CHANGES IN THE STRUCTURAL ASPECTS OF PERCEPTION IN THE AGED: AN ANALYSIS BY MEANS OF THE RORSCHACH TEST

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CHANGES IN THE STRUCTURAL ASPECTS OF PERCEPTION IN THE AGED: AN ANALYSIS BY MEANS OF THE RORSCHACH TEST

By

Herman Rochwarg

AN ABSTRACT

Submitted to the School of Graduate Studies of Michigan State College of Agriculture and Applied Science in partial fulfillment of the requirements for the degree of

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HERMAN ROCHWARG ABSTRACT

The purpose of this research project was to investigate one aspect of the psychological functioning of the aged; namely, the structural aspects of this group's perception. A review of the literature suggested that there is an involution of this perceptual process which parallels the decline noted in physiologic processes, sensory and motor functioning, intellectual abilities, and over-all psychological functioning of this group.

As a test of this general hypothesis, the Rorschach responses of two groups of subjects were analyzed: (1) a group of forty normal aged between the ages of 68 and 91; and (2) a group of forty normal adults between the ages of 23 and 45. None of the aged subjects were bed patients or convalescents. All were relatively active, either in the community or in the home in which they resided. The adult subjects were either government employees or held jobs in various industrial organizations.

The specific hypotheses stated the following:

1. The aged group, being characterized by a general biological involution, would show less evidence of integrative perceptual activity than the adult group.

2. The aged group would show more evidence of early thought processes than would the adult group.

The Rorschach responses of these two groups were analyzed in terms of developmental level, using an index of integrative perceptual activity and an index of primitive thought processes.

Both hypotheses were confirmed by the results. The aged group scored significantly lower on the Index of Integration, and significantly higher on the Index of Primitive Thought.

In the discussion of the results, three main points were stressed:

1. Senescence is a developmental phase characterized by its own unique psychological structure.

2. Perceptual decline in the aged is marked by considerable individual variation.

3. The indices of developmental level used in this investigation could be appropriately employed to evaluate the "psychological" age of elderly individuals.

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This research is dedicated to my wife, Irene, whose contributions were immeasurable.

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I. INTRODUCTION

Considerable attention has recently been focused on the problem of psychological changes in old age. A look at the available statistics should make apparent some of the reasons behind the sudden rise in attention devoted to this question. Over the past half century, remarkable changes have been taking place in the age distribution of the United States population. The reduction of mortality together with a decline in fertility and a restricted immigration have produced an extensive as well as challenging problem, that of an aging population. In 1900, there were a little more than three million people over 65 in the United States. This was one person out of every twenty-five. In 1950, the Bureau of Census reported that there were 13.4 million people over 65, or one person out of every twelve. Within the brief period of one decade -- 1940 to 1950 -- the population at ages 65 and over increased by 37 per cent, whereas the number at ages under 65 rose by only 13 per cent (53). Furthermore, the expectation is that by 1975, 20.7 million people in the United States will be 65 or over; and by the end of the century, the Bureau estimates that there will be more than 26 million people

or over.[1] This is 13 per cent of the anticipated population as compared with 4.1 per cent in 1900.

Concern with the problem of an aging population seems to mount as its wide-spread implications become more clear. An aged population is bound to have a higher crude[2] death rate, lower marriage and birth rates, less economic productivity and smaller per capita income (54). It has also been said that an aged population loses a great deal of its former initiative, "falling gradually into a stagnant conservatism in business, government and in personal habits" (11). Proposals for attending to the serious economic needs of this group are now being studied on a national as well as state level. Changes in the employment policies and contemporary educational practices loom as essential.

A dramatic appraisal of the situation is offered by a leading gerontologist:

> Man is a utilitarian creature and even pure scientific research is in part motivated by practical necessity. The present situation of a dramatically rapid increase in the number of the elderly in our population is wholly without precedent.....never before in the history of mankind has a like problem arisen; plagues, wars and famines have many times seriously changed the balance of population structure, but never before in the direction of a preponderance of the elderly such as is occurring today. (39, p.5)

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[1]The above estimates are made under the assumption that the prevailing conditions of fertility, mortality and immigration continue.

[2]The term "crude" refers to an uncorrected statistic, in this case a percentage.

A. The Biology of Aging

Almost nothing is actually known about the biology of aging; that is, its fundamental underlying causes. The impact of such factors as homeostatic constants, cellular infiltrates, cumulative tissue damage, nutrition, and heredity upon growth are not yet open to precise investigation. Explanations are often endowed moreover, with references to mystical growth energies (38).

The aging process is a continuous one, and involves all of the innumerable aspects of life. It begins with conception and terminates only with death. The term "aging" may be defined in several ways; for the purposes of this study, the one offered by Stieglitz will be used: "those changes which are introduced by the factor of time in living" (54). It involves two processes which go on simultaneously from the beginning to the end of life; growth or evolution, and atrophy or involution.

> These processes continue throughout life, though at various rates naturally. We can observe illustrations of atrophy even before the infant is born in the disappearance of the gill clefts which first develop and then atrophy in the early mammalian embryo. At the time of birth when the child begins to breathe and get its oxygen from the lungs instead of from the mother's circulation, the atrophy of certain arterial structures is indistinguishable under the microscope from the involutionary changes which we see later in life. The atrophic process is the same in the newborn infant and in the grandparent (25, p. 282).

A most interesting, as well as important aspect of the biologic process of aging, is the fact that aging changes

are neither uniform nor symmetric. "This asymmetry of maturation affects us both biologically and psychologically. Within the same species of mankind, there occurs great individual variation"(54). It is not uncommon to hear about the vigor and alertness of some spry septuagenarian. It is equally common to hear of others who seem "old" at fifty.

> Each organism is characterized by its own physiologic age which may be greater or less than than its chronological age. In addition, no organism is of uniform physiologic age throughout, for the various organs and systems age at different rates at intervals in the life span.....the process of aging progresses more rapidly in the beginning than in the end; the rate of change (aging) is greatest in the fetus, less in the infant, still less in the child and after maturity becomes so slow as to be perceptible only by observations spaced widely apart (54, p.6).

A fundamental distinction should be made at this point between healthy old age (senescence) and disease in advancing years (senility) (25,55). The basic difference between the two is that senescence is a slow, almost imperceptible process, whereas in senility there is an unduly rapid deterioration involving body physiology, mental activity, and emotional responsivity. It is with senescence that this paper concerns itself.

Physiological Changes in Senescence. The problem of defining what changes in the physiology of the aging individual are normal and which are abnormal, is puzzling even to pathologists. The issue becomes sharply focused upon the

possibility of distinguishing between the cumulative but physiological changes that inevitably take place in all individuals as they grow older, and pathological changes that occur in the elderly as a result of adverse environmental conditions (11). The definition of normal structural changes must be made in the statistical sense since it is impossible with our present knowledge of anatomy and biochemistry to distinguish between pathological and normal structural changes. If most individuals show a certain change, that change is accepted as an entirely proper reaction of the individual to the environment (38).

The basic physiologic changes occurring in senescence may be classified into three groups (7,8):

1. Reduction in the size of organs and of the organism as a whole. This is physiologic atrophy and is brought about in part by a reduction in the size of cells. Replacement and repair effective in earlier years have become inadequate to offset the attrition of use.

2. Changes in the intercellular and supporting tissue of the body which increase the proportion of connective tissue as compared to the more actively functioning elements.

3. Alterations in the blood vessels are the chief characteristics of the aging process. The large vessels lose their elasticity, the walls become thicker, muscle and elastic fibers are replaced by a nonelastic hyaline substance.

Intellectual, Sensory and Motor Decline in Senescence. So far only the physiology of aging has been discussed. Aging of the organism denotes, of course, aging in all areas -- aging physically, mentally, emotionally and socially. It is a fundamental tenet of gerontology that the elderly are not "just old people". They are structurally, functionally and mentally different men and women than in the days of their youth and early maturity (1,8,25).

Research in the area of behavior has demonstrated that the physiologic changes described above have a counterpart in the changes of psychological functions as well. Wechsler (58) states that, "intellectual decline occurs after maturity with the natural increase of age and is independent of any specific mental disease. Every human capacity after attaining a maximum begins an immediate decline. This decline is at first very slow but after a while increases perceptibly. Once the decline begins it progresses continually. The decline of mental ability with age is part of the general senescent process of the organism as a whole". According to Miles (35), Jones and Conrad found a continued improvement in intelligence test scores up to the early twenties and a gradual decline afterwards. This decline became became most marked after 45 years of age.

A study by Yerkes on intellectual decline is reported in the literature by Gilbert (19). Yerkes found that officers

in their sixties had an average mental age 18 months below those officers aged 20-25. Gilbert (19) also reports a study by Weiss who found that the intellectual performance of several hundred industrial workers between 20-60 declined steadily from the age of 30 on. Other independent investigations by Rabin(46), Madonick (32), Lorge (31) and Miles (35) all confirmed the fact that there is an intellectual decline accompanying normal old age.

Gilbert (19), in summarizing a discussion of intellectual changes with senescence said that: "From these many investigations into the matter of intellectual impairment with advancing age, we can see that there is a decline in intelligence test scores in senescence . All studies are in agreement on this point." In addition, she states that changes in intelligence are inextricably linked to changes in the physiology, personality and emotional life of the aged person and must be considered as part of a general biological involution.

It should be noted that not all intellectual functions follow the same course of decline with age but are dependent, in part at least, upon the length of use and practice. Some abilities, such as vocabulary, do not decline during old age (19).

Sensory activity as well as motor ability undergoes a decrement with time. The overall pattern of the changes in

mental abilities with age parallels this decline of sensory and motor functioning. Brozek, in reviewing the studies done in this area had this to say about changes in the aged:

> Maturity and old age are just two phases in man's total life cycle. The efficiency of sensory, motor, and intellectual functions follows a curve indicating an increase during the early years of life, a relatively steady state during adulthood, and decline with old age. This trend is characteristic of the changes in sensory, motor, and mental capacities in general but the detailed features vary for different functions; the overall pattern of changes in mental abilities with age is similar to the sensory and motor functions (6, p.233)

Personality Changes in Senescence. This pattern of physiological, sensory, motor, and intellectual decline with old age is strikingly similar to personality changes as well. Banham (3), in an attempt to describe these changes, speaks about three genetic stages roughly distinguishable from one another:

1. Infancy, with its characteristic undifferentiated and random behavior but not without signs of increasing differentiation and integration.

2. Maturity, where emotional sensitivity and control are most fully developed but with signs of consolidation and some disintegration in later maturity.

3. Old age, with constricted emotional responses and perseveration.

She comments on these psychological changes by adding that "the apparent diminution of affective adaptability in old age

is explained by the emotional organization undergoing a certain amount of consolidation, constriction, and disintegration in later years". Banham concludes with this comparison:

> All old people show in the normal process of aging a certain amount of inflexibility and narrowing of range of responses. Individuals vary as to the specific nature and degree of their inflexibility, but by and large, as they get older, they become more set in their ways, emotional moods, beliefs and attitudes. Just as there appears to be a process of maturation of behavior in early infancy with a neurological counterpart in the myelination of the axon sheaths, so also there seems to be a process of psychological senescence in the later years. This maturation and senescence shows in affective behavior as well as in motor coordination and thought processes (3, p.179).

The major portion of research with the aged carried on by psychologists has been devoted to the measurement of physiological and intellectual changes. The psychiatric literature, however, contains numerous articles describing personality changes, both normal and abnormal, in the aged person (34,39). Most of these are actually essays on age changes and are often founded on uncritical observations (57). A few articles like those by Schilder (50) and Kaufman (26) stand out as important contributions to the understanding of personality changes in old age.

With the introduction of more reliable measures of personality, psychologists have shown a growing interest in this problem of personality changes which accompany old age. Rorschach (49), in his original monograph, reported his impressions of the senescent's reactions to the ink blots.

He observed three principal features in the record:

1. A reduced capacity to make use of their inner resources and a weakening of the reaction to emotional challenges.

2. Inaccurate perceptions.

3. Highly restricted thought content demonstrating a tendency to stereotyped associations.

Klopfer's (28) analysis of 50 Rorschach protocols of aged individuals showed the aged person to be slower, less productive, constricted in inner integration and adaptive social responses. Moreover, the conclusions remark on the resemblance of the senescent's functioning to that of the child.

Prados and Fried (45) similarly analyzed 35 cases of old people between the ages of 50 and 80 and concluded that their affective life became quite shallow with little inner conflict and with slight emotional rapport with the environment. These writers also found that with increasing age, control over instinctual demands tends to disappear and some of the manifestations of childhood tend to recur.

Grossman, Warshawsky, and Hertz (21) reported a Rorschach study on 50 old people from 60 to 90 years old. They found the elderly people to be slower and less productive than the average adult. Thought processes were "rigid and often irrealistic", and an inability to form satisfactory social relationships was especially evident.

The most recent Rorschach analysis of a normal aged group was carried out by Ames et al. (2). These investigators were interested in studying age changes in intellectual and emotional functions and their results were essentially the same as those previously discussed.

In summary, then, the prominent features of the aged personality, as reflected in the Rorschach, may be stated as:

1. Decreased emotional responsiveness.
2. Narrowed range of interests.
3. Less adequate adjustment than younger adults.
4. Faulty perception of reality.
5. Recurrence of manifestations common in childhood.

In all but one of these studies, the primary aim of the investigators was to study the adjustment capacity of the aged. Though the findings were marked by their distinct structural congruence with other developmental changes observed in the senescent's functioning, no attempt was made to bring these results into any framework of genetic theory. Rather, there was a tendency to view senescence as a pathologic state of maturity.

Ames et al. (2), were the only investigators who attempted to discuss changes with age in terms of growth and development. They spoke about "patterned age changes which should take place in old age as they do in childhood". The subjects in this study were divided into three groups: the 70-year-olds, 80-year-olds and 90-year-olds. Using the customary scoring procedure,

the investigators expected to find marked differences between these three groups. On analysis of the data, however, no consistent differences were forthcoming. It was found that some subjects in each age group responded virtually as would the normal younger adult. Some subjects in the oldest age group responded more adequately than those in the younger. It was then decided to classify each subject as either "normal", "presenile" or "senile", principally on the basis of certain qualitative signs. For example, some of the signs designated as "presenile" included the giving of initial exclamations, refusals, interest in other peoples' responses, looking at the back of the card, an animal per cent of 50 or more, the relating of personal experiences and a response total of fifteen or less. On the basis of this qualitative sign approach Ames et al. reported that, " each of these three classifications seems to stand out as a patterned entity".

B. Perception as a Developmental Function.

As can be seen from the literature (64) the area of perception has proven to be a fruitful approach to the investigation of countless psychological problems. There is, in the area of psychology, a theory of perceptual development which has stimulated the present study. It is that of Heinz Werner(60). He states that all development may be expressed in terms of "an increasing differentiation of parts and an increasing sub-

ordination or hierarchization." Immature and mature levels of development can be described respectively as relatively "undifferentiated" or "differentiated and hierarchically integrated". Thus, immature perception, as seen in a young child, is a diffuse reaction to the global aspects of the situation as a whole. From this kind of perception, development is thought to proceed through "a process of differentiation and integration, a separation of discrete functions and psychological processes and their outgrowth into an integrated pattern of distinct visual processes".

Developmental movement, then, is in the direction of increasing differentiation and hierarchization. This genetic change is exemplified by certain paired concepts: "syncretic-discrete", "diffuse-articulated", "indefinite-definite", "rigid-flexible" and "labile-stable". Immature perception is said to be diffuse, indefinite, rigid, labile, and syncretic.[1] Mature perception is described as discrete, articulated, definite, flexible, and stable.

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[1] The term "syncretic" is defined by Werner: "If several mental functions or phenomena, which could appear as distinct from each other in a mature state are merged without differentiation into one activity, we may speak of a syncretic function or syncretic phenomena". (60, p. 53)

C. The Problem

In his discussion of perceptual development, Werner makes no direct reference to the course of this development in old age. Evidence has been presented to show the presence of physiologic, intellectual, sensory and motor decline in the aged. Projective techniques have more recently shown, that as a result of the aging process, there are also changes in overall psychological functioning. The application of Werner's theory to the study of the effects of aging in younger groups has already been effectively studied by means of the Rorschach (16,23). The application of these experimental findings of functional decline to Werner's genetic framework permits one to make the logical supposition that with old age there is also a reversal in the developmental pattern of perception towards decreasing differentiation and reduced hierarchization.

Friedman (16), using the Rorschach test as an experimental genetic instrument, introduced a scoring system designed to study variations in the structural aspects of perception. He defined various subgroups of the usual location choices (W and D)[1] so that it is now possible to assess the characteristics of each choice. All of these

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[1] A response to the whole of the Rorschach card is designated by a "W" score. A response to a delimited detail of the Rorschach card is designated by a "D" score.

Rorschach scores may be considered as reflecting levels of organization by the subject, since they are defined in terms of genetic theory, conceptualizing a change from a state of relative undifferentiatedness to a state of differentiation and hierarchic integration. Each response is assigned a score which represents the nature and quality of the individual's integrative effort at various genetic levels.

Hemmemdinger (23), using this genetic scoring system analyzed the protocols of 160 children ranging from 3-10 years of age as well as the record of 30 mormal adults, 20-40 years of age. In comparing the records of the two groups, he found that, "when the quality of the Whole (W) and Detail (D) scores is examined, the proportions of genetically mature scores were observed to increase regularly with ages from three years to adulthood". Subsequent studies by Siegel (52), Frank (14), and Lofchie (30) confirmed these conclusions. Of all the scores in the genetic scoring system, these "mature" scores reflect the most complex organizing activity of the person and were referred to by Lofchie as the "Index of Integration".[1]

It is the plan of the present research to use this Index of Integration in comparing the developmental level of a normal

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[1] A complete description of the genetic scoring system may be found in the Appendix. A brief description of this system will be found in the next chapter, along with a definition of the Index of Integration.

aged group with that of a younger normal adult group. The Index of Integration was chosen as a measure of developmental level because it is an index representative of the most highly developed organizational functioning and because it is the combination of scores in the genetic scoring system that shows a uni-directional positive relationship with development.

In a recent study, Misch (37) was able to differentiate a "verbal" group from a developmentally lower "motoric" group at a significant probability level on the basis of that group of scores in the system that seem specific to developmentally early thought processes. This group of scores, when taken together, was referred to by Misch as the "Index of Primitive Thought"[1] and will be used in this study as a second measure of developmental level. These scores show a uni-directional decrease with age up to adulthood and reflect developmentally early thought processes. This measure was included on both theoretical and empirical grounds as the writings of Banham (3), Rorschach (49), Klopfer (28) and Ames (2) have indicated there were recurrences in the aged of manifestations common to childhood.

It does not necessarily follow that if there is a reduction in those scores reflecting later developmental functioning that there will also be an increase in genetically early functioning since there is a middleground of scores in the scale which are not designated as either integrative or primitive.

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[1] A definition of the "Index of Primitive Thought" appears in the next chapter.

D. The Hypothesis

The general hypothesis is made by the author that in the process of normal aging, there is a reversal in the developmental pattern of perception away from the maximum hierarchic integration and organization found in normal adults. Secondly, that in the process of normal aging there is also a reappearance of genetically early perceptual processes. This led to the specific hypotheses that if an aged group were compared to an adult[1] group, the aged group would show less evidence of developmentally mature functioning and more evidence of developmentally early functioning than would the younger group.

Having specified the two groups (normal aged and normal adults) and the measures to be used (Index of Integration and the Index of Primitive Thought), the specific hypotheses become:

1. That the aged group will achieve lower scores than the adult group on the Index of Integration and

2. That the aged group will achieve higher scores than the adult group on the Index of Primitive Thought.

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[1] Henceforth, the word "adult" will be used to refer specifically to the younger group.

II. METHODOLOGY

A. The Subjects

The subjects in this experiment consisted of two groups: 1) an experimental group of 40 white males between the ages of 68 and 91; and 2) a control group of 40 white males between the ages of 23 and 45. Their intelligence was recorded in terms of mental age. The mental ages were derived from the vocabulary sections of either the Revised Stanford-Binet or the Wechsler-Bellevue Form I. Their education ranged from no formal schooling to four years of university training. No member of either group had a history of psychiatric disturbance and all considered themselves to be in good physical health.

Because of the major changes in this country's social and economic structure over the past 50 years, it would have been misleading to make a comparison of the socio-economic status of the groups on the basis of annual income, education or occupation alone. Rather, selected items from a social attainment scale reported by Phillips and Cowitz (41) and revealing many aspects of the subject's earlier economic and social experience were used. Table 1 is a comparison of

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[1] A complete description of the modified Worcester Social Attainment Scale may be found in the Appendix.

the two groups on age, social attainment, and intelligence.

TABLE 1

A COMPARISON OF GROUPS ON AGE, SOCIAL ATTAINMENT AND INTELLIGENCE

Group	Age Range	Mean Age	Median Age	Mean Score Social Attainment	Median M. A.
Aged (N-40)	68-91	78.3	78	15.4	19 - 9
Adult (N-40)	23-45	35.7	36	15.4	15 - 6

The experimental group was established in the following way. The author contacted various organizations known to have an intimate relationship with a normal elderly population. Without going into too many details, the research project was outlined to the proper authorities and assurances given that the tests to be used would not be taxing in any way to the subject. It was also made clear that no one who showed any reluctance would be tested.

The aged group was made up of subjects obtained from several sources; seventeen came from a Masonic Home in Charlton, Massachusetts; eight subjects were obtained at Goodwill Industries of Boston, a private industrial concern that is interested in providing employment for the aged; two of the subjects were from a private home for the aged; and the remaining thirteen were members of the South End House,

a Red Feather Agency which serves as a meeting place as well as a center for recreational and educational programs for the aged living in the community.

Since the aged group was to be compared with a younger group that was active and productive, it was considered desirable that the aged subjects be relatively active as well. None of the subjects used were either bed patients or convalescents. Of the entire group, 21 lived at home, many of them with their families. Of this number, eight had full-time jobs and several others held part-time positions. Of the two subjects coming from a private home one was an artist who continues to turn out paintings at a prolific rate, and the second was a volunteer instructor at the Manual Arts Therapy unit at a Veteran's Administration Hospital.

The Masonic home in Charlton is unique in that it bears only a slight resemblance to any institution dedicated to the care of the aging. The residents there have complete freedom to come and go as they please and visits to friends and relatives are a common occurrence. Married couples reside together, whereas it is almost a universal rule in most homes for the aged that the men and women live apart regardless of marital status. All of the subjects seen participated fully and actively in the affairs of the home. For example, one, a retired pharmacist, continues this role at the home, filling the pharmaceutical needs of all the residents.

A second ran the postoffice in the home, while a third managed the commissary. Still another was a guide, taking visitors to the home on tours of the grounds. Of the others, some worked in the laundry room, others in the dining hall and some tended the gardens.

The subjects from the South End House were regular participants in group activities and contributed substantially to the planning and organization of the various programs held at the center.

The control group was set up in the following way: Ten of the subjects were employed by the Veteran's Administration in various non-professional capacities. The remaining 30 were seen by another investigator as part of a larger research project.[1]

B. Procedure

The control subjects seen by the writer were told that he was preparing his doctoral dissertation on a comparison between the things a young group and an old group see on some ink blots. All those seen expressed a willingness to cooperate in the study.

As for the older group, the author was introduced to each subject by someone who was on friendly terms with that

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[1]The 30 control subjects seen by another investigator came from various industrial organizations in Massachusetts.

subject. In the case of the Masonic Home as well as the private home for the aged, this was the director. In the South End House, it was the social worker who acted as an intermediary. For the Goodwill Industries this task was handled by the personnel director.

It was explained to each of the subjects that the author was interested in working with older people and that this was a research project to "learn more about what makes older people tick". In addition, they were told that the information gathered was confidential and would remain so. They were told that other people their age had volunteered as subjects and found the tests interesting; that if they did not wish to go through the procedure, they did not have to. Of all the elderly individuals interviewed, seven refused to volunteer. Several of these were interviewed at the height of a widely publicized congressional hearing and felt that the author was and F. B. I. agent. Others considered themselves to be "stupid" and usually suggested the name of some other person who would, in his opinion, do much better. One or two felt that the procedure would be a violation of their privacy and refused to participate on that point.

Prior to the administration of the Rorschach, each of the elderly subjects was given a battery of four short

psychological tests[1] that are known to show a decrement with aging (32,46). It was felt that those subjects showing an unusually severe impairment on these tests should be eliminated. On this basis, two subjects were eliminated, both having shown an almost complete loss in memory and in simple arithmetic reasoning.

A standard Rorschach test was individually administered, there being a slight deviation in procedure only when the developmental aspects of a given response were not clear. Such an occasion arose when a "pars pro toto" or a "fabulized combination" appeared to have been given and further clarification was required.

In addition to the Rorschach test, the vocabulary test from either the Revised Stanford-Binet or the Wechsler-Bellevue Form I was administered. Both of these measures have been shown to be closely related (46, 57). The results of the Stanford-Binet are usually given in terms of mental age; the results of the Wechsler-Bellevue in terms of intelligence quotient (I. Q.). These I. Q. scores, however, may be transformed to equivalent mental age scores (58, p. 120, Table 17). Vocabulary has long been considered one of the best indices of intelligence (58). Furthermore, studies tend to agree that vocabulary holds up well

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[1]The Digit Span, Digit Symbol, and Arithmetic Sub-tests of the Wechsler-Bellevue, Form I, and the first paragraph for recall on the Wechsler Memory Scale were used (58,59).

with age and is remarkably resistant to impairment. Since it was intended to match the groups as closely as possible for original intellectual level, vocabulary seemed best suited to serve as an index.

Scoring of the Rorschach Protocols. A detailed description of the genetic scoring system will be found in Appendix I. Therefore, in this chapter the scores involved in the system will only be very briefly reviewed. All Rorschach protocols were scored independently by the author in accordance with the system developed by Friedman (16), and used by Siegel (52), Hemmendinger (23),Pena (40), Frank (14), Lofchie (30)and Misch (37). A sample of ten of the records chosen at random were independently scored by another psychologist to provide a measure of reliability.

C. The Genetic Scoring System

The genetic scoring system evolved by Friedman derives from Werner's description of developmental stages (60) and from observations made by Beck (4) and Rapaport (48). Werner has used the following schema to outline development: Development moves away from a fused unity of functions in the direction of articulation of functions and their integration into an ordered whole. The scores in the system represent an attempt to set up perceptual parallels to this general schema.

All scores in the system are based on location choice (W and D only), the definitness of the blot outline that the response requires, and organizational quality. The four highest response-types are also based on the adequacy of the form-level (whether or not the form elements are ∔ or -). The scores in the system are as follows:

W∔ and D∔ : responses are classed as "plus-plus" if they involve breaking down a solid blot area into component parts and then resynthesizing these parts to form an appropriately organized unity.

W∔ and D∔ : responses are classed as "plus" if they involve the integration of two or more discrete blot areas into an appropriately organized unity.

Wm and Dm : responses are classed as "mediocre" if they are given to a solid blot area, and are predominantly based on the specific gross outline of this area.

W- and D- : responses are classed as "minus" if the response requires a specific form, and if that form requirement is not met by the blot--i. e., if the form element is F-.

Wa and Da : responses are classed as "amorphous" if no specific form is required, the responses being based solely on chromatic or achromatic blot features.

Wpars and Dpars : responses are classed as "pars pro toto" when the only basis given for such responses is that some portion, less than half of the total blot area

included in the response, is given as the entire basis of what is seen. Pars pro toto responses include DW, DdW, D → D and DdD.

Wfab and Dfab : responses are classed as "fabulized combination" if they involve the inappropriate and arbitrary unification of two or more sub-units on the basis of sheer spatial contiguity.

Wcont and Dcont : responses are classed as "contaminations" if they involve the fusion of two separate responses given to the same area into a single response in which the elements of the two responses now intermingle.

Wv and Dv : the "vague" responses have been placed at the end of the list, not because they are lowest genetically, but because thay are essentially agenetic. That is to say, although an increasing number of "vagues" is to be expected as the general level of pathology comes to include more regressive phenomena (e. g., schizophrenics have more "vagues" than neurotics), "vague" responses are not characteristic of children. Although they seem associated with regression, they are uniquely adult. A response is scored as "vague" if the demand made on the blot structure is so minimal that almost any form could fulfill the requirement. "Vagues" fall between amorphous and mediocre response-types as regards the specificity of their form requirements.

The first three categories of this genetic system (viz., the plus-plus, plus and mediocre) are considered to be "mature"; in general they have shown a positive relationship with increasing age up to adulthood. The balance are considered to be "immature"; in general they have shown a negative relationship with increasing age. Some of the scores within the system, however, show stronger uni-directional relationships with age than do others. The two top scores (viz., the plus-plus and plus) have this characteristic relative to the mediocre score. Because of this, Lofchie (30) combined these two scores into an index of developmental level which has been used in the present study.

The Index of Integration. This index is a combinatory score, first proposed by Lofchie (30), who derived it from the work of Friedman (16), which is defined as the per cent of all W and D scores that clearly involve appropriate integration:

$$\frac{(W\not\not) + (D\not\not) + (W\not) + (D\not)}{(W + D)} \times 100$$

The integrated responses ($\not\not$ and $\not$) are the only response types whose median production at the normal adult level exceeds that of all levels of childhood and pathology and distinguishes between normal adulthood and psychoneurosis (30). The other scores in the system, while showing strong

developmental trends, have not demonstrated the clarity of relationship with development that these scores do. Or to put it in another way: of the scores presented in the genetic scoring system, two have been demonstrated to have superior validity as measure of perceptual development. Thus, theoretically and empirically, the integrative scores designate the most mature levels of perceptual development.

The Index of Primitive Thought. On the low side of the scale three types of responses (viz., pars pro toto, fabulized combination and contamination) seem to be most clearly associated with ideational processes of a developmentally early nature. These three have been combined into an index (The Index of Primitive Thought Processes) and have also been utilized in the present study. The psychological processes underlying these scores are reflected in behavior identified as syncretic, diffuse and labile.

This index is a combinatory score, first proposed by Misch (37), which is defined as the per cent of all W and D scores that fall in the pars pro toto, fabulized combination and contamination categories:

$$\frac{(W\text{pars and } D\text{pars}) + (W\text{fab and } D\text{fab}) + (W\text{cont and } D\text{cont})}{(W + D)} \times 100$$

D. The Statistical Technique

The procedure used was a chi square analysis. All the subjects, experimental and control, were ranked on a given score, and a combined median computed. This combined median provided a "cutting point"; the distribution of subjects from both groups was then compared in a 2 X 2 contingency table to test whether or not it was random with reference to the combined median. The null hypothesis, then, was that within the limits of chance, the distribution of each group would be evenly devided between the "above median" and "below median" categories. In case of those scores which yielded a combined median of zero (e. g. , the Index of Primitive Thought), the tables describing the results were labeled in such a way as to indicate that the tests were for presence vs. absence of the score, although the procedure was identical with those cases in which the combined median was a figure other than zero.

III. RESULTS

A. Reliability of Scoring

Although users of the developemtal system of scoring have repeatedly demonstrated that it is reliable (14,16,30 37,40,52), a sample of ten of the protocols, selected at random was independently scored by another psychologist.[1] This was done in order to provide a measure of reliability of the application of the system to this study. The percentage of agreement between the author and judge on the scoring of the 180 responses involved in the ten records was 93.6 per cent. This figure compares well with the mean agreement in all previous studies (93.7%) and would seem to indicate that the system of genetic scores has been reliably applied in the present study.

B. Location Choice and Productivity

Table 2 is a comparison of the two groups for location choice and response total. Although the two groups differed significantly on W and D location choices, a detailed discussion of these differences appears later in the chapter and will not receive further attention at this time.

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[1]The author wishes to express his appreciation to Dr. Robert C. Misch for his assistance in acting as a judge in this study.

TABLE 2

A COMPARISON OF THE GROUPS FOR LOCATION CHOICE AND RESPONSE TOTAL

Group	Median W%	Mean W%	Median D%	Mean D%	Median Dd%	Mean Dd%	Median "R"	Mean "R"
Aged	23	21	75	73	0.0	6	21	22.0
Adult	36	32	60	61	0.0	7	20	21.7

From the table it can be seen that there was very little difference in the average number of responses between the two groups. Previous Rorschach studies have reported a reduced productivity in the aged as compared with adults (10,28). However, the aged subjects in this study are of superior intellectual ability and this factor was probably most influential in the maintenance of their productivity.

The Number of Responses. Because of the possible influence on the various scores of the total number of responses, "R", a comparison has been made between the two groups on this variable. The results of this comparison are given in Table 3. As can be seen from the table, the difference between the two groups is not a significant one. No further consideration will be given to this variable in this paper.

TABLE 3

A COMPARISON OF THE NUMBER OF RESPONSES FOR BOTH GROUPS

		Aged Group (N-40)	Adult Group (N-40)	χ^2	Probability value
"R" (Combined Median 21)	Number above median	19	19	0.0	.99
	Number below median	21	21		

C. The Index of Integration

The Index of Integration, as was indicated in the previous chapter, is a combinatory score defined as the percentage of all *W* and D responses that fall in the plus-plus and plus categories. This combination of scores has been found to have a positive uni-directional trend with development and denotes the highest organizing capacity of the individual(30). Table 4 shows the comparison figures between the aged group and the adult group. As can be seen from the table, the index differentiated the aged from the younger group at a very significant level of probability. The plus responses formed a more discriminating score than the plus-plus responses, but both of them were exceeded in differentiating power by the Index of Integration.

TABLE 4

THE INDEX OF INTEGRATION AND ITS COMPONENTS

		Aged Group (N-40)	Adult Group (N-40)		Probability value
Index of Integration (Combined Median 15.0)	Number above median	9	31	24.0	.001
	Number below median	31	9		
Plus-plus % (Combined Median 0.0)	Number having at least one	4	17	9.3	.001
	Number having none	36	23		
Plus % (Combined Median 15.0)	Number above median	10	29	18.0	.001
	Number below median	30	11		

Table 5 is a comparison of the integrative scores attained by the two groups. The integrative W scores show more of a decline than the integrative D scores relative to their incidence in the adult group.

TABLE 5

A COMPARISON OF THE GROUPS FOR INTEGRATIVE SCORES

Group	Mean % of W++, W+	Median % of W++, W+	Mean % of D++, D+	Median % of D++, D+
Aged	4	0.0	9	8
Adult	20	17.0	25	22

D. The Index of Primitive Thought

The Index of Primitive Thought is a combinatory score defined as the percentage of all the W and D responses that fall in the pars pro toto, fabulized combination and contamination categories. These scores are specific to developmentally early thought processes and the index was first used to differentiate a developmentally mature group from one less mature at a significant level of probability (37). As indicated in Table 6 the index was able to differentiate

between the two groups. In addition, two of the component scores involved in the index, the pars pro toto and the fabulized combination discriminated between the two groups as well.

E. Interrelationship Between the Index of Integration and the Index of Primitive Thought

The present hypotheses were formulated in such a way as to predict differences in perceptual development from two approaches. The first of these approaches, utilizing the Index of Integration as its measure, was based on the experimental and empirical evidence of a general biological decline at senescence. The second approach, utilizing the Index of Primitive Thought as its measure, was based on the consideration that in the senescent period per se, there were resemblances to earlier behavior patterns. Therefore, in addition to predicting differences in the integrative capacity of the two groups, the existence of diffuse and syncretic perceptual patterns in the senescent group was expected as well. In a previous study, involving groups younger than the experimental subjects used here, these two measures were found to be unrelated (37). The results in Table 7 indicate that there was a significant relationship between the two indices suggesting the possiblity that in old age the process of decline is associated with extensive psychological changes.

TABLE 6

THE INDEX OF PRIMITIVE THOUGHT AND ITS COMPONENTS

		Aged Group (N-40)	Adult Group (N-40)	χ^2	Probability value
Index of Primitive Thought (Combined Median 0.0)	Number having at least one	26	3	26.0	.001
	Number having none	14	37		
Pars Pro Toto % (Combined Median 0.0)	Number having at least one	16	2	11.8	.001
	Number having none	24	38		
Fabulized Combination % (Combined Median 0.0)	Number having at least one	16	1	14.8	.001
	Number having none	24	39		
Contamination % (Combined Median 0.0)	Number having at least one	4	0	2.36	.10
	Number having none	36	40		

TABLE 7

INDEX OF INTEGRATION VS. INDEX OF PRIMITIVE THOUGHT FOR BOTH GROUPS

	Above Median Integration Index	Below Median Integration Index	χ^2	Probability value
Number having at least one Primitive Response	9	20	5.2	.02
Number having none	31	20		

F. The Index of Integration and Its Relationship to Other Variables

Cronbach (9) has pointed out that ratio scores such as the Index of Integration are often susceptible to spurious influences from other variables. Because of this possibility, a comparison was made between the Index of Integration and intelligence, social adequacy, and response total. The results of these comparisons are given in Table 8. As can be seen from the table, the relationship between the Index of Integration and these variables is not a significant one.

In table 9 the median values for the W, D, and Dd location choices for both groups are compared. The groups differed significantly on both D and W location choices. Because of the possible influence of such a difference upon the Index of Integration, the relationship of location choice to this index was investigated.

Table 10 shows the influence of W and D location choices on the Index of Integration. Only the W% was found to be significantly related to the index. A further analysis showed that it was only the W% of the adult group that bore this significant relationship to the Index of Integration. (The chi square for the comparison between the Index of Integration and the W% of the aged group was .10 and not significant.) It then became necessary to examine the degree to which the

integrative *W* responses (*W++*, and *W+*) were related to overall *W* production. A rank order correlation coefficient was found to be .10 and therefore negligible. Furthermore, when subjects of both groups were equated for *W%* and their respective scores on the Index of Integration compared by the method of Wilcoxon's (62) Paired Replicates, a very significant difference was found to exist (Table 11). Evidently, some other factor was responsible for the relationship found between *W%* and the Index of Integration.

G. The Index of Primitive Thought and Its Relationship to Other Variables

The Index of Primitive Thought, which is also a ratio score, was subjected to the same comparisons as the Index of Integration. In Table 12, the results of the comparisons between the Index of Primitive Thought and intelligence, social adequacy, and response total are given. None of the relationships were significant.

The next group of comparisons was made between the Index of Primitive Thought and location choice. Table 13 shows the relationship between the index and the *W* and D location choices for the separate groups. None of the comparisons proved to be statistically significant.

TABLE 8

THE INFLUENCE OF INTELLIGENCE[1], SOCIAL ATTAINMENT[2] AND RESPONSE TOTAL[3] ON THE INDEX OF INTEGRATION

Index of integration						
Number of Cases		Location of Variable	N	Independent Variable	χ^2	Probability Value
Above Median	Below Median					
17	23	Above median M.A.	80	M.A.	1.80	.20
23	17	Below median M.A.				
23	20	Above median S.A.	80	S.A.	.20	.70
18	19	Below median S.A.				
19	19	Above median "R"	80	"R"	.04	.80
22	20	Below median "R"				

[1]Intelligence is in terms of mental age and is designated in the table as M.A.

[2]Social attainment is designated in the table as S.A.

[3]Response total is designated in the table as "R".

TABLE 9

A COMPARISON OF LOCATION CHOICE FOR BOTH GROUPS

		Aged Group (N-40)	Adult Group (N-40)	χ^2	Probability Value
W% (Combined Median 27%)	Number above median	14	24	5.0	.02
	Number below median	26	16		
D% (Combined Median 66%)	Number above median	25	14	6.06	.01
	Number below median	15	26		
Dd% (Combined Median 0.0)	Number having at least one	18	20	.22	.70
	Number having none	22	20		

TABLE 10

THE INFLUENCE OF LOCATION CHOICE ON THE INDEX OF INTEGRATION

Index of Integration						
Number of cases		Location of Variable	N	Location Choice	χ^2	Probability Value
Above Median	Below Median					
25	13	Above median W%	80	W%	7.20	.01
15	27	Below median W%				
16	23	Above median D%	80	D%	2.44	.10
24	17	Below median D%				

TABLE 11

PAIRED REPLICATES FOR THE INDEX OF INTEGRATION

MATCHED FOR W%

Index of Integration %		Difference	Rank order	Lower rank total of same sign
AGED	ADULT			
16	46	/30	11.0	
0	23	/23	10.0	
13	22	/ 9	5.5	
11	27	/16	8.0	-0.0
10	15	/ 5	3.5	P = .01
4	6	/ 2	1.0	
5	10	/ 5	3.5	
0	12	/12	7.0	
11	15	/ 4	2.0	
13	36	/20	9.0	
0	9	/ 9	5.5	
$\sum$ 11	$\sum$ 11			

TABLE 12

THE INFLUENCE OF INTELLIGENCE, SOCIAL ATTAINMENT AND RESPONSE TOTAL ON THE INDEX OF PRIMITIVE THOUGHT

Index of Primitive Thought: Number of Cases Above Median	Index of Primitive Thought: Number of Cases Below Median	Location of Variable	N	Independent Variable	χ^2	Probability Value
18	22	Above median M.A.	80	M.A.	1.94	.20
11	29	Below median M. A.				
14	30	Above median S.A.	80	S.A.	.86	.60
15	21	Below median S. A.				
14	25	Above median "R"	80	"R"	.002	.95
15	26	Below median "R"				

[1]Intelligence is in terms of mental age and is designated in the table as M.A.

[2]Social attainment is designated in the table as S. A.

[3]Response total is designated in the table as "R".

TABLE 13

THE INFLUENCE OF LOCATION CHOICE ON THE INDEX OF PRIMITIVE THOUGHT

Group	Index of Primitive Thought: Number of Cases: Presence	Index of Primitive Thought: Number of Cases: Absence	Location of Variable	Location Choice	χ^2	Probability Value
Aged	11	9	Above median W%	W%	.038	.90
	8	12	Below median W%			
Aged	9	10	Above median D%	D%	0.0	.99
	10	11	Below median D%			
Adult	0	20	Above median W%	W%	1.5	.20
	3	17	Below median W%			
Adult	0	20	Above median D%	D%	1.5	.20
	3	17	Below median D%			

H. Intelligence

The intelligence level of all subjects was recorded in terms of mental age and based on the vocabulary items from either the Wechsler-Bellevue Form I, or the Revised Stanford-Binet. Table 14 indicates that the aged group differed significantly from the younger group in intellectual level. It must be emphasized that the senescent group in general seems to be of superior general ability and hence caution should be exercized before drawing conclusions from the results that would be applicable to all old people.

TABLE 14

A COMPARISON OF THE GROUPS FOR MENTAL AGE

		Aged Group (N-40)	Adult Group (N-40)	χ^2	Probability Value
Mental Age (Combined Median 16 - 6 yrs.)	Number above median	28	12	11.2	.001
	Number below median	12	28		

I. Social Attainment

In evaluating the social adequacy of the groups, items from the Worcester Social Attainment Scale were used. Some information about earlier experiences of the aged was considered desirable since this group was involved in a social

and economic atmosphere that differed perceptibly from that of the younger group. A quantitative comparison was based on the sum of the weighted scores of the items used. These included educational level, job level, job responsibility, level of supervision, marital status, membership in social organizations and avocations. As Table 15 indicates, there was no significant difference between the two groups on the selected items. Though the younger group usually had more formal schooling, there was less of a differential then expected due to the superior nature of the older group. The specific items from the Scale of Social Attainment can be found in the Appendix.

TABLE 15

A COMPARISON OF THE GROUPS FOR SOCIAL ATTAINMENT

		Aged Group (N-40)	Adult Group (N-40)	χ^2	Probability Value
Social Attainment Score (Combined Median 15.0)	Number above median	21	22	.04	.80
	Number below median	19	18		

J. Organization as a Developmental Function

Figure I gives the comparative median value for the integrative scores for children, adults, and aged. The figures for the children and adults are based on the cumulative samples used by Hemmendinger (23), Frank (14), and Siegel (52). The value for the aged group is from this study. As mentioned in the first chapter, there is a continual progression in the median integrative scores from age six on to adulthood. The integrative W scores do not appear until four years after the onset of the integrative D responses. In the aged group, the mature W scores drop out completely and the mature D scores show a marked decline. The median value of the aged group drops to a level somewhere between that achieved by eight and nine-year-old children.

K. Summary

In summary then, the results of the statistical comparisons are:

1. The genetic scoring system has been reliably applied.

2. As measured by the Index of Integration, the normal aged group shows a developmental decline when compared to a normal adult group.

3. As measured by the Index of Primitive Thought, the normal aged group shows a significantly greater number of responses characteristic of developmentally early thought processes than the younger normal adult group.

4. The Index of Primitive Thought and the Index of Integration are found to be significantly related in a negative direction.

5. The Index of Primitive Thought and the Index of Integration are found to be independent of intelligence, response total, and social attainment.

6. The Index of Integration is positively related to the *W* per cent of the adult group. However, the integrative scores (*ƒƒ*, *ƒ*) of the *W* location choice are found to be independent of the *W* production. When subjects from both groups are matched for *W* per cent and their Index of Integration scores are compared, a significant difference between subjects is found.

7. The groups differ significantly with reference to *W* and **D** location choices.

8. The groups do not differ significantly with reference to response total and social attainment.

9. The aged group is significantly higher in intellectual level than the adult group.

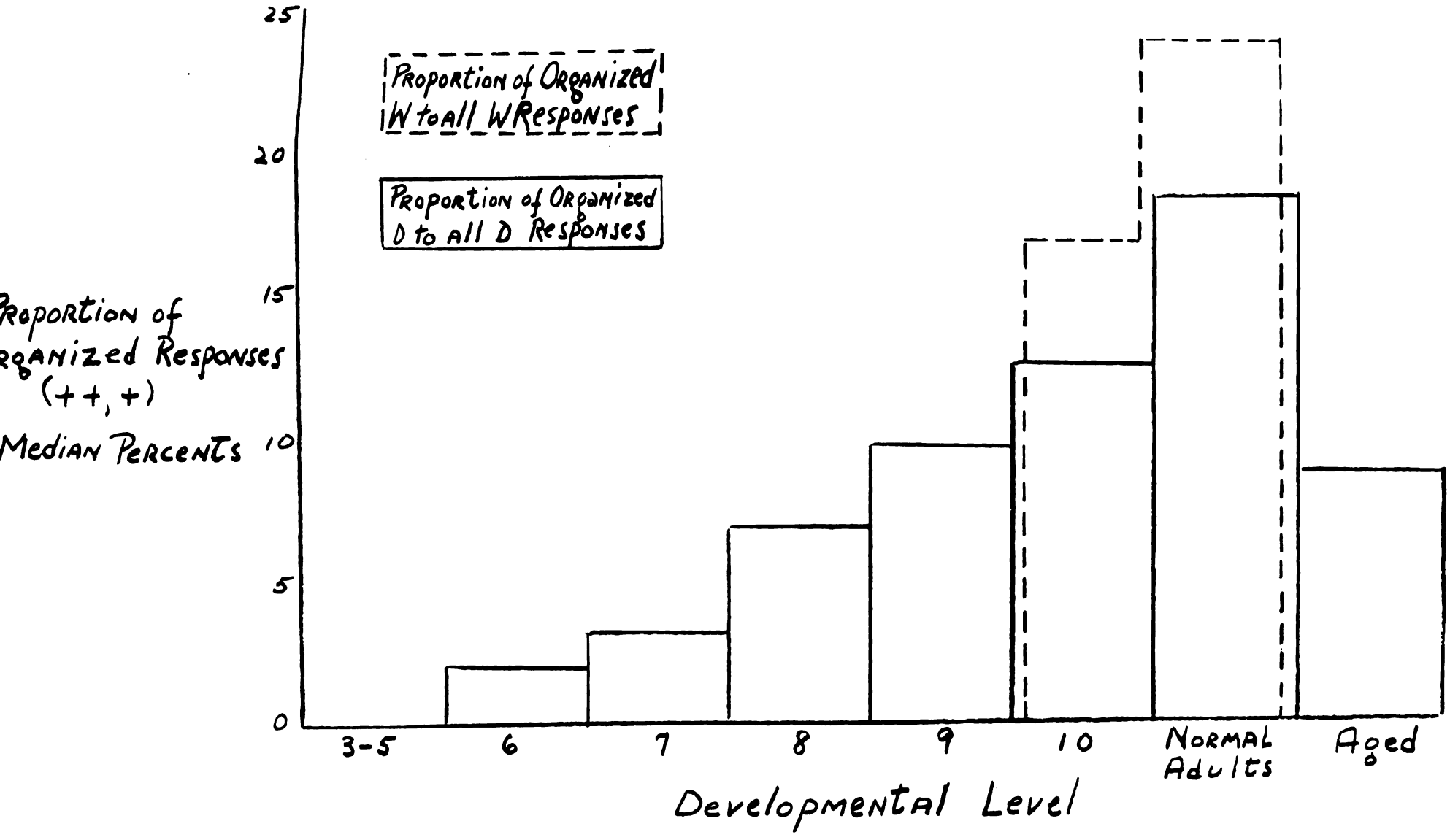

Fig. 1 Organization as a Developmental Function

IV DISCUSSION OF THE RESULTS

Evidence that old age is characterized by general biological involution led to the formulation of the major hypothesis that perceptual development undergoes a decline at senescence. The specific hypotheses were focused upon the level of organizing and intergrative capacity as measured by the Index of Integration, and the incidence of early thought processes as measured by the Index of Primitive Thought. Both of these hypotheses were substantiated by the results.

A. The Nature of Integrative Activity

The first prediction was that the aged group, characterized by a general biological involution, would be developmentally lower than the adult group as measured by the Index of Integration. The results showed that the aged group was lower than the adult group on the specific scores taken as a measure of development in the first hypothesis.

On both rational and empirical grounds the Index of Integration represents the highest response type in the developmental scoring system. An analysis of the tasks involved in the two components of the Index shows that integrative activity is common to both of them. The subject must be able to reconcile the conflicting stimulus qualities of the ink blots (e. g., form, color, shading) and order them into an

appropriately organized unity. To do this he must have the ability to distinguish between the central and the only peripherally important, and to be able to detach himself enough from the immediate situation to keep the peripheral from intruding on the central. This ability to reconcile conflicting demands and discriminate the essential from the nonessential has apparent behavior implications in terms of appropriateness of planning and judgment.

Empirically, it has been found that scoring on the Index of Integration is related: 1) to adequacy of motor performance of normal adults under conditions of experimental stress (30); 2) to the degree of disintegration in psychopathological conditions in adults (16, 52); and to 3) the degree of inhibitory behavior in several clinical groups (36). More pertinent to this present study, the scoring on the Index of Integration has also been found to be related to the chronological age in children and in normal adults (16,23). The present study has extended the range of correlates to include the relationship to normal old age, completing the trajectory of the three periods of human life--childhood, adulthood and senescence. The comparative median levels of the integrative scores are shown in Figure I and the decline with senescence, following the consistent increase with chronological age is striking. In addition is the fact that the integrative W scores, the last to appear in childhood, are the first to drop from the perceptual repertoire of the senescent. The integrative D responses drop

considerably, to a level found in early years.

The decline in the integrative capacity of the aged person, as measured by the Index of Integration, is to a point between the level achieved by the average eight-year-old and nine-year-old child. This should not be interpreted to mean that the senescent and the child are functionally equivalent. The scores reflect a general developmental decline, but there are no doubt other growth processes which are not reflected in these scores. The preference for whole over non-whole responses in the younger children has been held to reflect a global orientation (23); the first attempts at differentiation become reflected, then, in the increasing preference for non-whole responses. When this trend reverses, in later years and in adulthood, it is presumably because a more integrative functioning is becoming operative; i. e., the emergence or strengthening of functions that possess a higher degree of subordinating power (60). In substantiation of this latter statement is the fact that the sum of all response types that clearly involve integration (i. e., the Index of Integration) increases with age and is markedly greater in adulthood. Further, the presence of integrated whole responses (W/ and W/) in more than half the subjects does not occur until four years after integrated D responses. The radical decline in the integrated whole responses in old age seems to reflect the diminished potential of this integrative functioning in that the scores

developing last (W/ and W/) are the first to disappear in more than half of the subjects.

B. The Nature of Primitive Thought

The second prediction was that the aged group in this period of biological decline, would show evidence of developmentally early thought processes as measured by the Index of Primitive Thought. This index is defined as the sum of the pars pro toto, fabulized combination and contamination responses. This prediction was also borne out by the results. Werner has described the pars pro toto character of the young child's thought, in which any part carries the quality of the whole, as symptomatic of a diffusely organized cognitive structure. There is here an absence of articulation and specificity. The others in the environment are not discriminated so much as individuals but rather loosely apprehended as members of some crudely and rigidly defined group with all the qualities of the group as a whole. The environment of such people is populated only by general groups (e. g., "mothers", "farmers", "cops") and the differentiation within its sphere is negligible since the parts are synonymous with the whole. Almost half of the aged group developed at least one response of this type, whereas it appeared only once in each of the records of two adult subjects. These responses decrease markedly from the period of childhood, where they are most common, to normal adulthood where they are rare.

There were four separate instances of a contaminated response, and these all occurred in the aged group. These are the most primitive of the scores in the Index of Primitive Thought and are found in young children and some psychopathologic groups.

Almost half of the aged group developed at least one fabulized combination. Such responses, based on the sheer fusion of temporal and spatial contiguities, are representative of what Werner has called "syncretic" functioning. The process is not different from what occurs in dreams (the fusion of two or more figures into one dream image) and is called "condensation" in psychoanalytic theory.

Piaget (43) has noted that the child's thought is essentially syncretic. "The mind leaps from premise to conclusion at a single bound, without stopping on the way."

It can be seen from the diminished number of appropriately organized responses and from the profusion of diffuse and syncretic percepts that the aged group clearly operates at a lower developmental level than the younger group. Some of the Rorschach responses, namely those covered by the Index of Primitive Thought, are of such a nature that there is an immediate impression that the thought processes of the aged individual seem similar to those characteristic of the child. These similarities have been noted in the preceding pages but there are differences as well. The fabulized combinations

of the older group best illustrate these intrinsic differences. The fabulized combination found in children is generally a response in which two or more area are first separately interpreted and then combined on the basis of spatial relationship. An example presented by Rapaport (48) illustrates this: Card IV, D6: "foot", D4: "branch". The response becomes: "there's a branch with a foot on it." The integration is always inappropriate and follows the separate interpretation of parts.

The characteristic fabulized combination of the aged person is one that begins as an integrative response and is then spoiled. For example, one elderly subject, in responding to Card VIII said, "I see two bears (D1) climbing up a cliff (D4); on the way up they are clinging to the sails of a ship (sails are D5). The first part is clearly an integrative response (alone, scored as D/) but the elaborative portion of the response involves an inappropriate combination of areas. In contrast to the child, whose integrative efforts are inappropriate from the start, the aged person is able to synthesize the discrete blot area only to have the organization upset with further elaboration. This description of perceptual activity may be likened to maturation processes in general during which any developmental stage preserves vestiges of the earlier stages from which it has emerged, and any degeneration bears signs of the higher level from which it has declined. The process of a

decreasing integrative capacity in the older person seems dramatically illustrated by this feature.

C. The Relationship Between Primitive Thought and Integrative Activity

The hypotheses tested here were based on the formulation that developmental changes in the aged would be associated with decreasing integration, as measured by the Index of Integration, along with an increase in early thought processes as measured by the Index of Primitive Thought. As discussed previously, both of these predictions were borne out by the findings. In this study, the two indices have been found to be correlaries. There is a middle group of scores, however, covering responses that are not considered as either integrative or perceptually primitive. It is possible, then, for the indices to be independent of one another. Misch (37), in a comparison of a "verbal" adult group with a developmentally lower "motoric" adult group, found no significant relationship between the Index of Integration and the Index of Primitive Thought, whereas both measures discriminated between the groups at a significant probability level. Werner has stressed the point that, "the normal man does not always function at the same level of mental activity". The same normal person, depending on inner or outer circumstances, may be characterized by entirely different levels of development,

and primitive modes of behavior not only appear under some conditions, but are continually present (60).[1]

It seems reasonable to suggest that the senescent's decline is of a nature which, amongst other things, involves a weakening of those psychological processes ordinarily engaged in negotiating with more primitive thought and inhibiting its production. The result is that the primitive perceptual processes become more prevalent at old age than at adulthood, though they are present, to a varying degree in both groups.

Comparisons were made between both measures of perceptual development and mental age. All previous studies with the developmental scoring system have shown the absence of a significant relationship between the mature scores and intelligence (30,36). In the present study, however, it was felt that the effect of old age on intellectual functioning might influence the production of integrative scores. It was on this account only that some measure of intelligence was included in the research. As it turned out, the aged group proved to be intellectually superior to the adult group.

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[1] Gardner Murphy, according to Klopfer(27), has also spoken about developmental levels of perception and his description follows closely the theory presented by Werner. Murphy feels that the adult mind is functioning at mature and immature levels all the time but that each person has his own proportion of these processes.

In attempting to comply with the requirement that the sample be limited to those aged who are still active and alert, a selection factor seems to have been operating. Gilbert (19), Stieglitz (54), Brozek (6) and others have been impressed by the close relationship between intellectual decline and general physical involution.

D. Implications of the Findings

In the first chapter, it was mentioned that the rate of decline differs widely among people and that physiological and psychological ages seldom coincide with chronological age (34, 54). There seems to be even more individual variation and asymmetry in psychological maturation and later involution than in the physical changes inherent in senescence (54). Knowledge about the psychological age of old people is of great importance in social planning, and of economic interest. Reliable information, for example, is necessary before a decision may be made as to which persons may continue working past the technical retirement age, which can enter upon a modified work program and which should be given simpler tasks even before the retirement age has been reached. It would seem that an arbitrary retirement age should be replaced by a more flexible system of evaluating the potential of old people.

The scores in the developmental scoring system, having been set up to parallel developmental changes seem to offer a realistic approach to the study of psychologic age in these

elderly people. Certainly it would seem that a senescent with a minimum of primitive thought would exercize better judgment than an old person in whom these processes are in abundance. Likewise, an old person who retains some measure of integrative capacity as measured by the developmental scores should be able to offer more in the way of productivity than someone with no such apparent capacity. The implications for economic "reclamation" of the aged are obvious. Other uses of this technique would be in evaluating older people at institutions for the aged and hospital admissions suspected of senility.

Many writers, in discussing the psychological changes concommitant with old age, have been impressed by the parallels that could be made between the behavior of neurotic adults and senescents (17,57). Several writers even went so far as to label these oldsters "neurotic". Pollack (44) compiled an extensive list of behavioral similarities between old people and neurotics. He included negativism, social withdrawal, boredom, inadequacy feelings, regressive tendencies, rigidity and conservatism as being features common to both groups. Still others have attempted to make childhood as a period, comparable to senescence (20,39). One writer recalls the folk wisdom that says the aged person ultimately returns to a "second childhood" (31).

What is common to both positions is the failure to recognize old age as a distinct period of development with its own unique mental structure. Such things as a mild impairment of judgment, a growing more "set in their ways" and a failing of recent memory are all "normal" to this period. Just as the child is not to be considered "a little man", so too is the elderly person not to be thought of as just "an old adult". Decline of functions should not be equated with a loss of functions for certainly there are many people in the world today who have lived six decades or more and continue to be productive, alert and interesting. In this respect, the results of this study lend empirical support to the view that individual differences among the aged are great. Fourteen of the aged subjects, for example, showed no sign of primitive thought processes and nine were above the median on the Index of Integration. The transition from adulthood to senescence is seen as a gradual process with overlapping functional areas and not one sharply delimited by specific age groups.

V. SUMMARY AND CONCLUSIONS

The formulation leading to the specific hypotheses tested in the present study was based on considerations drawn from two sources: Werner's developmental theory and evidence from biological investigations. Werner states that the development of all organic forms and their functions is expressed in an increasing differentiation of parts and an increasing subordination or hierarchization. Immature and mature levels of development can be described respectively as relatively "undifferentiated" or "differentiated and hierarchically integrated". Immature perception is described as undifferentiated and diffuse. From this kind of perception, development proceeds through a process of differentiation and progressive hierarchization. The essence of development is this steadily increasing differentiation and centralization. This developmental change is characterized by certain paired concepts: syncretic-discrete, diffuse-articulated, indefinite- definite, labile- stable and rigid-flexible. Immature perception as found in the young child is said to be syncretic, diffuse, indefinite, labile and rigid. Mature perception as found in normal adults is described as discrete, articulated, definite, flexible and stable.

It was further observed that the period of old age is clearly marked by a general biological involution. This decline is reflected in innumerable aspects of the individual's functioning, although special attention was devoted in this paper to

perceptual changes occurring in the elderly. These changes are the normal accompaniments of this particular developmental phase and are not to be considered as disease processes in any sense.

The course that perceptual development takes beyond adulthood is not covered by Werner's theory. In the light of the indisputable evidence that old age is a period of general biological involution, the following major hypothesis was suggested: that in the process of normal aging there is a reversal in the developmental pattern of perception away from the maximum hierarchic integration and organizing capacity characteristic of adulthood. Empirical and theoretical support was also responsible for the notion that in this senescent period, considerable manifestation of early behavior patterns is prevalent. As a test of this formulation, which is an attempt to apply the evidence of general biological changes in senescence to perceptual changes in senescence, the specific hypothesis was made that if a normal aged group and a normal adult group were compared, then the aged group would show less evidence of integrative and organized perception than the adult group. A second specific hypothesis was that the aged group would show more evidence of perceptual activity characteristic of early developmental periods than the adult group.

As a test of these hypotheses, the Rorschach responses of two groups of subjects were analyzed:

(1) 40 normal aged subjects between the ages of 68-91.

(2) 40 normal adult subjects between the ages of 23-45.

The Rorschach responses were analyzed in terms of developmental level, using the Index of Integration and the Index of Primitive Thought Processes.

The results confirmed both of the hypotheses.

In the discussion of the results, the following three aspects were emphasized:

(1) Senescence is a developmental phase characterized by its own unique psychological structure.

(2) Perceptual decline in the aged is marked by considerable individual variation.

(3) The indices of developmental level used in this investigation could be appropriately employed to evaluate the "psychological" age of elderly individuals.

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APPENDIX I

The Genetic Scoring System

The Genetic Scoring System

The genetic scoring system evolved by Friedman derives from Werner's description of developmental states (60) and from observations made by Beck (4) and Rapaport (48). Werner has used the following schema to outline development: development moves away from a fused unity of functions in the direction of articulation of functions and their integration into an ordered whole. The scores in the system represent an attempt to set up perceptual parallels to this general schema.

All scores in the system are based on location choice; the definiteness of the blot outline that the response requires; and organizational quality. The four highest responses are also based on the adequacy of the form-level. Location is scored according to Beck (4). Definiteness of blot requirements are based on Phillips' complexity- of-response continuum(42). Form-level is scored first according to Beck's tables (5). If a response is not listed by Beck, it is scored according to Hertz's tables (24). If a response is found in neither of these two tables, it is scored according to principles of form adequacy derived from Beck's tables by Phillips (42).

The scores in the system, in order of genetic level, are as follows:

W++ and D++ : a response is classed in the "plus-plus"

category if its location is W or D; if the response requires a specific form; if that form requirement is met by the blot, i. e., if the form elements are F+; and if the response involves breaking down a solid blot area into component parts and resynthesizing these parts into an appropriately organized unity. Thus, for example, the response, "A fountain with a statue of an angel on each side", given to the whole of card I would be scored W++. The response "A guy on a motorcycle" given to D1 on card IX would be scored D++. It should be noted that a plus-plus score requires an unbroken blot area. Cards I, IV, V, VI and IX have been classified by Friedman as "unbroken"; whole responses to these cards can be scored W++. Cards II, III, VII, VIII and X have been classified as "broken"; whole responses to these latter cards cannot be scored W++.

W+ and D+ : a response is classed in the "plus" category if its location is W or D; if the response requires a specific form; if that form requirement is met by the blot; and if the response involves the synthesis of two or more discrete blot areas into an appropriately organized unity. W+ responses can only be given to the broken cards II, III, VII, VIII and X. Thus, for example, the response, "Two fellows toasting each other at a bar" to the whole of card II is scored W+. As Lofchie has noted, certain difficulties arise in the application of the scoring system to responses which may potentially

be D/, but might possibly only be Dm (see below). The reason for this is that certain areas, which are scored as unitary D areas by Beck, contain within them other D areas which are segregated and discrete. The clearest example is D9 on card III, which contains within it D10, D5, D6 and D11. In such cases a D/ is scored whenever two or more of the elements are successfully combined into a single response. Thus, for example, whenever a human figure is seen in the D9 area on card III, the response is scored D/.

Wm and Dm : a response is classed as "mediocre" if its location is W or D; if the response requires a specific form; if that form requirement is met by the blot; and if the response is given to an unbroken blot area. Like the plus-plus responses, Wm responses are restricted to the unbroken cards. In practice, however, certain exceptions must be made, as Friedman has already noted. These are the cases in which a broken blot area (e. g., card VII) elicits a whole response based almost entirely on the schematic outline of the blot (in this case, the U-shape); the response "harbor", for instance, given to the whole of card VII would be scored Wm.

W- and D- : a response is classed as "minus" if its location is W or D; if the response requires a specific form; and if that form requirement is not met by the blot--i. e., if the form elements in the response are F-.

Wa and Da : a reponse is classed as "amorphous" if its location is W or D; and if no specific form is required, the

response being based solely on chromatic or achromatic blot features. Amorphous responses in this system encompass color, shading in all its varieties, and the black-white continuum.

Wpars and Dpars : a response is classed as "pars pro toto" if the location is W or D; and if the only basis given for the response is that some portion, less than half the total blot area included in its percept, is described as being the entire basis of what has been seen. In traditional scoring systems, such responses have been called "confabulatory". An example would be card VI (W), described as a "squashed cat" solely because of the (Dd) "whiskers". In addition to the usual DdW and DW we have included pars pro toto responses to D areas (DdD and D → D). As with the Wpars responses, the Dpars response is one based solely on some area less than half the total area involved in the percept. An example would be the response "man" given to card III, D9, solely because D10 looks like a "foot" (scored D → D).

Wfab and Dfab : a response is classed as a "fabulized combination" if the location is W or D; and if the response involves the inappropriate and arbitrary unification of two or more sub-units on the basis of sheer spatial contiguity. An example would be card V, D1 and Dd22 both interpreted as "penises"; then the leteral half of the card, from which D1 and Dd22 project was interpreted as a "boy's head with two penises growing out of the top."

Wcont and Dcont : a response is classed as a "contamination" if the location is W or D; and if the response involves the fusion of two separate responses given to the same area into a single response in which the elements of the two responses now intermingle. These are very rare responses, even within pathological groups. An example is card X, D9, interpreted first as a "caterpillar", then as a "man", then as "caterpillar man".

Wv and Dv : the "vague" responses have been placed at the end of the list, not because they are lowest genetically, but because they are essentially an agenetic score. That is to say, although an increasing number of "vague" is to be expected as the general level of pathology comes to include more regressive phenomena (e. g., schizophrenics have more "vagues" than neurotics), vague responses are not characteristic of children. Although they seem associated with regression, they are uniquely adult. Responses are classed as "vague" if their location is W or D and if the demand made on the blot structure is so minimal that almost any form could fulfill the requirements. Whether the form-level is plus or minus has no bearing on whether a response is classified as a "vague". Some form element must be present (to distinguish it from an amorphous response), but it cannot be a very specific form element (to distinguish it from a "mediocre" or minus response).

Phillips(42), has developed a series of content classes

along a continuum of increasing form specificity. Almost all "vague" responses are included in the first three of these classes. These contents include: Art, Emblem, Stain, Fire, Botony, Clouds, Food, Geography, Mineral, Nature and Smoke. If the content of a given response can be classed as any of these, and the form element is essentially unelaborated, the response is scored "vague". In addition Anatomy contents like "X-ray", "medical chart" and the like, in which no specifically named anatomical parts are involved, are also scored "vague". The other exception is in the case of responses involving primitive organisms (e. g., "amoeba") which belong, being animals, in class VII, but which as Phillips notes, have the specificity requirements of class III.

The first three categories of this genetic system(viz., the plus-plus, plus and mediocre) are considered to be "mature"; in general they have shown a positive relationship with increasing age. The balance are considered to be "immature"; in general they have shown a negative relationship with increasing age. Some of the scores within the system, however, show stronger uni-directional relationships with age than do others. The first two scores on the high side of the scale (viz., the plus-plus and plus) have this characteristic relative to the mediocre. On the low side of the scale, the scores which appear most directly to reflect primitive thought processes (viz., the pars pro toto, fabulized combination and contamination) show the most consistently negative relationship

with increasing age up to adulthood and in addition are extremely rare within a normal adult population. The minus score is common to almost every record, including normal adults. The amorphous score, while rare, does occasionally occur in normals, and does not have the consistently negative relationship with age that the primitive thought processes group of scores has.

APPENDIX II

Modified Worcester Scale of Social Attainment

Modified Worcester Scale of Social Attainment

	Rating
1. Educational Level	
Some postgraduate work	6
College graduate	5
Completed technical school, or one or more years of college	4
High school graduate	3
Some high school	2
Six to eight grades of school	1
Five or less grades of school	0
2. Job Level	
Managerial, professional	3
Skilled (D. O. T.[1] 4 and 5)	2
Semi-skilled (D. O. T. 6 and 7)	1
Unskilled (D. O. T. 8 and 9)	0

[1] Dictionary of Occupational Titles. Vol. I and II, 1949. Superintendent of Documents, Washington 25, D. C.

Rating

3. Job Responsibility

Inventive-creative, e. g., artist, research worker, but not technician 3

Wide range of freedom, must adapt to changing conditions, e. g., office manager; insurance salesman. 2

Sets up own job but supervisor available for unusual conditions and emergencies, e. g., production worker; radio repair man 1

Routine work, minumum of individual freedom, e. g., postal clerk; assembly line worker . . 0

4. Level of Supervision

Head of company which employs 10 or more workers; head of department which includes skilled workers 4

Head of company which employs less than 10 workers; head of department which includes semi-skilled workers. 3

In charge of a group of unskilled workers. . 2

Has helper when needed 1

Never in command 0

Rating

5. Marital status

Married 2

Divorced and remarried successfully 1

Divorced, separated, or single 0

6. Type of Organization

If subject belongs to more than one organization, the organization with the higher rating determines his score.

Belong to organizations where membership results in service to the community, e. g., PTA; Community Chest; Red Cross 1

Elks; Knights of Columbus; sports clubs . . 0

7. Number of Organizations

Belongs to 4 or more 2

Belongs to 2 or 3 1

Belongs to one or none 0

8. Organization Attendance

Regular 2

Infrequent 1

Never 0

Rating

9. Leadership in Organizations

Executive position 2

Minor position, e. g., committee member; Sergeant-at-arms; union grievance man 1

No position 0

10. Habitual Recreational activity

The following criteria for habitual recreational activity are used:

a) Self-educative, e. g., course work; home study.

b) Constructive, e. g., repairing equipment; building; painting.

c) Requires training or skill, e. g., choral singing; playing musical instrument.

Meets any of the above 2

Meets none of the above, but engages in participant recreation, e. g., fishing; golf; chess; cards 1

Meets none of the above, and activities restricted to spectator recreation, e. g., viewing television; casual reading . . . 0

Rating

11. Social Participation and Leadership

The following criteria are used:

a) States he has at least one close friend.

b) Participates in social gatherings at least once a month.

c) Indicates he is more than just a passive follower in social groups.

All criteria met 3

Two criteria met 2

One criterion met 1

No criterion met 0