more secondary form of aggressive representation). Active-subject. (Motor discharge of aggression) (Holt, 1959, p. 12). Defensive demand 2 (slight need for defense; content and structure of responses . . . are only slightly unusual in conversation and arouse only slight degrees of tension (Holt, 1959, p. 48). Control and defense: Esthetic context: (The aggression is controlled by placing it in the context of the arts; DC + 2); Cultural context: (Control achieved by depicting the actors in a rite or ritual; DC + 2); Geographical remoteness (control by depicting the action as occurring outside of the United States; DC + 2); Depiction: (control by depicting the aggression as portrayed in a print or picture; DC + 2); Negation: (aggression poorly controlled by denying that the intent is aggressive; DC = 2).

Total score. DD = 2; DC = + 5; FL = + 2; ARS = 2 x (5 + 2) = 14.

Traditional Rorschach Scoring

The scoring procedures are taken from Klopfer, et al. (1954) exactly as presented therein. It is assumed that the reader is familiar with the procedures of scoring and no attempt will be made here to further describe them. Mean scores were calculated for the creative and control groups on 27 variables as follows: R, W%, D%, d%, F+, F-, F, total F, M, FM, Fm + mF + m, FC + F/C, CF + C/F, C, Fc + cF + c + k + Fk + kF + K, FC' + C'F, H + (H), Hd, A, Ad, number of content categories, P, F+%, M/sumC, W/M, A%, F%. (See Appendix I for the procedures by which each was tabulated and calculated, and for the rationale for combining some of the categories.)

The Dogmatism Scale

The Dogmatism Scale is a 40 item instrument described by Rokeach (1956, 1960). It consists of a series of statements to which the subject indicates his agreement or disagreement along a 6 point scale ranging from +3 to -3, with the zero point excluded to force responses towards disagreement or agreement. For scoring purposes, a constant of 4 is added to each score, this eliminating minus numbers. Thus, a score of +40 represents the maximum low score and +280 the maximum high score. The construction and description of the scale is extensively covered by Rokeach (1956, pp. 6-11, 1960, pp. 71-80).

CHAPTER IV

STATEMENT OF HYPOTHESES

It is assumed that the presence in the Rorschach of a high degree of libidinal and aggressive content and/or formal thought deviations, and a high degree of control and defense of such materials (as indicated by a high total Adaptive Regression Score) constitutes an operational definition of regression in the service of the ego. This follows from the definition of adaptive regression, for if a subject is able to allow such material into his productions, yet is able to utilize it effectively while transforming it into responses which are socially acceptable, he has regressed for the purpose of facilitating a higher level of functioning.

It is further assumed that a necessary, but not sufficient, condition for creative productivity is the ability to adaptively regress, operationalized as discussed above. This may be formalized as follows:

1. If a person is creative, then he will show evidence of adaptive regression.
2. From 1., it follows that, given a creative person, adaptive regression will be manifested; also, given a person who does not manifest adaptive regression, we may predict that he is not creative, i.e., we are stating that creative productivity cannot occur

solely on the secondary process level.

Hypotheses

1. It is proposed that mere presence of primary process material does not constitute creativity, since the manifestation of a great deal of such material without adequate controls may constitute psychosis. Therefore, H_1 states that there will be no difference between the creative and control groups in the number of scorable primary process responses produced.

2. It is proposed that the presence of a high degree of primary process material along with evidence of effective control of such material constitutes an operational definition of adaptive regression. Further, that such regression is a necessary condition for creativity. Therefore, H_2 states that the Creative group will have a higher total Adaptive Regression Score than the Control group.

3-4. It is proposed that the Dogmatism Scale constitutes a measure of the degree to which individuals are able to function unencumbered by drive intrusion. However, the writer has further stated that it is possible to differentiate two groups of individuals within those who manifest drive intrusion, i.e., those who utilize it effectively and those who do not. Two hypotheses are therefore genereated from this formulation:

H_3 states that there will be no relationship between

the number of responses scorable for primary process and scores on the Dogmatism Scale, regardless of classification as creative or control.

H_4 states that there will be a negative relationship between the total Adaptive Regression Scores and scores on the Dogmatism Scale, regardless of classification as creative or control.*

5. It is proposed that the Dogmatism Scale measures the degree to which the individual is "open" to external perceptions and to internal drives. Since a number of theories hold that this also constitutes a necessary condition for creative thought, H_5 states that the Creative group will have a lower Dogmatism Scale score than the Control group.

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*The negative correlation is predicted since a high ARS score is taken as an indication of adaptive regression, while a high Dogmatism Scale score is taken as an indication of dogmatic thinking.

CHAPTER V

RESULTS

Composition of the Sample: Age, Intelligence and Art Training Factors

No attempts were made to equate the creative and control groups for factors of age, intelligence, or art training. (Both groups were selected from the advanced program in art, however). Therefore, the first step in the analysis of data is to determine if any of these factors differentiate the two groups. The results are presented in Table 1.

From Table 1, it is evident that the subjects in the creative and control groups do not differ in intelligence, age or degree of art training as measured by number of art credits taken. This being so, we may assume that differences which occur on other variables cannot be accounted for in terms of these three factors.

Rorschach: Adaptive Regression

The Adaptive Regression Score (ARS) is proposed as an operational measure of creative regression in the service of the ego. It has been discussed in detail on pages 52-54 and will be re-evaluated later in this chapter and the succeeding chapter. At this point it is necessary to demonstrate that the measure itself is a reliable one, since

TABLE 1

Age, Intelligence and Number of Art Credits for the Creative and Control Groups

Group	Age		ACE[1]		Number of art credits	
	Mean	σ^2	Mean	σ #	Mean	σ #
Experimental (Creative) N = 20	23.15	5.15	116.79	16.38	55.90	11.79
Control (random) N = 20	22.30	2.15	108.0	17.97	52.10	17.72
t.	.680		1.592		.798	
p.	.6		> .05		.4	

Variances are homogeneous.

[1]The intelligence factor is measured in this study by the raw total score of the American Council on Education Psychological Examination. The test was not given as part of the study, but scores were obtained from the tests administered to students when they entered the University. Such scores were available for 19 of the 20 experimental subjects, and all 20 of the control group.

[2]The procedure suggested by Edwards (1954, p. 274) will be followed throughout when the variances differ significantly. Edwards states that, when nl equals n2, the pooled estimate of the variance may still be used, but that the significance of the difference should be calculated with one-half the usual degrees of freedom.

much of what is to follow is based upon it.

The problem of determining reliability in the Rorschach is a difficult one. Klopfer, et al. (1954, pp. 441-461) discusses the problems inherent. Although there is an alternate form available (The Behn series), studies comparing the Rorschach and Behn cards have revealed many differences between them. Eichler (1951), for example, found that the Behn series results in the production of more FM responses, fewer F, M and H responses, and tends to facilitate the production of more shading responses and animal responses.

Test-retest measures have been criticized because of the memory factor involved (Klopfer, et al., 1954, p. 443). This leaves only the split-half procedure, which has been used with varying success. Hertz (1934) reported an average coefficient for all traditional scoring categories of .829 and concluded that "the various scoring categories and relationships were reliable on the whole--enough so to make the Rorschach test a reliable instrument" (reported in Klopfer, et al., 1954, p. 442). However, Hertz later suggests that the method is not an adequate one. "Because of the global nature of the test, it is not possible to split it and work with isolated variables" (Hertz, 1951, p. 316).

Granting the above criticisms, the split-half method still seems to be the best means of testing the reliability of Rorschach variables. The problems involved in doing so,

however, are by no means solved. To split the cards so that each half contains equal stimulus value is impossible, primarily because it is difficult to determine the stimulus values of any card, let alone its value compared with other cards. Also, an odd-even split results in the assigning of two chromatic cards to one half and three to the other.

Nonetheless, an odd-even split involves the least number of difficult judgments, and this method was used to attempt a determination of the reliability of the ARS score. The correlation between the ARS determined from odd numbered cards and ARS determined from even numbered cards is .562, significant beyond the .01 level. It may be concluded that the score is a reliable measure.

Hypotheses H_1 and H_2 have to do with the amount of primary process manifested in the Rorschach records and the effectiveness with which such material is utilized. The hypotheses are that the creative and control groups will not differ on amount of primary process manifested, but will differ on the effectiveness measure. It should be recalled that the measure of primary process is the number of responses scorable for primary process (PPR) and the measure of effectiveness of utilization is the Total Adaptive Regression Score (ARS), computed as the algebraic sum of all DD x (DC + FL) for each response. The results are presented in Table 2.

TABLE 2

Comparison of the Creative and Control Groups on Number of Rorschach Responses (R), Number of Primary Process Responses (PPR), and Total Adaptive Regression Score (ARS)

Group	N	R		PPR		ARS	
		Mean	σ	Mean	σ	Mean	σ
Creative	20	45.40	12.40[#]	26.25	7.23	145.12	62.85
Control	20	32.80	14.22	17.80	7.77	65.68	56.07
F[##]		8.84		12.67		17.91[*]	
p		.02		.02		.01	

[*] one-tailed test

[#] The F-ratio for all variances presented reveals that Homogeneity of Variance is established.

[##] Analysis of Variance used rather than a 't' test to provide the mean square for the Analysis of Covariance presented later.

Examination of Table 2 reveals that the creative group differs significantly from the control group in number of Responses given, number of Primary Process Responses given, and total Adaptive Regression Score. However, the possibility must be explored that since the two groups also differ significantly in the number of responses given, differences in mean ARS and PPR may be dependent on the number of responses given and therefore may be accounted for in terms of productivity, i.e., responses, rather than in the meaning of the ARS and PPR scores themselves. To provide a test of

this possibility, the data presented in Table 2 were further analyzed.

The first step in testing the possibility that the differences in the Adaptive Regression Score and number of Primary Process Responses are related to the number of Responses given is to calculate the correlation coefficient between responses and each of the two variables. In addition, it will also be of interest to inspect the correlation between ARS and PPR. The results are presented in Table 3.

TABLE 3

Intercorrelations among the Adaptive Regression Score (ARS), Number of Primary Process Responses (PPR), and Number of Rorschach Responses (R)

Variables	N	r	p.
ARS-R	40	.43	$< .01$
PPR-R	40	.76	$< .01$
ARS-PPR	40	.55	$< .01$

The results of this calculation reveal that there is a significant relationship between both the ARS and number of Primary Process Responses and the total number of Responses produced. The interpretation of such results is, of course, that a high (or low) ARS, or a high (or low) PPR may be a function of the number of responses given.

The difference between the two groups on number of primary process responses produced holding the number of

total responses constant may be tested using the technique of Analysis of Covariance described by Edwards (1956, pp. 335-355). The result is given in Table 4.

TABLE 4

Comparison of the Creative and Control Groups on Number of Primary Process Responses (PPR) Produced, with the Number of Rorschach Responses (R) Produced Held Constant

Source of variation	Sum of squares of errors of estimate	df	Mean square	F
Total	1200.74	38		
Within groups	1099.80	37	29.72	3.399*
Adjusted means	100.94	1	100.94	

*$p > .05$

When the mean PPR for the creative and control groups are compared, adjusting each for the total number of responses given, the previously significant F ratio is no longer significant. This is interpreted as meaning that it is the correlation between PPR and R which accounts for the difference between the mean PPR for the two groups. In the light of this result, hypothesis H_1 may now be accepted, i.e., it is concluded that there is no difference in the amount of primary process produced by the creative and control groups when the total number of responses produced by the two groups is held constant.

The ARS score may be similarly handled to answer the question as to whether the number of responses given accounts for the significant mean difference between the two groups. Number of responses will again be held constant through the Analysis of Covariance technique. The results are given in Table 5.

TABLE 5

Comparison of the Creative and Control Groups on the Total Adaptive Regression Score (ARS), with Number of Rorschach Responses Held Constant

Source of variation	Sum of squares of errors of estimate	df	Mean square	F
Total	157313.2	38		
Within groups	122280.92	37	3304.89	10.60*
Adjusted means	35032.22	1	35032.22	

*$p < .01$

The interpretation of the significant F given in Table 5 is that the difference between the means on the variable ARS for the creative and control groups cannot be accounted for in terms of the correlation between ARS and number of responses, since the two means have been adjusted for R through the covariance technique.

A further test regarding the ARS variable is necessary. The results given in Table 4 are interpreted as evidence for the conclusion that the two groups do not differ in

number of Primary Process Responses when the means are adjusted for total Responses. However, the F-ratio of 3.399 is an almost significant figure (F of 4.11 is necessary for significance at the .05 point). The question is raised now as to whether the differences in the ARS are due to the "near" significant difference on the PPR variable, since the correlation between ARS-PPR indicates that the ARS will vary with the number of responses scorable for primary process. (r for ARS-PPR = .55, significant beyond the .01 level, see Table 3).

Since it has already been demonstrated that ARS differences cannot be accounted for in terms of R, an analysis of covariance for ARS with PPR held constant will suggest an answer to the question. The result is presented in Table 6.

TABLE 6

Comparison of the Creative and Control Groups on the Total Adaptive Regression Score (ARS), with Number of Primary Process Responses (PPR) Held Constant

Source of Variance	Sum of Squares of errors of estimate	df	Mean square	F
Total	133907.84	38		
Within groups	111661.75	37	3017.89	7.37*
Adjusted means	22246.09	1	22246.09	

*$p < .01$

The interpretation of the significant F-ratio given in Table 6 is that difference in mean ARS for the creative and control groups cannot be accounted for in terms of the number of primary process responses produced, since each ARS mean has been adjusted for PPR.

A final test of the difference between the means on the ARS variable may now be made, holding both PPR and R constant, as a final check on whether the ARS score is a function of the productivity of the subjects, or a function of the contributing factors contained in the ARS, i.e., FL, DD, and DC. The procedure for holding two variables constant while testing for the significance of the difference in mean scores on a third variable is known as multiple analysis of covariance, and is described in detail by Johnson (1949, pp. 246-261). Johnson's procedures were followed exactly as given therein. The result of this analysis is given in Table 7.

TABLE 7

Comparison of the Creative and Control Groups on the Total Adaptive Regression Score (ARS), with Number of Primary Process Responses (PPR) and Number of Rorschach Responses (R) Held Constant

Sources of variance	df	Sum of Squares of errors of estimate	Mean square	F
Total	37	133858.00		
Within groups	36	120101.53	3336.15	4.12*
Adjusted means	1	13756.47	13756.47	

*$p < .05$

The results given in Table 7 represent the final test of the differences between the ARS for the creative and control groups, independent of variation contributed by number of Responses and number of Primary Process Responses produced. The significant F-ratio presented in Table 7 is interpreted as meaning that the mean ARS score does differentiate the two groups, even when R and PPR are held constant. Hypothesis H_2 may now be accepted with assurance that variance due to differences in productivity have been controlled.

Having demonstrated that the ARS differentiates the two groups, it will be fruitful at this point to examine the contributing factors to this score. To refresh the reader's memory, the scores involved are those of Defense Demand (DD), Defense Contribution (DC), and the Form-Level score (FL). The ARS, it will be recalled, is represented by the equation

$$ARS = DD \times (FL + DC_1 + DC_2 + DC_3 + \ldots . DC_n)^*$$

The question is now raised as to whether these scores contribute equally to the ARS. An answer will be provided by comparing the creative and control groups for mean score on DD, DC and FL. The analyses for DD and DC will be presented first, followed by the results of the FL comparison. The significance of the differences for DD and DC are presented

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*The reader may find it useful to refer to the presentation in Chapter III, pp. 52-54 which discusses the scoring in greater detail.

in Table 8. Since both of these scores may be a function of the number of responses scorable for primary process, the results of an analysis of covariance for each, holding PPR constant, is given in Table 9.

TABLE 8

Comparison of Creative and Control Groups on Defense Demand (DD) and Defense Contribution (DC) Scores

	DD		DC	
	Mean	σ	Mean	σ
Creative	61.70	20.77#	52.72	18.57#
Control	40.50	18.26	32.45	28.29
F	11.75		12.92	
p	$< .01$		$< .01$	

#Variances are homogeneous.

The results presented in Tables 8 and 9 indicate that although the two groups are differentiated significantly by the mean DD and DC scores, in each case the significant F-ratio obtained is non-significant when number of Primary Process Responses is held constant. The interpretation of the non-significant covariance F-ratios is that the two groups do not differ in mean DD or DC and that the DD and DC scores are a function of the number of Primary Process Responses produced.

TABLE 9

Comparison of Creative and Control Groups on Defense Demand (DD) and Defense Contribution (DC) with Number of Primary Process Responses (PPR) Held Constant in Each Comparison

Source of variance	Sum of squares of errors of estimate	df	Mean square	F
Defense Demand (DD)				
Total	3090.8	38		
Within groups	3070.32	37	82.98	< 1.00, N.S.
Adjusted means	20.48	1	20.48	
Defense Contribution (DC)				
Total	6497.0	38		
Within groups	6169.9	37	166.75	1.96*
Adjusted means	327.1	1	327.1	

*$p > .05$

Since the ARS score is composed of three factors (DD, DC, FL), and two of these (DD,DC) have been shown to lack differentiating power regarding the two groups, it follows logically that the third factor (FL) must be a large contributor to the ARS. This follows since it has been demonstrated that the ARS does differentiate the two groups (see Table 7). Examination of Table 10 indicates that the FL score does, in fact, significantly differentiate the creative and control groups.

TABLE 10

Comparison of the Creative and Control Groups on the Form Level Score (FL)

Group	Form Level Score (FL).	
	Mean	σ
Creative	12.30	12.68
Control	.20	14.81
F	7.698	
p	$<.01$	

Before presenting the needed result of holding the number of responses constant while comparing the two groups on the FL variable, it will be necessary to discuss the meaning of the differentiating power of FL. If this is, in fact, the only contributor to ARS which differentiates the

two groups, then it may be that the form level scoring rather than the more complicated ARS variable is of importance to the present study. Exploring this further, it will be necessary to determine whether the form-level scoring is differentiating only when utilized for primary process responses (FL), or whether the form level of non primary process responses also differentiates the two groups.

Taking into account the questions raised above, the following analysis will be presented. The form-level score for primary process responses (FL) will be analyzed holding total number of responses constant through the covariance technique (Table 11). The same analysis will be presented for the form level score of non-primary process responses (Tables 12 and 13). A comparison of Tables 10 and 11 with Tables 12 and 13 will then suggest the differentiating facility of the form-level score.

The results presented in Tables 10 and 11 indicate that the form-level score for primary process responses differentiates the two groups, and continues to do so when number of responses is equated for each group. The mean score for the creative group is significantly higher than that for the control group (12.30 vs .20). Examination of Tables 12 and 13 reveals that the form level score of non-primary process responses does not differentiate the two groups, either before or after equating the groups for total number of responses produced. It may now be concluded that,

TABLE 11

Comparison of the Creative and Control Groups on the Form Level Score for Primary Process Responses (FL) with Number of Rorschach Responses (R) Held Constant

Source of variance	Sum of squares of errors of estimates	df	Mean square	F
Total	8329.52	38		
Within groups	7220.30	37	195.14	5.68*
Adjusted means	1109.22	1	1109.22	

*$p < .05$

TABLE 12

Comparison of the Creative and Control Groups on the Form Level Score for Responses Not Scorable for Primary Process (FL non PPR)

Group	FL Non PPR	
	Mean	σ
Creative	13.65	17.00#
Control	8.90	11.65
F	1.06	
p	$>.05$	

#Variances are homogeneous.

TABLE 13

Comparison of the Creative and Control Groups on the Form Level Score for Responses not Scorable for Primary Process (FL Non PPR) with Number of Rorschach Responses (R) Held Constant

Source of variance	Sum of squares of errors of estimate	df	Mean square	F
Total	6724,56	38		
Within groups	6718.28	37	181.58	<1.00 N.S.
Adjusted means	6.28	1	6.28	

of all the Rorschach scoring presented, only the FL score differentiates the creative from the control groups, with a higher FL score associated with the creative group. The significance of this conclusion will be taken up in the Discussion portion of the paper (Chapter VI).

There is no difference in the amount of primary process material produced between the creative and control groups when differences in total number of responses given is held. There is a significant difference in the adaptive regression score proposed as an operational measure of creative regression, the creative group having a higher score. Much of this difference seems to be due to the better form quality manifested by the creative group in responses scorable for primary process. The mean form quality score for non primary process responses produces no significant difference between the two groups.

The answer to the question posed is evident from the results presented. The creative and control groups do not differ significantly on either Defense Demand or Defensive Contribution. However, the creative group is differentiated in having a higher mean Form Level for responses scorable for primary process, and it appears that it is this variable which contributes the greater part to the total adaptive regression score.

The final question to be explored before moving on to the results relative to the relationship between the

adaptive regression variable and the dogmatism variable is that of the relationship between the scoring procedures utilized here and traditional Rorschach scoring techniques.

Each of the 40 protocols scored for ARS was rescored using Klopfer's method (Klopfer et al., 1954). Mean differences for each of the 27 variables presented in Table 14 were examined using the t-ratio method. Examination of the results presented reveals that only four of the 27 variables significantly differentiates the two groups: Mean number of responses (R), mean number of pure form responses (F), form-dominated color responses (FC + F/C), and animal content responses (A). In each case, however, when the variable is expressed as a percentage of the number of responses produced, the difference between means is not significant (F%, FC + F/C/R, A%). It may be concluded, therefore, that the traditional scoring technique as represented by the Klopfer system does not differentiate the two groups used in the study.

Summary of Results: Rorschach Variables

Hypotheses H_1 and H_2 are both accepted. There is no difference in the amount of primary process material produced between the creative and control groups when differences in the total number of responses produced are held constant. There is a significant difference between the two groups in the Adaptive Regression Score proposed as the operational

TABLE 14

Comparison of the Creative and Control Groups on Variables Scored by the Klopfer System

Variable	Creative		Control		
	Mean	σ	Mean	σ	t
R	42.90	14.14	32.10	13.01	2.51*
W%	41.70	17.31	47.20	19.39	.947
D%	50.55	15.17	48.05	15.72	.511
Dd%	7.55	6.56	4.80	5.92	1.39
F+	16.20	8.43	12.05	6.77	1.72
F-	4.15	2.70	2.95	2.46	1.46
F	1.15		.55		b
Total F	21.5	9.59	15.55	9.27	2.39*
M	6.0	4.05	5.05	3.45	.81
FM	6.35	3.10	4.60	2.78	1.88
Fm+mF+m[a]	1.40		.80		b
FC+F/C[a]	3.65	2.49	2.30	1.49	2.08*
CF+C/F[a]	1.85	1.59	1.60	2.29	.38
C	.10		.10		b
Fc+cF+k+K[a]	1.45		1.40		b
FC'+C'F[a]	.6		.65		b
H+(H)[a]	6.45	4.33	5.50	3.57	.76
Hd	1.95		1.35		b
A	14.30	6.63	9.45	3.30	2.90**
Ad	1.50		1.60		b
No. Content Cat	10.85	3.05	10.05	2.91	.85
P	6.25		6.05		b
F+%	79.70	12.68	82.35	8.18	.79
M/EC	1.80	1.09	2.74	3.87	1.06
W/M	4.12		3.94		b
A%	35.95		36.55		b
F%	47.60	14.10	46.15	11.26	.359

Table 14, Continued

Variable	Creative		Control		
	Mean	σ	Mean	σ	t
FC+F/C/R	.08		.07		b

*p < .05
**p < .01

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[a]Categories combined due to small frequencies.

[b]Significance of the difference not computed, since the difference is negligible.

measure of creative regression. Much of this difference appears to be due to the ability of the creative group to maintain better form quality in responses scorable for primary process. The form-level score does not differentiate the two groups when applied to responses non-scorable for primary process. When the protocols produced by the Creative and Control subjects are scored for the more conventional scoring categories as represented by Klopfer, none of the categories differentiate the two groups, although four categories are differentiating before the number of responses produced are equated.

Creativity, Adaptive Regression and Dogmatism

Before presenting the results regarding the hypotheses proposed relative to the relationship of dogmatism to adaptive regression, an attempt will be made to answer the questions raised concerning the adequacy of using a "filled" versus an "unfilled" Dogmatism Scale.

The only previous use of the Dogmatism Scale without filler items is that of Vidulich (1958) who reports a corrected split-half reliability of .76 with a sample of 93. Since this compared favorably with previously reported split-half reliabilities of .78 and .81 using the scale with filler items, Vidulich concluded that "padding" is not as essential as previously supposed.

The result of the present test-retest using a "filled"

and "unfilled" scale for 30 subjects support the conclusions reached by Vidulich (1958) that it does not seem necessary to use filler items, since the use of such items does not make an appreciable difference in the reliability of the scores obtained. ($r = .881$; $p < .005$).

Having demonstrated that the Dogmatism scale utilized in the study is a reliable instrument, it is now possible to examine the results regarding Hypotheses H_3, H_4 and H_5.

Hypothesis H_3 is to the effect that, regardless of classification as creative or control, there will be no relationship between the amount of primary process manifested on the Rorschach and the Dogmatism Scale score. H_4 states, however, that there will be a negative relationship between the Adaptive Regression score and the Dogmatism Score. These hypotheses follow from the proposal that the Dogmatism score constitutes a measure of the degree to which individuals are able to function unencumbered by drive intrusion. A number of analyses were done to investigate the relationships posited in Hypothesis H_3. First, relatively high and relatively low dogmatic subjects were compared on the number of Primary Process responses produced. These subjects were classified as high or low if they fell above or below the median Dogmatism score for the 40 subjects, respectively. An additional test of Hypothesis H_3 is provided by comparing the mean PPR for the ten subjects scoring highest on the Dogmatism scale with the mean for the ten subjects scoring lowest on the

scale. These results are presented in Table 16. The correlation between Number of Primary Process responses produced and Dogmatism Scale scores is -.017, which is not significant.

TABLE 15

Comparison of Relatively High and Relatively Low Dogmatic Subjects with Respect to Number of Primary Process Responses (PPR) Produced

Group	N	Mean Number PPR[1]	σ
High Dogmatic[#]	20	20.90	8.77
Low Dogmatic[##]	20	23.15	7.95
F		---	
p.		N.S.[a]	

[#]Above median for 40 subjects.

[##]Below median for 40 subjects.

[a]Mean square within groups higher than mean square between groups.

[1]Comparison of the mean PPR for the ten highest and ten lowest Dogmatism scores also reveals no significant differences. (Mean square within is greater than the mean square between, F is non-significant).

The results presented in Table 15 and the correlation of -.017 between Number of Primary Process Responses produced and the Dogmatism Scale scores is sufficient evidence to accept Hypothesis H_3. It may be concluded that there is no

relationship between the amount of primary process material produced on the Rorschach and dogmatism as measured by the Dogmatism Scale.

Calculation of the correlation coefficient between the Adaptive Regression Score (ARS) and the Dogmatism Scale reveals that the relationship is negative as posited in Hypothesis H_4. However, it is not significant ($r = -.175$). Examination of the scatter diagram for the ARS and D scores suggests that the relationship is curvilinear. Since the Pearson-r computed for such data will underestimate the degree of relationship (Edwards, 1954, p. 197), a correlation ratio ("eta") was utilized to investigate the regression of ARS on D, and the regression of D on ARS. The results of this analysis are presented in a note following Table 16. As noted, although the correlation ratios are higher than the correlation coefficient, neither is significantly different from zero.

TABLE 16

Correlation between Adaptive Regression Scores (ARS) and Dogmatism Scale (D) Scores for 40 Subjects

Variable	r	p.
ARS-D	-.175*	$> .05$

*Examination of the scatter diagram suggests that the relationship is curvilinear. The Correlation-ratios (eta) for the same data are not significantly different from zero. (Regression of ARS on D is .381, $F < 1.00$; D on ARS is .391, $F < 1.00$).

Hypothesis H_5 states that the creative group will have a significantly lower mean Dogmatism Score than the control group. The hypothesis stems from the proposal that the Dogmatism score measures the degree of "openness" to external perceptions and internal drives, a factor also proposed as a necessary condition for creativity. The test of significance for the two means reveals that the mean D score for the creative group (129.6) is significantly lower than that of the control group (147.05; $P < .025$).

Hypothesis H_5 is accepted, since the difference between the means is significant, and the creative group mean is lower as predicted.

These results present what may be a paradoxical situation. It will be recalled that the mean Adaptive Regression Score for the creative group is significantly higher than that of the control group. The results just presented indicate that the mean Dogmatism score for the creative group is significantly lower than that of the control group. In view of this, one would expect a negative relationship between the Adaptive Regression score and the Dogmatism score. The correlation of -.175 indicates that although such a relationship exists, it is not significant. The question may then be posed as to whether the Adaptive Regression Score and Dogmatism score are measuring two different things. Another possibility is that the ARS and D scores operate differently in the two groups. The data for examining the

latter possibility are available, and are presented in Table 17. Here the correlations for ARS - D are given for the creative and control groups separately.

TABLE 17

Correlation between Adaptive Regression Scores (ARS) and Dogmatism Scores (D) for the Creative and Control Groups

Group	N	r(ARS-D)	p.
Creative	20	.425	$< .10$
Control	20	-.321	$> .10$

Although neither correlation is significant, the correlation for the creative group suggests that the Adaptive Regression Score is positively related to the Dogmatism Score, while for the control group it is negatively related. The results are not conclusive in that neither correlation is significantly different from zero, and the significance of the difference between the two correlations presented is itself not significant ($p = .19$).

In view of the finding that the FL score for primary process responses contribute the greatest amount of variance to the ARS, the results of correlating the D score with the FL score are presented in Table 18. Again the results suggest that the D score is negatively related to the measure of adaptive regression for the total sample,

negatively related for the control group, and positively related for the creative group. Again, none of the correlations are significantly different from zero. The consistent reversal in sign of the correlations is striking, and will be discussed further in the next chapter.

TABLE 18

Correlations between Form Level of Responses scorable for Primary Process (FL) and Dogmatism Scale Scores (D) for the Total Sample, and for the Creative and Control Groups

Group	Correlation FL-D	p
Creative	.170	> .10
Control	-.366	> .10
Total	-.243	> .10

Summary of Results: Creativity, Adaptive Regression, and Dogmatism

Results indicate that there is no relationship between the amount of primary process produced on the Rorschach and scores on the Dogmatism Scale. The Adaptive Regression Score derived from the Rorschach does significantly differentiate the creative and control groups, the mean ARS being higher for the Creative group. The Dogmatism Scale score also differentiates the two groups, the mean D score being lower for the creative group. However, the correlation

between ARS and D is not significantly different from zero. Further analysis of the relationship between ARS-D suggests that the ARS is positively related to D in the creative group and negatively related to D in the control group, although neither relationship is significant. The same relationships are obtained in correlating the D score with the FL score for the respective groups.

CHAPTER VI

DISCUSSION

The theoretical papers considered in Chapter II indicate that considerable agreement exists regarding the role of adaptive regression in creativity. The intent of the present study is twofold: to demonstrate the operation of this factor in art students evaluated by their professors as highly creative and to evaluate a method proposed as operationalizing the concepts involved. How well this intention has been accomplished may be evaluated by examining the results presented in Chapter V.

The ARS was presumed at the outset to be an operational measure of adaptive regression. A high ARS, according to the theory from which it is generated, signifies three things. One, that the Rorschach responses produced contain a high degree of primary process characteristics. This is signified by the defense demand score (DD), which is, in effect, a rating of the primary process manifestation. Secondly, that the responses are produced with a minimum amount of perceptual distortion as indicated by the form-level rating (FL), and third, that the responses contain the means by which the primary process material is made socially acceptable. The latter is indicated by the DC scores which are added to produce the total DC for each response. Thus, the higher the ARS, the more the conditions necessary for

adaptive regression are met, i.e., a willingness to allow primary process material into the thought process and the effective utilization of such material without perceptual distortion.

A comparison of the mean ARS thus derived for the creative and control groups supports the hypothesis that the creative group would have a significantly higher mean score than the control group (Tables 3, 5, 6, 7). However, further analysis of the ARS reveals that, of the three constituents, DD, DC and FL, only the form level score (FL) differentiates the two groups (Tables 8, 9, 10, 11). Two points may be raised regarding these results. First, are they consistent with the theory of adaptive regression as it relates to creativity? And second, does the evidence raise serious question about the usefulness of the ARS?

The latter question might best be discussed first. As has been mentioned previously, the determination of DD and DC scores involves considerable time and effort. A response which is scorable for primary process may be categorized in one or more of 60 possible Content and/or Formal categories, and in one or more of 41 Control and Defense categories. It would appear that such fine categorization does not contribute to the ability of the ARS to discriminate the two groups in the study. A more parsimonious approach is suggested by the finding that only the FL score is significantly discriminative. If the determination is made as to whether a given response

contains primary process, and the form-level for such responses is rated, this provides sufficient data to differentiate the two groups. It should be noted again that it is only the form-level of primary process responses which makes this discrimination, and that rating either non-primary process responses, or total responses, for form level is not discriminative (see Tables 12 and 13).

This leads now to the second question. If the ARS is heavily loaded with extraneous, non-discriminative factors, and the FL score is accepted as the important factor, does the latter fulfill the intention of the study, i.e., to find an operational measure of adaptive regression, and to demonstrate such in creative art students. This is an important point, since it will be recalled that the total number of responses (R) also discriminates the two groups (Table 3), and R is far easier to determine than FL. It is obvious, however, that R, although discriminating, does not enable one to say a great deal about the differences between the two groups, relative to adaptive regression. The most one would say regarding R is that the creative group is more productive than the control group. Certainly this is one of the necessary conditions for creativity, as has been pointed out by Guilford (1957) and others, but it does not throw light on the adaptive regression hypothesis.

The point has been well taken (by Holt, 1959, p. 3) that when we speak of primary process, we are referring to the

function of "intervening variables," rather than to manifest behavior. An intervening variable, according to Mac Corquordale and Meehl, is exemplified by the dispositional term resistance in physics. It is defined by implication, and not conceived as observable even with future developments in technique. In this sense, it is an explanatory conception which bridges the gap between physical stimulus and observable response or behavior.[a] The point to be made here is that it is not possible to "see" the primary process in operation. Likewise, the term "adaptive regression" is not to be equated with observable behavior. Both must be inferred from something that is manifest.

Keeping the foregoing in mind, does the FL (an observable on the Rorschach) qualify as an entity from which adaptive regression may be inferred? Is it as much a measure of adaptive regression as the more complicated ARS entity? A re-examination of the necessary conditions for the conclusion of adaptive regression leads to a positive answer. Adaptive regression requires primary process, plus control over and utilization of such material. There is no question but that the FL indicates the presence of primary process material, for by definition it is the form level assigned only to responses

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[a]For a more complete discussion of intervening variables and other explanatory concepts such as hypothetical constructs, see Tolman (1951) and Mac Corquodale and Meehle (1951). The concept of the dispositional term and the procedures by which they may be reduced to testable hypotheses is discussed in detail by Carnap (1953).

scorable for primary process. Is a high-form level score an indication of control and utilization? It is the general consensus of Rorschach investigators that it is. Schafer (1948) for example, indicates that "The low F+% of a schizophrenic is indicative of the extent of the breakdown of reality-testing and the suffusion of apperception with pathologically autistic thought content" (p. 69). Williams (1947) found a correlation of .61 between F+% and a measure of control (the digit symbol test of the Wechsler-Bellevue) in an experimentally induced stress situation.

The form-level of responses may then be assumed as a measure of control.

The operationalizing of form level as an indication of utilization may be granted if one accepts the assumption that the maintenance of adequate reality testing in the presence of primary process manifestation is an indication that such manifestation is not threatening to the individual. Consequently it does not require extensive defensive measures to contain it, and permits its utilization in creative (or other) endeavors.

In view of the foregoing discussion, it seems reasonable to propose at this point that the operational measure of adaptive regression be restated in terms of the FL score, i.e., the form quality of responses containing primary process material.

The fact that the creative and control groups do not

differ in amount of primary process material produced when number of responses is held constant (Table 4), but are significantly differentiated by the FL score suggests the following conclusion. The creative group manifests less disturbance of perceptual accuracy in the manifestation of primary process material, and thus is in a better position to utilize such material effectively.

Brief mention should be made here as to why the traditional scoring techniques for rating form quality fail to demonstrate a significant difference between the two groups. The answer may be found in two differences between the traditional techniques and that utilized in the present study. First, the usual F+ vs F- scoring involves a rating of all responses for form-level. No differentiation is made as to the drive characteristics of the responses. The present technique does differentiate responses scorable and non-scorable for primary process before the form quality rating is assigned. The results presented in Tables 10, 11, 12 and 13 reveal that it is only the scorable PPR which differentiate the two groups. Secondly, the form-level scoring system provided by Mayman (1959) and utilized in the present study is a more highly differentiated system than the traditional technique (see Appendix H for the form-level categories proposed by Mayman). Such a system provides for greater differentiation in rating form quality, and as such may be more sensitive to perceptual disturbance as indicated by the

accuracy of the perceived forms.

Psychopathology and the Artist

The production of responses which are drive-dominated (primary process responses) is correlated with the total production of responses, and therefore was co-varied out in the re-testing of the hypothesis that creative artists and the control group would not differ in primary process production (H_1). The co-variance results permitted the acceptance of this hypothesis. However, a case can be made for the viewpoint that regardless of co-variance lack of difference, and the demonstration that the creative artists manifest greater perceptual accuracy while producing primary process material, they do manifest more of a thought process akin to that found in a variety of psychopathologies, i.e., libidinal and aggressive discharge, formal thought processes such as condensation, symoblization, autistic logic, etc. The viewpoint that the creative individual is "odd," "mentally-unbalanced," "psychotic," etc., is one accepted not only by the uninformed layman. Hyslop (1925), in a work entitled "The Great Abnormals" points to the peculiarities of such men of genius as Malhebes, Dante, Coleridge, Schiller and Milton. Jacobson (1926) states that, "The genius is usually, if not always, of insane temperament, but his creative work reflects the man at his best, that is to say, sanest." Roe (1946) suggests that some of the artists she studied were

alcoholics, and that they used alcohol as a means of relieving the tension generated by their artistic endeavors.

The greater absolute number of primary process responses in the creative group is not interpreted in this paper as indicative of psychopathology. On the contrary, they may be interpreted as indicative of mature strength of ego resources since they appear with a higher form quality, suggestive of less disturbance when dealing with primary process material.

Nevertheless, there is the possibility that when primary process is available, as it seems to be in these creative individuals, it may manifest itself in other than creative productivity. Under conditions which facilitate greater relaxation of control than that afforded by the Rorschach testing situation, their ability to operate close to the primary process end of the continuum may be reflected in behavior. Since primary process, by definition, disregards reality considerations, the creative artist may be less threatened by unreality than the average individual, who reacts to drive expression with anxiety and alarm.

Bellak (1958), makes a similar point in terms of psychoanalytic theory.

> The gifted person, by virtue of being able to regress in the service of the ego, maintains relatively less firmly defined boundaries--of the self, of ideas than does the average person. He makes less use of repression and therefore is relatively more likely to experience ego regression (which might lead to neurotic or psychotic symtomatology). The answer to "madness and genius" is then that the creative person and the disturbed share the quality of ease of ego-regression, of adaptive

> functions of the ego; they share the characteristic of less rigidly defined conceptual and perceptual boundaries and less strong counter-cathexis (by repression). However, disturbance and creative ability are not identical because the gifted person combines the ability for partial regression with an ability for synthesis, and an ability to increase again the adaptive capacity--to the point of reality testing, criticism and an ability to communicate (p. 372).

The Paradoxical Relationship between the Adaptive Regression Score and the Dogmatism Scale Score

If the foregoing is accepted as an interpretation, it may be possible to explain the paradoxical relationship found between the Adaptive Regression score and the Dogmatism scale score. It will be recalled that the results (Table 17) suggest a positive, although non-significant, relationship between ARS and D for creative subjects, and a negative relationship for control subjects. The same relationships were found for FL and D. It is proposed now that the creative group may appear both adaptively regressive and Dogmatic, due to the fact that the Dogmatism Scale and the Adaptive Regression measurements are measuring different things. The Rorschach test is, as described by Rorschach, an "experiment in perception." It requires visual perceptions of a type similar to those required in the production of a painting. The Dogmatism scale does not require such perceptions. It does, however, require a "cognitive" appraisal of the self and of social reality as perceived by the subject.

This may mean that when working in their own area,

i.e., visual perception, the primary process material available to creative artists is not threatening or disturbing. However, when asked to operate in other, more "cognitive" areas involving self-appraisal and evaluation of social realities, the availability of primary process which is so essential to creative productivity results in the kind of "encumberance" described by Rokeach as characteristic of dogmatic thinking.

There is still another question to be explored in regard to the relationship between dogmatism and the operational measure of adaptive regression. Bellak (1958) and others point to the increased ability of the creative individual to "synthesize" the primary process material made available through regression. Rokeach (1960) posits, and presents evidence in support of the contention, that the Dogmatism scale also differentiates individuals who are able to synthesize from those who cannot. (See particularly Rokeach, 1960, Chapters 9 and 10.)

In view of the fact that the two theoretical positions described assume that the ability to synthesize is necessary for satisfactory performance on the respective measures under consideration, it is surprising that the measures do not correlate more highly. The suggestion I would like to make here is that both the ARS and FL score may be measuring only what Bellak calls the "initial phase of oscillation," and not the second, or integrating, phase. It will be recalled that Bellak proposes a rapid oscillation between the

regression function and the ego adaptive function (see pp. 17-18 this paper, and Bellak, 1958, p. 367). It is possible that the Rorschach measures used in the present study provide information about the ability of the creative artist to regress without threat, but do not measure the synthesizing or integrating aspects of the processes involved. Such an interpretation would further support the proposal that there are many necessary conditions for creativity, not all of which may be measured by a single instrument.

Another possibility is that the Dogmatism scale and the ARS or FL scores are measuring different aspects of synthesis. The tasks set by Rokeach for his subjects may possibly involve an integration on the secondary process level only. On the "Doodlebug" problem, for example (see Rokeach, 1960, pp. 171-181) the subject is asked to overcome previously held beliefs and to then integrate a new set of beliefs into a working solution. Low dogmatic subjects were found to achieve this integration better than high dogmatic subjects. The integration called for, however, may be of an intellectual nature not involving the more affective components of the personality structure. Rokeach's position would not support such a conclusion, since he posits that there is no essential difference between the affective and the cognitive (see page 35 this paper), but it is a possibility worthy of further consideration. The other side of this argument is that the synthesis called for in adaptive regression <u>does</u> call for an

integration of "affectively loaded" material which is not necessary in tasks such as the "Doodlebug" problem. If the foregoing is true, then it may be possible to explain the failure of the Dogmatism scale and the ARS and FL scores to correlate more highly. They may be measuring different aspects of synthesis.

Limitations and Suggestions for Future Research

The foregoing raises a number of questions for further research. Why, for example, should the primary process availability operate so differently in visual perception as contrasted with personal-social-cognitive areas? Does it in fact so operate? More importantly, if it so operates, why should it do so differentially for the creative and control groups? The answers to such questions can only be obtained through further research with more clearly defined groups than were utilized in the present study. It is a severe limitation that the subjects utilized here are not extreme groups as far as the Dogmatism variable is concerned. Vidulich (1958), for example, reports a mean Dogmatism score of 145.21 for a group of unselected undergraduate students. The mean D score of the control group in the present study is 147.05, and therefore must be viewed as "average" rather than "high." By the same standard, the mean D score of the creative group in the present study is 129.6, and may be considered as only relatively "low," rather than as extremely undogmatic.

Another limitation of the study is that presented by the nature of the sample. Although the subjects in the creative group were evaluated by their professors as showing promise of success in the field, they are by no means accomplished artists, nor have they had the opportunity to accumulate the large breadth of experience posited as one of the necessary conditions for creative accomplishment. This limitation is somewhat offset by the fact that the positive results presented were obtained by comparing a judged group with a random group which, by the nature of its randomness, may be assumed to contain some students as creative or more creative than contained in the judged creative group. The significant differences reported here for the Adaptive Regression, Form Level, and Dogmatism scores suggest that even with such assumed overlap, the measures are discriminating and worthy of further use. They should, however, be tested using known artists whose creativeness is not open to question.

One of the more obvious studies needed is that designed to determine whether known groups lacking in control over primary process are discriminated by the FL score. A schizophrenic sample would meet this criterion, and it may be hypothesized that such a group would show a greater number of primary process responses, but with lower FL scores than a normal group. Responses not scorable for primary process may not be as threatening to schizophrenics, and as such

should not result in a breakdown of reality testing processes. The FL score for non-primary process responses should, therefore, show no differences in the psychotic and control groups. If such was the case, then a significant contribution may be made to clincial diagnostic procedure.

CHAPTER VII

SUMMARY

The study was undertaken to provide an empirical test of the theory of adaptive regression as it functions in creative artists. An operational measure of adaptive regression suggested by Holt (1959) in relation to the Rorschach test was utilized as the measuring instrument, and the study served as a test of the measures proposed. Further hypotheses were generated from the work of Rokeach (1960) regarding the relationships of dogmatic thinking with adaptive regression.

Twenty advanced undergraduate art students judged as highly creative by their professors served as the "creative" group, and a sample of 20 additional art students were randomly selected to serve as the control group. The Rorschach test and Dogmatism scale were administered individually to all subjects, and a Dogmatism scale interspersed with filler items was mailed to each subject approximately one month after the individual administration. The correlation between the "filled" and "unfilled" scales is .881, significant beyond the .005 level. Comparison of the two groups reveals no significant differences in age, intelligence as measured by the A.C.E. test, and previous art training as measured by number of art credits at Michigan State University or elsewhere.

The Rorschach protocols were scored using a manual

provided by Holt (1959). The manual contains specific directions and categories for evaluating the extent to which primary process is manifest and the control features associated with primary process production. In order to demonstrate the inter-scorer reliability of the scoring system, the writer and another scorer independently scored 14 of the protocols, and a correlation was calculated for the adaptive regression score derived. The inter-scorer reliability is .945, significant beyond the .005 level. Intra-subject reliability of the same measure was demonstrated, using the split-half method, to be .562, significant beyond the .01 level.

The operational measure of adaptive regression is given by the formula

$$ARS = (DD \times FL + DC_1 + DC_2 \ldots . DC_n)$$

where ARS is the adaptive regression score, DD is the rating assigned to each response indicating the amount of primary process material contained, FL is the form-level of the response. The right hand portion of the equation is summed for all responses produced up to a maximum of 60. The number of responses permitted each subject was arbitrarily set by the writer prior to the study at six per card.

The data were analyzed using the t-ratio, product-moment correlation, analysis of variance, analysis of covariance, and multiple analysis of covariance. The latter were necessary to partial out the effects of the total number

of responses and number of primary process responses produced. Both of these variables significantly differentiate the two groups, although the latter is not significantly differentiating when number of responses is held constant.

Five major hypotheses were presented for testing. Two hypotheses dealt with the adaptive regression factor. It was hypothesized that the two groups would not differ in amount of primary process material produced, but would differ in the effectiveness of utilization of such material as measured by the ARS. Both hypotheses are upheld. It was demonstrated that the creative group has a higher mean ARS score than the control group, and that this difference remains significant when number of primary process responses and total number of responses are held constant.

Further analysis of the ARS score reveals that the form-level score is the only contributing factor in discriminating the two groups. The two groups do not differ significantly on the variables DD or DC. It was proposed that the FL score may be acceptable as an operational measure of adaptive regression, since it reflects the degree to which perceptual accuracy is maintained during the production of primary process material. This proposal is substantiated by the finding that the form-level score of responses not scorable for primary process does not differentiate the two groups.

Three hypotheses regarding the relationship between

dogmatism and adaptive regression were submitted for testing. It was hypothesized that the creative group would have a significantly lower mean Dogmatism Scale score than the control group. This hypothesis was accepted. It was further hypothesized that, regardless of classification as creative or control, subjects scoring high and low on the D measure would not differ on amount of primary process material produced. This hypothesis was also accepted. Finally, it was hypothesized that, regardless of classification as creative or control, there would be a negative relationship between the measure of adaptive regression and dogmatism. Although the correlation between ARS-D is negative, it is not significantly different from zero. The same result is found for the relationship between FL-D. Further analysis of the relationship for the control and creative groups suggests that the Dogmatism measure is positively related to adaptive regression for the creative group, and negatively related for the control group. Possible explanations for such results are given, but further research is needed to provide more conclusive answers to the questions raised.

The major conclusion drawn from the study is that the form-level score (FL) is a useful diagnostic measure worthy of further investigation, both in the study of creativity with acknowledged artists, and as a diagnostic instrument in clinical research and practice. Some suggestions are given for possible research studies with the score.

Although the operational measure of adaptive regression originally proposed (ARS) was shown to contain factors which are non-differentiating, the theory of adaptive regression finds support in the results presented. The FL score, however, provides as much information as does the ARS, and does so more parsimoniously.

Analysis of the results of scoring the records by a traditional scoring method reveals no significant differences on any of 28 variables, although four variables are differentiated before equating the two groups for number of responses produced.

REFERENCES

Anderson, H. H. (Ed.) Creativity and its cultivation. New York: Harper, 1959.

Beck, S. J. Rorschach's test. New York: Grune and Statton, 1949.

Bellak, L. Creativity, some random notes to a systematic consideration. J. proj. Tech., 1958, 22, 363-380.

Berlin, L., Guthrie, T., Weider, A., Goodell, Helen, and Wolff, H. G. Studies in human cerebral function: the effects of mescaline and lysergic acid on cerebral processes pertinent to creative activity. J. nerv. ment. Dis., 1955, 122, 487-491.

Born, W. Unconscious processes in artistic creation. J. clin. Psychopath. and Psychother., 1945, 253-272.

Burchard, E. M. L. Projective techniques in the analysis of creativity. J. proj. Tech., 1952, 16, 412-427.

Bychowski, G. Metapsychology of artistic creation. Psychoanal. Quart. 1951, 20, 592-602.

Carnap, R. Testability and meaning. In Feigle, H., and Brodbeck, May (Eds) Readings in the philosophy of science. New York: Appleton-Century-Crofts, 1953, 47-92.

Cleeton, G. U. Originality: a summary of experimental literature. J. abnorm. soc. Psychol., 1926, 21, 304-315.

Dewey, J. Art as experience. New York: Milton Balch, 1934.

Drevdahl, J. E. Factors of importance for creativity. J. clin. Psychol. 1956, 12, 21-26.

Edwards, A. L. Experimental design in psychological research. New York: Rinehart, 1950.

Edwards, A. L. Statistical methods for the behavioral sciences. New York: Rinehart, 1956.

Eichler, R. M. A comparison of the Rorschach and Behn ink-blot tests. J. consult. Psychol., 1951, 15, 185-189.

Eiduson, Bernice T. Artist and non artist: a comparative study. J. Pers., 1958, 26, 13-28.

Eindhoven, J E., and Vinacke, W. E. Creative processes in painting. J. gen. Psychol., 1952, 47, 139-164.

Ellenberger, H. The life and work of Hermann Rorschach (1884-1922). Bull. Menninger Clin., 18, 1954.

Freud, S. The interpretation of dreams. In Brill, A. A. The basic writings of Sigmund Freud. New York, Modern Library, 1938, 181-549. (original German edition, 1916)

Freud, S. Metapsychological supplement to the theory of dreams. In Freud, S. Collected papers, Volume IV. London: Hogarth Press, 1950, 137-151. (Original German edition, 1916). (a).

Freud, S. The unconscious. In Freud, S. Collected papers, Volume IV. London: Hogarth Press, 1950, 98-136. (original German edition, 1915). (b).

Feibleman, J. K. The psychology of the artist. J. Psychol., 1945, 19, 165-189.

Ghiselin, B. (Ed.) The creative process. New York: New American Library, 1955.

Goldberger, L and Holt, R. R. Experimental interference with reality contact: individual differences. New York: Research Center for Mental Health, 1958 (dittoed).

Gordon, W. J. J. Operational approach to creativity. Harvard Business Review, 1956, 41-51.

Gordon, W. J. J., and Bruner, J. S. Motivating the creative process. Boston: The Institute of Contemporary Art, 1954.

Gordon, W. J. J., Gifford, D. C., and Bruner, J. S. Integrating the creative process into industry, education, science and the arts. Boston: Center for Design Studies of the Institute of Contemporary Art, 1957.

Guilford, J. P. Creativity. Amer. Psychologist. 1950, 5, 444-454.

Guilford, J. P. Creative abilities in the arts. Psychol. Rev., 1957, 44, 110-118.

Hall, C. S. and Lindzey, G. Theories of Personality. New York: Wiley, 1957.

Harrower, G. and Cox, K. The results obtained from a number of occupational groupings in the professional level with the Rorschach group method. Bull. Canad. Psychol. Assn., 1947, 3, 31-33.

Hart, H. H. The integrative factor in creativity. Psychiatric. Quart., 1950, 24, 1-16.

Hartmann, H. Ego psychology and the problem of adaptation. In Rapaport, D. Organization and pathology of thought. New York: Columbia Univ. Press, 1951, 362-398.

Hathaway, S. R. and McKinley, J. C. The Minnesota Multiphasic Personality Inventory - manual. New York: The Psychological Corp., 1951.

Hersch, C. The cognitive functioning of the creative person: a developmental analysis by means of the Rorschach test. Diss. Abstr., 1958, 18, 296-297.

Hertz, Marguerite R. Reliability of the Rorschach ink-blot test. J. Appl. Psychol., 1934, 18, 461-477.

Hertz, Marguerite R. Current problems in Rorschach theory and technique. J. proj. Tech., 1951, 15, 307-338.

Holt, R. R. Implications of contemporary personality theories for Rorschach rationale. In Klopfer, B., Ainsworth, Mary D., Klopfer, W. G., and Holt, R. R. Developments in the Rorschach technique, Volume I. New York: World Book, 1954, 501-560.

Holt, R. R. Gauging primary and secondary processes in Rorschach responses, J. proj. Tech., 1956, 20, 14-25.

Holt, R. R. Manual for the scoring of primary process manifestations in Rorschach responses. New York: Research Center for Mental Health, 1959. (dittoed).

Hutchinson, E. D. Materials for the study of creative thinking, Psychol. Bull., 1931, 28, 392-410.

Hutchinson, E. E. How to think creatively. New York: Abingdon-Cokesbury, 1949.

Hyslop, T. B. The great abnormals. London: Phillip Allan, 1925.

Jacobson, A. C. Genius: some revaluations. New York: Greenberg, 1926.

Johnson, P. O. Statistical methods in research. New York: Prentice-Hall, 1949.

Jung, C. G. Psychology and Literature. In Ghiselin, B. (Ed.) The creative process. New York: New American Library, 1955, 208-223.

Klopfer, B., Ainsworth, Mary D., Klopfer, W. G. and Holt, R. R. Developments in the Rorschach technique, Volume I. New York: World Book, 1954.

Kris, E. Psychoanalytic explorations in art. New York: International Universities Press, 1952.

Mac Corquodale, K. and Meele, P. W. Operational validity of intervening constructs. In Marx, M. H. (Ed.) Psychological theory. New York: Macmillan, 1952, 103-111.

Markey, F. V. Imagination. Psychol. Bull., 1935, 32, 212, 236.

Mayman, M. Form quality of Rorschach responses. Topeka: Menninger Foundation, March 17, 1959, (dittoed).

Munsterberg, Elizabeth and Mussen, P H. The personality structures of art students. J. Pers., 1953, 21, 457-466.

Myden, W. Interpretation and evaluation of certain personality characteristics involved in creative production. Percept. mot. Skills, 1959, 9, 139-158.

Newell, A , Shaw, J.C., and Simon, H. A. The processes of creative thinking. Santa Monica: Rand Corporation, 1958. (Paper presented before a symposium at the University of Colorado, May 14, 1958).

Patrick, Catherine. Creative thought in artists. J. Psychol., 1937, 4, 35-73.

Pine, F. Thematic drive content and creativity. J. Pers., 1959, 27, 136-151.

Pine, F. and Holt, R. R. Creativity and Primary process: a study of adaptive reqression. New York: Research Center for Mental Health, 1959. (dittoed).

Piotrowski, Z. A. Perceptanalysis. New York: Macmillan, 1957.

Portnoy, J. A psychological theory of articic creation. Amer. Psychologist, 1949, 4, 266 (abstract).

Prados, B. Rorschach studies on artists - painters. Rorschach Res. Exch. 1944, 8, 178-183.

Rapaport, D. Organization and pathology of thought. New York: Columbia University Press, 1951.

Roe, Anne. Alcohol and creative work, Part I. Painters. Quart. J. of Stud. in Alcohol, 1946, 6, 415-467.

Roe, Anne. Painting and personality. Rorschach Res. Exch., 1946, 10, 86-100.

Rokeach, M Political and religious dogmatism: an alternative to the authoritarian personality. Psychol. Monogr., 1956, 70, No. 18.

Rokeach, M. The open and closed mind. New York: Basic Books, 1960.

Rokeach, M., McGovney, W. C. and Denny, M. R. A distinction between dogmatic and rigid thinking. J. abnorm. soc. Psychol., 1955, 51, 87-93.

Rorschach, H. Psychodiagnostics. Berne, Switzerland: H. Huber, 1942.

Schactel, E. G. Perception as creative experience. In Schactel, E. G. Metamorphosis, New York: Basic Books, 1959, 237-248.

Schafer, R. The clinical application of psychological tests. New York: International Universities Press, 1948.

Schafer, R. Psychoanalytic interpretation in Rorschach testing. New York: Grune & Stratton, 1954.

Smith, P. (Ed.) Creativity: An examination of the creative process. New York: Hastings House, 1959.

Stein, M. and Heinze, Shirley. Creativity: summaries of selected literature. Chicago: The Free Press, 1960.

Steiner, M. E The use of the Rorschach method in industry. Rorschach Res. Exch., 1947, 11, 46-52.

Taylor, C. W. (Ed.) The 1955 University of Utah research conference on the identification of creative scientific talent. Salt Lake City: University of Utah Press, 1956.

Taylor, C. W. (Ed.) The second (1957) University of Utah conference on the identification of creative scientific talent. Salt Lake City: University of Utah Press, 1958.

Terman, L. M. and Chase, Jessie M. The psychology, biology and pedagogy of genius. Psychol. Bull., 1920, 17, 397-409.

Tolman, E. C. The intervening variable. In Marx, M. H. (Ed.) Psychological theory. New York: Macmillan, 1952, 87-102.

Venning, G. H. and Polder, E. Bibliography on creativity. Bureau of Educational Research, Columbus, Ohio: Ohio State University, Jan., 1954.

Vidulich, R. N. An empirical analysis of the belief referents of persons with open and closed cognitive systems. Unpublished doctoral dissertation, Michigan State University, 1958.

Vinacke, W. E. Creative thinking. In Vinacke, W. E. The psychology of thinking. New York: McGraw-Hill, 1952, 238-261.

Wallas, G. The art of thought. New York: Harcourt, Brace, 1926.

Williams, M. An experimental study of intellectual control under stress and associated Rorschach factors. J. consult. Psychol., 1947, 11, 21-29.

Appendix A

Criteria sheet used by Art professors to recommend creative students

Please list the names of the 15 students majoring in your department who you feel best meet the following criteria, and also the names of the 15 students majoring in your department who you feel least meet the criteria. Please note that the criteria stated are meant as suggestive of the type of person we are interested in, rather than as an exhaustive definition of creativity.

> The student is a creative person, i.e., is able to reorganize existing facts and his perceptions into new and meaningful arrangements, and is able to communicate these arrangements to others; is able to perceive new solutions to problems; is not bound by previous judgments to the extent that known solutions hamper his desire to find better solutions; is able to interpret his perception of reality to others through a particular medium, e.g., painting, ceramics, design, sculpture, etc.

Would you please choose your selections from the ranks of relatively advanced students (juniors and seniors) in order that there be increased chance that other members of your department would also know them. In addition, may I suggest that these students need not be the most or the least intelligent students you have encountered, as I am sure you will

Appendix B
INFORMATION BLANK

Please fill out the following accurately. The information called for is essential to the research in which you have been asked to participate. Assurance is given you that all information will be treated as confidential and used for the purposes of this research only.

NAME:_____ SEX:_____
LAST FIRST MIDDLE

PRESENT ADDRESS:_____ PHONE:_____

AGE:_____ DATE OF BIRTH:_____ STUDENT NUMBER:_____

ENTERED MICHIGAN STATE:_____ AS FRESHMAN_____ TRANSFER FROM___
TERM YEAR

PRESENT CLASS (FRESHMAN, SOPH., ETC.):_____

MAJOR:_____

ART BACKGROUND:

PREVIOUS ART COURSES AT MSU (LIST BY NUMBER AND GIVE NAME OF INSTRUCTOR).

	NUMBER	INSTRUCTOR
1.	_____	_____
2.	_____	_____
3.	_____	_____
4.	_____	_____
5.	_____	_____

PREVIOUS ART COURSES OTHER THAN MSU (GIVE COURSE TITLE AND INSTITUTION)

	TITLE	INSTITUTION
1.	_____	_____
2.	_____	_____
3.	_____	_____
4.	_____	_____
5.	_____	_____

What is your occupational or vocational goal? (For example: professional artist, art teacher, illustrator, or other goal not associated with art.)

The following is a study of what the general public thinks and feels about a number of important social and personal questions. The best answer to each statement below is your personal opinion. We have tried to cover many different and opposing points of view; you may find yourself agreeing strongly with some of the statements, disagreeing just as strongly with others, and perhaps uncertain about others; whether you agree or disagree with any statement, you can be sure that many other people feel the same as you do.

Mark each statement in the left margin according to how much you agree or disagree with it. Please mark every one. Write +1, +2, +3, or -1, -2, -3, depending on how you feel in each case.

+1:	I AGREE A LITTLE	-1:	I DISAGREE A LITTLE
+2:	I AGREE ON THE WHOLE	-2:	I DISAGREE ON THE WHOLE
+3:	I AGREE VERY MUCH	-3:	I DISAGREE VERY MUCH

1. A person who thinks primarily of his own happiness is beneath contempt.

2. The main thing in life is for a person to want to do something important.

3. In a discussion I often find it necessary to repeat myself several times to make sure I am being understood.

4. Most people just don't know what's good for them.

5. In times like these, a person must be pretty selfish if he considers his own happiness primarily.

6. A man who does not believe in some great cause has not really lived.

7. I'd like it if I should find someone who would tell me how to solve my personal problems.

8. Of all the different philosophies which have existed in this world there is probably only one which is correct.

9. It is when a person devotes himself to an ideal or cause that his life becomes meaningful.

10. In this complicated world of ours the only way we can know what is going on is to rely upon leaders or experts who can be trusted.

11. There are a number of persons I have come to hate because of the things they stand for.

12. There is so much to be done and so little time to do it in.

13. It is better to be a dead hero than a live coward.

14. A group which tolerates too much difference of opinion among its own members cannot exist for long.

15. It is only natural that a person should have a much better acquaintance with ideas he believes in than with ideas he opposes.

16. While I don't like to admit this even to myself, I sometimes have the ambition to become a great man, like Einstein, or Beethoven, or Shakespeare.

17. Even though freedom of speech for all groups is a worthwhile goal, it is unfortunately necessary at times to restrict the freedom of certain political groups.

18. If a man is to accomplish his mission in life it is sometimes necessary to gamble "all or nothing at all".

19. Most people just don't give a "damn" about others.

20. A person who gets enthusiastic about a number of causes is likely to be a pretty "wishy-washy" sort of person.

21. To compromise with our political opponents is dangerous because it usually leads to the betrayal of our own side.

22. If given the chance I would do something that would be of great benefit to the world.

23. In times like these it is often necessary to be more on guard against ideas put out by certain people or groups in one's own camp than by those in the opposing camp.

24. In a heated discussion I generally become so absorbed in what I am going to say that I forget to listen to what the others are saying.

25. Once I get wound up in a heated discussion I just can't stop.

26. There are two kinds of people in this world: those who are on the side of truth and those who are against it.

27. Man on his own is a helpless and miserable creature.

28. The United States and Russia have just about nothing in common.

29. In the history of mankind there have probably been just a handful of really great thinkers.

30. The highest form of government is a democracy and the highest form of democracy is a government run by those who are most intelligent.

31. The present is all too often full of unhappiness. It is the future that counts.

32. Unfortunately, a good many people with whom I have discussed important social and moral problems don't really understand what is going on.

33. Fundamentally, the world we live in is a pretty lonely place.

34. It is often desirable to reserve judgment about what's going on until one has had a chance to hear the opinions of those one respects.

35. The worst crime a person can commit is to attack publicly the people who believe in the same thing he does.

36. In the long run the best way to live is to pick friends and associates whose tastes and beliefs are the same as one's own.

37. Most of the ideas which get published nowadays aren't worth the paper they are printed on.

38. It is only natural for a person to be rather fearful of the future.

39. My blood boils whenever a person stubbornly refuses to admit he's wrong.

40. When it comes to differences of opinion in religion we must be careful not to compromise with those who believe differently from the way we do.

Appendix D

"Filled" Dogmatism Scale

CREATIVITY PROJECT: REVISED QUESTIONNAIRE

The following is a study of what the general public thinks and feels about a number of important social and personal questions. The best answer to each statement below is your personal opinion. We have tried to cover many different and opposing points of view; you may find yourself agreeing strongly with some of the statements, disagreeing just as strongly with others, and perhaps uncertain about others; whether you agree or disagree with any statement, you can be sure that many other people feel the same as you do.

Mark each statement in the left margin according to how much you agree or disagree with it. Please mark every one. Write +1, +2, +3, or -1, -2, -3, depending on how you feel in each case.

+1:	I AGREE A LITTLE	-1:	I DISAGREE A LITTLE
+2:	I AGREE ON THE WHOLE	-2:	I DISAGREE ON THE WHOLE
+3:	I AGREE VERY MUCH	-3:	I DISAGREE VERY MUCH

1. A person who thinks primarily of his own happiness is beneath contempt.
2. I am often the last one to give up trying to do a thing.
3. The main thing in life is for a person to want to do something important.
4. Everyone at times thinks about things too bad to talk about.
5. In a discussion I rarely find it necessary to repeat myself several times to make sure I am being understood.
6. There is usually only one best way to solve most problems.
7. Most people just don't know what's good for them.
8. It is not always easy to tell the truth.
9. In times like these, a person must be pretty selfish if he considers his own happiness primarily.
10. I prefer work that requires a great deal of attention to detail.
11. A man who does not believe in some great cause has not really lived.
12. Most people get angry sometimes.
13. I'd like it if I should find someone who would tell me how to solve my personal problems.

14. I often become so wrapped up in something I am doing that I find it difficult to turn my attention to other matters.

15. Of all the different philosophies which have existed in this world there are probably many which are correct.

16. I dislike to change my plans in the midst of an undertaking.

17. It is when a person devotes himself to an ideal or cause that his life becomes meaningful.

18. If I could get into a movie without paying and be sure I was not seen I would probably do it.

19. In this complicated world of ours the only way we can know what is going on is to rely upon leaders or experts who can be trusted.

20. I never miss going to church.

21. There are a number of persons I have come to hate because of the things they stand for.

22. I like to know some important people because it makes me feel important.

23. There is so much to be done and so little time to do it in.

24. I usually maintain my own opinions even though many other people may have a different point of view.

25. It is better to be a dead hero than a live coward.

26. I do not like everyone I know.

27. A group which tolerates difference of opinion among its own members will last longer than one which doesn't.

28. I find it easy to stick to a certain schedule, once I have started it.

29. It is only natural that a person should have a much better acquaintance with ideas he believes in than with ideas he opposes.

30. I gossip a little at times.

31. While I don't like to admit this even to myself, I sometimes have the ambition to become a great man, like Einstein, or Beethoven, or Shakespeare.

32. I do not enjoy having to adapt myself to new and unusual situations.

33. Even though freedom of speech for all groups is a worthwhile goal, it is unfortunately necessary at times to restrict the freedom of certain political groups.

34. Some people vote for men about whom they know very little.

35. If a man is to accomplish his mission in life it is sometimes necessary to gamble "all or nothing at all".

36. I prefer to stop and think before I act even on trifling matters.

37. Most people just don't give a "damn" about others.

38. Once in a while I laugh at a dirty joke.

39. A person who gets enthusiastic about a number of causes is likely to be a pretty "wishy-washy" sort of person.

40. I try to follow a program of life based on duty.

41. To compromise with our political opponents is dangerous because it usually leads to the betrayal of our own side.

42. At times I feel like swearing.

43. If given the chance I would do something that would be of great benefit to the world.

44. I usually find that my own way of attacking a problem is best, even though it doesn't always seem to work in the beginning.

45. In times like these it is often necessary to be more on guard against ideas put out by certain people or groups in one's own camp than by those in the opposing camp.

46. I do not read every editorial in the newspaper every day.

47. In a heated discussion I generally become so absorbed in what I am going to say that I forget to listen to what the others are saying

48. I am a methodical person in whatever I do.

49. Once I get wound up in a heated discussion I just can't stop.

50. I think it is usually wise to do things in a conventional way.

51. There are two kinds of people in this world: those who are on the side of truth and those who are against it.

52. My table manners are not quite as good at home as when I am out in company.

53. Man on his own is a wonderful creature.

54. The United States and Russia have just about nothing in common.

55. In the history of mankind there have probably been just a handful of really great thinkers.

56. I always finish tasks I start, even if they are not very important.

57. The highest form of government is a democracy and the highest form of democracy is a government run by those who are most intelligent.

58. I would rather win than lose in a game.

59. The present is all too often full of unhappiness. It is the future that counts.

60. I often find myself thinking of the same tunes or phrases for days at a time.

61. Unfortunately, a good many people with whom I have discussed important social and moral problems don't really understand what is going on.

62. I have a work and study schedule which I follow carefully.

63. Fundamentally, the world we live in is a pretty happy place.

64. I find it hard to make talk when I meet new people.

65. It is often desirable to reserve judgment about what's going on until one has had a chance to hear the opinions of those one respects.

66. I usually check more than once to be sure that I have locked a door, put out the light, or something of the sort.

67. The worst crime a person can commit is to attack publicly the people who believe in the same thing he does.

68. I have never done anything dangerous for the thrill of it.

69. In the long run the best way to live is to pick friends and associates whose tastes and beliefs are the same as one's own.

70. I believe that promptness is a very important personality characteristic.

71. Most of the ideas which get published nowadays aren't worth the paper they are printed on.

72. I am always careful about my manner of dress.

73. It is only natural for a person to be rather fearful of the future.

74. I always put on and take off my clothes in the same order.

75. My blood boils when a person stubbornly refuses to admit he's wrong.

76. When it comes to differences of opinion in religion we must be careful not to compromise with those who believe differently from the way we do.

APPENDIX E

Primary Process categories used for scoring the Rorschach Protocols, and the Defense Demand (DD) associated with each

Content			(DD*)
L.	Libidinal		
L 1 O.		Oral 1	(2-4)
L 1 A.		Anal 1	(3,4)
L 1 S.		Sexual 1	(4)
L 1 E-V.		Exhibitionistic-voyeuristic	1
L 1 H.		Homosexual 1	(4)
L 1 M.		Miscellaneous libidinal 1	(3,4)
L 2 O.		Oral 2	(1-3)
L 2 A.		Anal 2	(1-3)
L 2 S.		Sexual 2	(1)
L 2 E-V.		Exhibitionistic-voyeuristic	2
L 2 H.		Homosexual 2	(1-3)
L 2 M.		Miscellaneous libidinal 2	(2,3)
Ag.	Aggressive		
Ag 1 P-S.		Potential--subject 1	(4,5)
Ag 1 P-O.		Potential--object 1	(3-4)
Ag 1 A-S.		Active--subject 1	(4-5)
Ag 1 A-O.		Active--object 1	(4,5)
Ag 1 R.		Results 1	(4,5)
Ag 2 P-S.		Potential--subject 2	(2,3)
Ag 2 P-O.		Potential--object 2	(1,2)
Ag 2 A-S.		Active--subject 2	(2)
AG 2 A-O.		Active--object 2	(2)
Ag 2 R.		Results 2	(1-3)
Anx.	Anxiety and guilt		
Anx 1.		Anxiety 1	(3)
Anx 2.		Anxiety 2	(1-3)
Aff.	Affective drive-derivatives		(3)

*DD = Defense Demand

APPENDIX E, Continued

Formal			(DD)
C.	Condensation		
C f-p	1.	Fusion of percepts	(4)
C i-e	1.	Internal-external view	(4)
C p-f	1.	Partial fusion	(3)
C u-p	1.	Unrelinquished percepts	(2)
C-co	1.	Composition 1	(3,4)
C-co	2.	Composition 2	(2)
C a-l	2.	Arbitrary linkage of percepts	(2,3)
C a-ci	2.	Arbitrary impossible comginations	(3)
C a-cu	2.	Arbitrary unlikely combinations	(2)
Arbitrary combinations of color and form			
FC arb	1.	FC arb	(3)
F/C	2.	FC or F/C	(2)
Do	2.	Fragmentation	(1)
Imp	2.	Impressionistic response	(2,3)
Trans	1.	Fluid transformation of percept	(3)
C-sym	1.	Color symbolism	(3)
C-sym	2.	Color symbolism	(1)
S-sym	1.	Spatial symbolism	(3)
I-sym	1.	Concrete image symbolism	(3)
I-sym	2.	Concrete image symbolism	(1)
ML	1.	Loosening of memory	(4)
Au Lg	1.	Austistic logic	(5)
DW	1.	DW	(4)
Ctr A	1.	Affective contradiction	(4)
Ctr L	1.	Logical contradiction	(3,4)
Ctr In.		Inappropriate activity	(3,4)
VS	2.	Verbal slips	(2)
VP	2.	Peculiar verbalizations	(3)
VQ	1.	Queer verbalizations	(4)
VC	1.	Verbal condensation	(4)
VI	1.	Verbal incoherence, confusion	(5)
Au El	1.	Autistic elaboration, Level 1	(3-5)
Au El	2.	Autistic elaboration, Level 2	(1-2)
S-R	1.	Self-reference	(2,3)
F-Msc	1 or 2.	Miscellaneous formal aspects	(3-4)

APPENDIX F

Control and Defense categories used to score the Rorschach protocols, and the Defense Contribution (DC) associated with each

Sequence		(DC) *
Recovery, modifying percept		
S M 1-0.	Level 1 - unscorable	(+1.5)
S M 2-0.	Level 2 - unscorable	(+1)
S M 1-2.	Level 1 - Level 2	(+.5)
S M R+.	Rationalization of percept	(+2)
S M R-.	Rationalization of percept	(-2)
Recovery, changing percept		
S C 1-0.	Level 1 - unscorable	(+1)
S C 2-0.	Level 2 - unscorable	(+1)
S C 1-2.	Level 1 - Level 2	(+.5)
Regression, modifying percept		
S M 0-1.	Unscorable - Level 1	(-1)
S M 0-2.	Unscorable - Level 2	(-1)
S M 2-1.	Level 2 - Level 1	(-.5)
Regression, changing percept		
S C 2-1.	Level 2 - Level 1	(-.5)
Delay		
Inh.	Inhibition	(+1; 1.5)
Reflection on response		
Isp+,-.	Introspection	(+2; -1)
Crt+,0.	Criticism of response	(+2; -2)
Remoteness		
R-min.	Minimal remoteness	(0)
R-eth.	Ethnically different	(+.5)
R-an.	Animals	(+1)
R-pl.	Plants	(+1.5)
R-ia.	Inanimate	(+2)
R-dep.	Depictions	(+1)
R-geo.	Geographical remoteness	(+2)
R-tm.	Remoteness in time	(+2)
Remoteness in level of reality		
R-fic s+.	Specific fictional	(+2)
R-fic s-.	Specific fictional	(-1)
R-fic n+.	Non-specific fictional	(+2)

APPENDIX F, Continued

R-fic n-.	Non-specific fictional	(-1)
R-fan+.	Explicit fantasy or dream	(+2)
R-fan-.	Explicit fantasy or dream	(-1)

Context of response (DC)

Cx C+,-.	Cultural context	(+2; -1)
Cx E+,-.	Esthetic context	(+2; -1)
Cx I+,-.	Intellectual context	(+2; -1)
Cx H+,-.	Humorous context	(+2; -1)

Pathological defenses

Va-.	Vagueness of percept	(-3)
Prj-.	Projection of responsibility	(-3)
Neg+,-.	Negation and undoing	(+1 -2)
Eu-.	Euphemism	(-1)
Minz-.	Minimization	(-1)
Obs+.	Obsessional defense	(-1)
Den-.	Attempted denial	(-2)

*DC = Defensive Contribution

APPENDIX G

General criteria for rating Defense Demand

The following is taken from Holt (1959, p. 48.)

DD Criteria

1. No apparent need for defense:

   Here fall responses that contain aspects of the primary process only implicitly, or references to matters that would hardly be noticed if referred to at a polite tea party.

2. Slight need for defense:

   The content and structure of the responses rated at this level are only slightly unusual in conversation, and arouse only slight degrees of tension. Also, any response containing both Level 2 Content and Level 2 Formal scores must be rated at least 2.

3. Moderate need for defense:

   The Content and Formal deviations here scored are at the level that might cause moderate tension or social embarrassment if they occurred in conversation. Also, any response combining Level 1 Content and Level 2 Formal or Level 2 Content and Level 1 Formal must be rated at least 3.

4. Considerable need for defense:

   The level here is set by the example of sexual organs: it is possible for most people to refer to such things in a doctor-patient setting, but it is not permissible in ordinary conversations. Also, any response combining any kind of Level 1 Content and Level 1 Formal material must be rated at least 4.

5. Great need for defense:

   Shocking ideas which could under no circumstances be introduced onto a social conversation without extensive controls and defenses. Such responses are almost pathognomonic of psychosis, since they imply both a serious breach of judgment in order to be mentioned, and the availability to awareness of ideas that are usually kept unconscious.

APPENDIX G, Continued

DD Criteria

6. Greatest need for defense:

Sometimes it happens that a response contains content that would be rated 5 and also formal deviations that are at the 5 level. The result is about as much primary process and need for defense as can be packed into a single response; responses rated 6 will occur exclusively in psychotic records.

APPENDIX H

Form Level scores (FL) and explanation of Form Level Categories The following, with slight revision (*), is taken from Holt (1959, p. 59).

Form Level Score	Category	Explanation
+3*	F+	Sharp, convincing forms, easily seen by E.
+2*	Fo	Popular and near popular forms, Fixed list in manual (Mayman, 1959).
+1.*	Fw+	Reasonably plausible, but not terribly convincing forms; takes a little stretching to see.
-1	Fw -	Forms that bear only a slight resemblance to the blot area; not very plausible, or based on one point of resemblance.
-2	Fv	Vague, non-definitive forms--things that intrinsically do not have specific shapes. "Clouds"; "opening of a cave"; "ink splash"; "blood stain, running down"; "pile of dirt"; "piece of dough"; "texture of cloth."
-3	Fa	Amorphous responses, in which form plays no role (and could not, by the nature of the concept). Usually pure C, C', or CH. "sky"; "water"; "night"; "spring"; (and other abstract concepts) "urine" (but "wine stain" seen as having some sort of shape, Fv; likewise, "blood" may be Fa but is usually Fv.

APPENDIX H, Continued

Form Level Score	Category	Explanation
-3	Fs	Spoiled form responses, to be given where the subject gives what is basically a familiar and good response (which could have been scored Fo or F) but introduces some specification that has the effect of markedly lowering the acceptability of the response as a whole.
-4	F-	Arbitrary forms, bearing very little or no resemblance.

*Holt (1959, p. 59) suggests scoring Fw+, Fo, and F+ as 0, +1, +2, respectively. The present decision to eliminate the 0 Form Level, and score +1, +2, +3 is based on the desire to allow "good" form level to make a contribution to the Adaptive Regression Score.

APPENDIX I

Rorschach Scoring Categories - Klopfer System

The means for the following Rorschach categories are presented in Table 14. The explanation gives the formula by which each category was calculated.

Category	Explanation
R	The total number of Rorschach responses produced.
F+%	The sum of all Form-dominated responses scored + (e.g., FC+, Fm+) divided by the sum of all Form-dominated responses.
M/sum C	The sum of all M responses divided by the sum of C responses, where FC =.5, CF = 1.5, C = 1.5.
W/M	The sum of all W responses divided by the sum of all M responses, (e.g., 3/4 = .75).
F%	The sum of all F responses (i.e., F, F+, F-) divided by the total number of responses produced (R).

In all other cases, the calculation is obvious from the category itself. For example, Fm + mF + m is the sum of these three categories combined due to the smallness of the frequencies of each.

All other percentage categories are calculated as the percentage of the total number of responses (R).

The category "No. of content Categories" is calculated as the total number of categories used. (See Appendix J for a list of the content categories).

APPENDIX J

Content Categories Used to determine "Number of Content Categories" variable in Table 15.

Human (H)

Human part (Hd)

Human-mythological or fiction [(H)]

Animal (A)

Animal part (Ad)

Animal skin (Askin)

Sex (Sex)

Blood (Blood)

Inanimate objects (Obj)

Natural forms (Nat)

Landscapes (Ldsp)

Anatomy (A)

Clouds (cld)

Food (fd)

Architecture (Arch)

Art (art)

Symbolism (Symb)

Abstraction (Abstr)

Botony (Bot)

Mask (Mask)

Map (Map)

Miscellaneous (Misc)

Appendix K

Raw Data - Creative Group (N = 20)

Subject Code	D scale	"filled"* D scale	R	PPR	Non PPR	ARS	DD	DC	FL	FL Non PPR	FL - R
35	122		17	16	1	196.5	58	44.5	6.0	3.0	9.0
38	176	161	45	33	12	197.0	72	66.5	27.0	4.0	31.0
24	97	92	34	15	19	132.5	32	35.5	25.0	21.0	46.0
14	119		32	17	15	118.5	39	35.5	12.0	4.0	16.0
6	146	156	43	26	17	243.5	59	84.5	14.0	23.0	37.0
5	114		55	23	32	89.0	47	41.0	6.0	43.0	49.0
34	127		37	22	15	90.0	56	36.0	10.0	6.0	16.0
36	121	85	61	26	35	85.0	56	46.0	-3.0	10.0	7.0
18	122		54	25	29	139.0	51	48.0	12.0	18.0	30.0
30	123	124	33	30	3	33.0	106	9.5	-4.0	7.0	3.0
32	134		55	35	20	148.5	77	65.0	2.0	1.0	3.0
25	141	114	54	35	19	267.0	76	81.0	44.0	-5.0	39.0
39	163	136	60	25	35	180.0	46	68.0	30.0	45.0	75.0
37	141	130	31	17	14	61.5	42	41.5	-7.0	-12.0	-19.0
40	151	132	39	22	17	181.0	53	57.0	3.0	8.0	11.0
22	99	86	45	30	15	174.5	70	62.0	20.0	1.0	21.0
4	140	161	60	38	22	237.0	96	82.0	18.0	22.0	40.0
9	107	109	54	21	33	129.5	35	46.5	31.0	52.0	83.0
12	132	118	60	32	28	136.5	67	47.0	17.0	20.0	37.0
16	117	96	39	37	2	63.0	96	58.5	-17.0	2.0	-15.0
		* 35 items, data for 14 subjects who returned the scale									
Sum X	2592	1700	908	525	383	2902.5	1234	608.5	246.0	273	519
Sum X^2	343576	215476	44148	14775	9621	500243.25	84332	62161.3	7196	9221	26559
$\bar{X}$	129.6	121.42	45.40	26.25	19.15	145.12	61.70	30.42	12.30	13.65	25.95

Appendix L

Raw Data - Control Group (N = 20)

Subject Code	D scale	"filled"* D scale	R	PPR	Non PPR	ARS	DD	DC	FL	FL Non PPR	FL - R
19	169	160	19	14	5	95.5	40	29.5	6.0	-1.0	5.0
26	94	95	54	31	23	112.5	64	57.0	-7.0	23.0	16.0
15	147	136	17	11	6	10.0	35	13.0	-2.0	4.0	2.0
8	122	124	21	12	9	92.5	28	26.5	10.0	4.0	14.0
7	100	114	38	23	15	156.0	51	36.5	33.0	13.0	46.0
3	197	169	41	18	23	79.5	36	36.5	1.0	15.0	16.0
11	160	134	46	28	18	124.0	68	55.0	0	-9.0	-9.0
1	190	164	28	15	13	51.0	30	28.0	5.0	13.0	18.0
23	128	123	12	6	6	14.0	8	10.0	2.0	7.0	9.0
2828	163		26	14	12	76.5	27	36.0	13.0	7.0	20.0
27	168	151	24	14	10	-19.5	35	11.5	-13.0	15.0	2.0
20	184		59	27	32	28.5	52	45.5	-24.0	-5.0	-29.0
31	142	139	12	8	4	-1.0	16	4.0	-1.0	-4.0	-5.0
29	132	118	43	15	28	60.0	35	23.0	9.0	7.0	16.0
10	117	131	54	19	35	10.0	47	21.0	-12.0	42.0	30.0
2	171	159	37	28	9	46.0	73	44.5	-18.0	9.0	-9.0
33	149	129	24	10	14	78.0	25	28.5	1.0	18.0	19.0
17	144		23	10	13	42.5	20	29.5	-5.0	-6.0	-11.0
21	122	117	37	28	9	176.0	65	64.5	14.0	14.0	28.0
13	142		42	25	17	81.5	55	49.0	-8.0	12.0	4.0
Sum X	2941	2163	657	356	301	1313.5	810	649.0	4.0	178	182
Sum X^2	447935	298853	25425	7484	6063	137632.25	39142	26272.5	3058	4166	7128
$\bar{X}$	147.05	135.18	32.85	17.8	15.05	65.68	40.5	32.45	.20	8.90	9.10

*35 items, data for 16 subjects who returned the scale