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JULIA LAVINIA FRANKLIN

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THE INHIBITION PROCESS AND THE HANDLING OF HUMANS AND HUMANS IN MOVEMENT ON THE KINGET

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THE INHIBITION PROCESS AND THE HANDLING OF HUMANS AND HUMANS IN MOVEMENT ON THE KINGET

CHAPTER I

INTRODUCTION

Psychologists have long been interested in the ability of people to handle impulses and to inhibit feelings which often play important roles in establishing effective relationships with others. This study proposes to investigate the relationship between the production of humans (H) and humans in movement (M) on the Kinget Drawing Test and the ability to inhibit inappropriate responses on the Digit Symbol subtest of the Wechsler-Bellevue Intelligence Scale. It further proposes to examine the relationship between compulsory immobilization prior to the completion of the Kinget and production of humans and humans in movement on the Kinget.

The way in which a person handles human activity and human figures has been used diagnostically for many years and is considered by psychologists to be revealing of his interpersonal relationships and of the controls that are exercised in relation to interaction with others. Therefore, many of the diagnostic instruments used by psychologists provide an opportunity to deal with the human figure and the human figure in activity. The Thematic Apperception Test (TAT) seeks to provide such an opportunity through interpretation of pictures. The Machover test calls

for the drawing of both male and female figures. The Kinget test allows subjects a choice of whether to draw humans, animals, objects, scenes, or symbols. The Rorschach provides an opportunity to see humans and human activity in ink blots. Diagnosticians consider production of H and M on the Rorschach and on other instruments to be revealing of interpersonal relationships and of the controls that are exercised in relation to interaction with others.

People who have difficulty in maintaining effective interpersonal relationships seem to produce fewer H and M on the Rorschach and also have trouble drawing humans on either the Machover or the Kinget. Disturbed persons may on the Machover refuse to draw people or may attempt tc avoid dealing with people by drawing a rear view, a side view, or the head only, by obscuring the figure after it is completed, by drawing a caricature, or by drawing a stick figure. Kinget states, "When the human figure predominates among the Nature content, a capacity for direct contact and an eagerness for dealing with people may be assumed" (Kinget, 1952, p. 50). She further points out that ". . . deliberate limitation of the human figure to a specific part of it is always revealing" (Kinget, 1952, p. 53). She also states that "Schematism (exemplified as the "stickman") is a frankly unfavorable symptom and even if it appears in only one drawing of a set it is suspect" (Kinget, 1952, p. 61). She continues, "The failure to represent the characteristic roundness and organicity of living objects, which essentially constitutes schematism, points almost with certainty to some vital-emotional disturbance. The authors of such drawings are generally people who have difficulty establishing smooth relationships, or whose attitude toward

others is somehow lacking in genuineness, depth, and warmth" (Kinget, 1952, p. 61).

Inhibition and H and M

Rorschach (1942, pp. 79-80) reports a relationship between inhibition of overt motor activity and the tendency to project human movement onto ink blots. Others (Biere and Blacker, 1956; Korchin, Meltzoff, and Singer, 1951; Levine, Glass, and Meltzoff, 1957; Meltzoff, Singer, and Korchin, 1953; Shipola and Taylor, 1953; Singer, Meltzoff, and Goldman, 1952; Werner, 1945; Werner and Thuma, 1942; Werner and Wapner, 1949) have also observed that restricting external movements tends to result in the projection of more M than when motor activity is spontaneous.

Rapaport, Gill, and Schafer (1946, p. 213) contend that the person giving many human movement responses is superior in his ability to inhibit responses. In his psychoanalytic theory of behavior, Rapaport (1951) states that inhibition of action directed toward immediate need satisfaction is a basic condition for human movement responses. Levine, Glass, and Meltzoff (1957) found a relationship between measures of inhibition and production of responses involving humans in movement.

Many clinicians feel that human movement responses are representative of a rich inner life which depends upon maturity and ego integration (Klopfer, 1956; and Rorschach, 1942). It has also been suggested that ability to inhibit is dependent upon maturity and ego integration (Beck, 1952; Klopfer, 1956; and Levine, Glass, and Meltzoff, 1957). Although the ability to inhibit responses is thought of in

different terms, the classroom teacher is quite well aware of the necessity for maturity before a child is able to behave in a manner which is consistent with the demands of society. There may be common relationships between ego integration, maturity, ability to inhibit, ability to adjust adequately in interpersonal relationships and ability to handle humans and human activity in a testing situation. This study will deal with the relationship between the ability to inhibit and the handling of human content on the Kinget.

Meanings of M

The human movement response has been used and defined in a wide variety of ways and definitions of M include such concepts as fantasy living, imagination, richness of inner life, mental plasticity, level of ego integration, maturity, empathic participation, inner creativity, introversion, and delay of drive impulses. In discussing responses involving human movement, it is usually implied that there is a relationship between such responses and intelligence level. In fact, a great deal of experimental evidence points to a relationship between human movement responses and intelligence. In a survey of the literature made by Levine, Spivack, and Wight (1959), it was found that most of these studies showed a positive relationship between human movement responses and intelligence level.

Beck (1952) views M as representing a defense of the ego through withdrawal, sublimation, or through absorbing anxiety into imaginative activity. Piotrowski (1957) views M as an expression of deeply imbedded psychological tendencies to follow a "prototypal" role rather than as

representing a role of fantasy. Psychoanalytic theorists emphasize M as an indirect expression of repressed impulses. To Klopfer (1956), M is an indication of acceptance of one's inner promptings. Rorschach (1942), in observing the increased number of responses involving human movement with the restraining of motor activities, felt that these findings substantiated his belief that the psychological mechanisms represented by M restrain or inhibit motor behavior in real-life situations.

In an effort to reformulate the meaning of the Rorschach M response and to provide an empirical test of the revised interpretation of M, King (1958) used controlled interviews on each of 100 male neuropsychiatric patients who were selected on the basis of cooperative attitude, minimal confusion, absence of brain damage, average intelligence or better, 45 years of age and under, and with limited previous psychotherapeutic contacts. In addition to the interviews, subjects were given a Rorschach and the Wechsler-Bellevue Verbal Scale Form I. The Rorschach performance served as the basis of selection of a High-M and Low-M group of 30 subjects each, equated for age, verbal intelligence, education, cooperation, confusion, and nine Rorschach scores. High-M producers showed greater tendency to recognize their problems as involving disturbances in interpersonal relations, project themselves backward in time in accounting for their problems, utilize interpersonal fantasy in coping with their problems, and project themselves beyond their present problem into the future.

M in This Study

In this study M will be considered in relation to the inhibition process and it is hoped that the findings of this study will add to the

knowledge of the inhibition process. It is also hoped that the findings of this study will increase the usefulness of the Kinget Drawing Test.

The theory underlying this study, which relates M to the ability to inhibit, can be consistent with all or most of the previously stated definitions of M, since in all of the definitions, a relationship is implied between M productivity and the handling of impulses. The relationship between production of M and inhibition has been studied since the Rorschach test was first used. In this study, the relationship of the production of M on the Kinget test will be studied in relation to the ability to inhibit.

M Related to Response Delay

A relationship between production of human movement responses and response delay has been recognized by many authorities (Klopfer, 1956; Levine, Glass, and Meltzoff, 1957; Levine and Meltzoff, 1956; Piotrowski, 1957; Rapaport, 1951; Rapaport, Gill, and Shafer, 1946; Rorschach, 1942; and Werner and Wapner, 1949). This relationship has been discussed particularly in relation to personality development and adjustment. Klopfer (1956) points out the strikingly regular increase in number of M responses with increase in chronological age and mental age. Meili-Dworetzki states, "M is, in virtually all investigations, shown as distinctly increasing with chronological age and mental age" (Klopfer, 1956, p. 158). She further states, "From the genetic point of view we understand why children and poorly integrated adults use more FM and less M" (Klopfer, 1956, p. 171). It has frequently been observed that the first occurrences of M in children's Rorschach records and the

increase in the number of M parallel the development of ability to delay responses. According to Klopfer, there is a ". . . relative scarcity of M in the records of the overwhelming majority of all cases of psychiatric disorder" (Klopfer, 1956, p. 171). There is not, however, agreement among the experts as to which of the psychiatric disorders show evidence of shorter reaction time to the blots. Poor ego integration and lack of maturity are thought by Klopfer to be evident in psychiatric subjects who produce few M. However, both Klopfer and Beck agree that M does occur among psychiatric patients who are still striving to maintain an integrated ego. Since maturity, ego integration, and response delay have been related by theorists and since short reaction times and lack of M have been related to lack of maturity and poor ego integration in psychiatric patients, it seems that a mass of evidence is growing which related response delay and M production in psychiatric subjects.

Several studies (Biere and Blacker, 1956; Levine, Glass, and Meltzoff, 1957; Meltzoff, Singer, and Korchin, 1953; Shipola and Taylor, 1953; Singer, Meltzoff, and Goldman, 1952; Werner, 1945; and Werner and Thuma, 1942) have found evidence of longer reaction time for M responses than for responses involving other components. These studies have also found more M responses being given by individuals who respond slowly than among individuals who respond quickly.

Shipola and Taylor (1953) point out the apparent relationship between response time and M. These investigators studied reactions to the Rorschach under "free" and "pressure" situations. The free situation was highly similar to regular Rorschach administration. Subjects were allowed to work at their own speed, but in the pressure situation,

subjects were continually urged to respond as soon as possible. Only one response was required for each of twenty blots. Strong indications of lack of control or of excessive control were found among the forced immediate responses and a highly significant relationship between greater productivity of M and freedom from pressure was found. The results indicated that M responses in either situation were related to delayed reaction times. Reaction times for M responses were longer than for other types of responses given. These investigators concluded that M responses are delayed responses, that they reflect control of immediate, impulsive reactions, and that the slow, deliberate person will produce more M responses than will the fast, impulsive person.

Biere and Blacker (1956) found that subjects in the M-greater-than-Sum-C group generally had significantly longer reaction times to the Rorschach blots than did the subjects in the Sum-C-greater-than-M group. Their results were not specifically in relation to longer response times for movement responses or shorter reaction times for color responses, but they showed a difference which was general in relation to the performance of subjects. These investigators see M as being "... an internal modification of the stimulus" and as a "... subjective intermediate process" thus necessitating a longer reaction time.

It seems that a delay period is necessary for the production of human movement responses, and that when an interval of time does not occur, other responses are produced. These are responses which tend to be more readily perceived, less complex, more impulsive, and more emotionally toned than are responses given following an optimum delay period.

Optimum Response Times on the Rorschach

Although research on response times on the Rorschach has been done (Matarazzo and Mensh, 1952), no definitive studies have been made. It has been pointed out that there are wide variations in reaction time among groups of individuals and among an individual's first responses to each of the ten Rorschach cards (Beck, 1949; and Klopfer, 1956). Because of these variations, definitive normal ranges of reaction times with fixed minimum and maximum time limits have not been established. According to Beck (1949), the central time for the first response to the blots for normal subjects is approximately twenty seconds. He points out that the fastest responses to the cards are given by hypomaniacs and by children whose responses are given instantly or within five seconds. He says, "Lack of inhibition would thus seem to be the critical factor" (1949, p. 52).

Inhibition as Related to Time

Quickly given responses and those which involve an extreme length of delay are predominantly poorly integrated responses and usually reveal a great degree of emotionality. Evidence is available which indicates that people who do not inhibit well are likely to respond quickly or to respond very slowly (Levine, Glass, and Meltzoff, 1957). It apparently takes time to inhibit responses, but effective inhibitors will inhibit relatively more rapidly than will less effective inhibitors. Either too long or too short reaction times seem to indicate inadequate handling of impulses.

Impulses are aroused as a subject responds to stimuli and apparently some time is needed for mobilization of inner resources in order

to handle these impulses. The responses of children are thought to be impulsive and less controlled than those of mature adults. Children's responses tend to be immediate ones without prior consideration of the consequences of such responses. We find considerable evidence in theories of personality to indicate that the ability to inhibit increases with maturity and degree of ego development. Freud's concept of a predominance of impulsive id responses in early infancy and a decrease of these responses with the development of the ego and superego closely parallels the hypothesized relationship between maturity, ego integration, and ability to inhibit. In Lewin's topological system (1936), the inner-personal region and the motoric region of the very young child are extremely permeable, thus allowing tension produced in the inner-personal region to discharge almost immediately into the first response with little selection or evaluation.

Klopfer (1956) states that children, immature adults, and deteriorated adults tend to respond quickly, impulsively, and less effectively than do mature adults. The threat of impulses aroused by a specific stimulus or stimulating situation seems to determine the length of time needed by the individual for adequate handling of the threat. Inhibition is not an instantaneous process since complex ego controls are involved.

Previous Studies of M and Inhibition

A person's ability to inhibit impulses has been related to the perception of M responses on the Rorschach test. The work of Vold and Freud greatly influenced Rorschach's thinking concerning relationships between M and inhibition. John Mourly Vold (Piotrowski, 1957) worked

for many years to demonstrate that the more inhibited is the muscular activity, the more active becomes the kinesthetic imagery. He primarily investigated the relationship between interference with free movement during sleep and the amount of movement in the dreams of the sleeper. He found that when movements of the sleeper were artificially inhibited, that kinesthetic movements tended to be translated into dreams. Freud (1955) found these studies to be in accordance with his theories and explained that the increased movement in the dreams was made necessary by the repression of action tendencies. Rorschach (1942) stated that the psychological value of his M responses was essentially the same as that of the movement content of dreams and that the productivity of M increases with the inhibition of overt motor activity.

In a recent series of studies by Singer and his co-workers (Levine, Glass, and Meltzoff, 1957; Levine and Meltzoff, 1956; Levine, Spivack, and Wight, 1959; Meltzoff and Litwin, 1956; Meltzoff and Singer, 1953; Singer and Herman, 1954; Singer, Meltzoff, and Goldman, 1952; and Singer and Spohn, 1954), attention has been directed toward investigating relationships between the inhibition process and the Rorschach human movement response. These investigators used the sensory-tonic field theory of perception as posed by Werner and Wapner (1949) as the basis for their experimentation. Werner states that tonic energy is the dynamic property common to both sensory and motor activity and he postulates a relationship between the two. According to the field theory, an individual's available tonic energy may be released through body movement or may increase tonicity in a sensory area, the increased tonicity bringing about spatial displacement and illusory motion. Werner feels that M is an exemplification

of the underlying unity of sensory and motor processes. Werner (1945) and Werner and Thuma (1942) studied the perception of brain-injured children and concluded that motorically hyperactive mental defectives produce fewer M responses than do the more phlegmatic, indigenous feeble-minded of comparable mental ages.

Meltzoff, Singer, and Korchin (1953) required college students to write a phrase as slowly as possible without lifting their pencils from the paper while a control group copied an innocuous article at ordinary speed. Half of the subjects were administered Rorschach card III prior to the writing task and the other were given card VII. After the task each group was administered the other card. The subjects who were given the inhibition task of writing slowly almost doubled the number of M responses for the card following the inhibition task, while no significant differences were found in relation to other kinds of responses. The total number of responses increased some for both the control and experimental groups with presentation of the second card. Those subjects who took longer times in the inhibition task (who might be considered the better inhibitors) were found also to have larger numbers of M responses on the card given before the slow writing task. When the more extreme inhibition times were studied in relation to M productivity, the results were even more striking. The authors concluded that the voluntary inhibition of motor activity resulted in increased productivity of M responses, and that there is a direct relationship between the length of inhibition time of motor activity and the productivity of M.

Singer, Meltzoff, and Goldman (1952) investigated the effect of a more generalized condition of motor inhibition on the subsequent

perception of movement on the Rorschach and included hyperactivity as another variable. Twenty-four male college students served as subjects. One group was required to "freeze" for five minutes between administration of blots and another was required to do vigorous calisthenics. A decided increase in the number of M responses following inhibition was found as compared with the number of M responses for a control group whose interim activities were undirected. The differences were significant at the five per cent level of confidence for the controls versus the inhibitors and for the hyperactivity group versus the inhibitors. Number of M responses did not differ significantly between the control and hyperactivity group. It seems probable that greater change in muscular and emotional tension would have been produced by freezing than by calisthenics.

Measurement of voluntary cognitive inhibition and motor inhibition ability and a rating of physical activity were related to Rorschach M responses made by adolescents ranging in age from 11 to 19 years in a study done by Spivack, Levine, Fuschillo, and Travernier (1959). These investigators concluded that M differs in meaning in the protocol of adults and adolescents and that general inhibition ability is found generally in adulthood and not in adolescence.

Goldman and Herman (1961) found a greater increase in movement responses (FM% only) on achromatic cards for physically immobilized subjects. Changes in M% and m% were not significantly different from the controls.

In a study which utilized fifteen boys suffering from progressive muscular dystrophy as subjects (McCully, 1961), inconsistencies between

behavior and Rorschach movement responses were found. It is probable that permanent immobilization as the result of muscular dystrophy has a different meaning than does temporary immobilization. This difference may account for the inconsistency of findings.

In a recent study, Neel (1960) attempted to find a relationship between any situation calling for inhibition, or producing an inhibited state, and the production of human movement responses, animal movement responses, and inanimate movement responses. She administered the Rorschach to ninety-three university students in a group with five different conditions. Subjects in the first group had the dominant arm tied during administration of the Rorschach and subjects in the second group were instructed to copy a paragraph describing a foot race as slowly as possible. The third group was told that people normally see sexual things on the Rorschach, but that they were to inhibit any such responses. A fourth group was told that people normally see sexual things, but they were not told to inhibit such responses. The fifth group was given the normal introduction to the Rorschach. All subjects were asked to give only two responses to each card. Matching for intelligence was done on the basis of Wonderlic scores and no relationship between IQ and M was found. Increases in production of human movement responses were not found. The findings in regard to animal movement were in the predicted direction, but were insignificant. The results of inanimate movement were unequivocally positive. The failure to support the findings of earlier investigation concerning the relationship between inhibition and M may have been the result of instructing all subjects to give only two responses. This direction may have been sufficiently inhibitory so as to

increase M production for all groups. Since all groups were tested at once, it is possible that seeing other subjects' arms tied or writing slowly may have been inhibitory for other groups.

Other studies have found that the more active patients in a waiting room gave less M on the Rorschach than did the less active patients (Singer and Herman, 1954), that college students who could inhibit laughter in a laughter-provoking situation produced more M than subjects who could not inhibit laughter (Meltzoff and Litwin, 1956), and that college students with greater ability to inhibit motor activity voluntarily were able to inhibit learned word associations and produce new words more quickly than those who were less adept at inhibiting motor activity (Meltzoff and Levine, 1954).

Levine and Meltzoff (1956) used a word association task as a measure of cognitive inhibition and administered this test to ninety-three university students. Their results indicated that subjects who are more responsive to kinesthetic stimuli, or M, on the Rorschach are able to inhibit associations more effectively than are subjects who are not productive of M responses. They concluded that their findings provided ". . . further support to the triadic hypothesis interelating motor perception, motor behavior, and cognitive processes" (Levine and Meltzoff, 1956).

Levine, Glass, and Meltzoff (1957) administered the Digit Symbol subtest of the Wechsler-Bellevue Intelligence Scale, a word association task, and Rorschach cards to psychiatric outpatients. They reasoned that the writing of the familiar N instead of the correct reverse N on the Digit Symbol subtest is a function of insufficient delay or control of a

response tendency. Three possibilities concerning the origin of the reverse N error were suggested: 1. correct perception of the stimulus but poor inhibition at the motor level; 2. closure taking place too rapidly at a perceptual level, so that the normal N is actually perceived; 3. response at a cognitive level as if there were no difference between the stimulus as given and the normal N.

Approximately two hundred subjects who had been administered the Rorschach and the Digit Symbol subtest were selected by choosing from the files the first case who had made one or more reversals of the reverse N and choosing the next case, in alphabetical order, who reproduced the reverse N correctly. To the group above were added twenty-seven more subjects who reversed the reverse N (reversers) and twenty-nine subjects who wrote the reverse N correctly (non-reversers). These additional subjects were administered the word association test of cognitive inhibition.

The procedure for the word association task was as follows: a list of ten easy paired associates was read to the subject. After the associations were learned to a criterion of one perfect recitation, the subjects were asked to respond, upon presentation of the stimulus word, with any word other than the learned associate. Cognitive inhibition time was taken as the average time interval between presentation of the stimulus and the response for the ten pairs.

The authors reasoned that subjects who made the reverse N error should produce fewer M responses than controls who did not make the error. In addition, they hypothesized that subjects who made the error should be less able than controls to inhibit an old association and rapidly produce a new one for it in the word association task.

It was found that a significantly greater proportion of reversers than controls produced less than two M on the Rorschach. Subjects who reversed the reverse N had a significantly longer mean CIT than did controls. A mean CIT of 5.8 seconds was obtained by the reversers, while the controls had a mean CIT of 4.46 seconds. The authors concluded, "There is a growing body of evidence to suggest inhibition ability involves a stable process in the person extending beyond the immediate stimulus situation" (Levine, Glass, and Meltzoff, 1957). A question arose from the results of the study when it was found that, although the subjects were selected by alternation from the files, a difference of nine points in mean IQ was found. Those who reversed the reverse N scored lower than subjects who copied the reverse N as it was.

Non-reversers were found to produce more M on the Rorschach than did reversers by Levine, Glass, and Meltzoff (1957). However, the non-reversers had higher IQ scores than did the reversers, and since higher IQ is related to increased M productivity, the greater M production of the non-reverser group may have been largely, or in part, a function of the differential in intelligence test scores. If the random selection of subjects produced a normal distribution for intelligence, with the reverser group being comparable in intelligence to the non-reverser group, then it is possible that reversers tend to score less well than do non-reversers on IQ tests.

A factor which confounded the findings of Levine, Glass, and Meltzoff (1957) was that the same test was used for selection of the reversers and the non-reversers which was used as the measure of intelligence. Since reversing the reverse N would mean failure of a test item

which contributed to the total test score, this factor alone could result in lower scores in the reverser group. Further, in terms of statistical probability, individuals who miss one item on a test have a greater probability of missing additional items than do individuals who pass it.

The findings of the most recent study of the series (Levine, Spivack, and Wight, 1959) reconfirms the results of Levine, Glass, and Meltzoff (1957) in that these investigators found significant relationships between reversing and M production for psychiatric adults. However, the relationship did not hold for disturbed adolescents. An analysis of reversing and IQ level again showed a difference in IQ level between the adult psychiatric reversers and non-reversers, with the non-reversers obtaining a mean IQ score of 101.3 and the reversers obtaining a mean IQ score of 93.5. It was concluded that ". . . it would seem that adequate functioning of a delay mechanism is an important element in earning a good score on the intelligence test as a whole" (Levine, Spivack, and Wight, 1959, p. 310). The authors further stated, "It is suggested that a theoretical position relating measures of intelligence to the psychology of ego functions may eventually provide a framework to understand concepts of intelligence and personality in the same terms" (Levine, Spivack, and Wight, 1959, p. 311). The same test, the Wechsler-Bellevue, was used in this study both in the selection of reversers and as a measure of intelligence. As in the previous study, this procedure confounded the results since failure of the Digit Symbol subtest by reversers resulted in their obtaining lower scores on the total test.

In a study in which disturbed adolescents served as subjects, Spivack, Levine, and Sprigle (1959) made a similar error and clouded their findings by using tests of inhibition in which success was correlated with intelligence level. They found a difference of 17.2 IQ points between the mean IQ's of good and poor inhibitors, with good inhibitors having the higher scores. M was used as one measure of inhibition and positive relationships were found between M production and intelligence. The authors stated, "The significant correlations between all three measures and IQ support the hypothesis that measures of ego delay are related to general intelligence" (Spivack, Levine, and Sprigle, 1959, p. 429). However, in finding correlations between intelligence and measures of inhibition which had already been established as related to intelligence, they introduced a factor which made their findings inconclusive.

Fager (1960) published a study in which differences in IQ level for reversers and non-reversers were not found. He combined both psychiatric and non-psychiatric hospitalized subjects. He, too, used the Wechsler-Bellevue as both the measure of intelligence and as the criterion for selection of reversers and non-reversers. He found a high correlation between M and intelligence in his total population. However, when he split his groups into high IQ reversers (mean 117.7) and low IQ non-reversers (mean 80.0), including mixed psychiatric and non-psychiatric subjects, no differences in M production were found. He concluded that relationships between the type of cognitive inhibition employed by Levine, Glass, and Meltzoff (1957) and Rorschach human movement responses remains unclear. These results are interesting in that a correlation between M and IQ together with no difference in M production between high

IQ reversers and low IQ non-reversers, means that the high correlation must have been caused by high M production in the low IQ reversers. However, this was not the case, since no differences were reported between the reversers and the non-reversers, as would have been found had this been true. It should also be noted that no difference in M production was found between two groups with a forty point IQ difference, while at the same time the study confirms the relationship between M production and IQ. These discrepancies leave the results of Fager's work in a questionable position.

In a study done by Sommer (1958), he attempted to determine whether the relationship between M and IQ would appear with a psychiatric population with the effects of total number of responses and H held constant. Correlations and partial correlations were made between scores on the Wechsler Verbal Scale and the number of Rorschach M responses for one hundred and twenty-three psychiatric patients. The correlation between M and IQ was supported with both H and number of responses held constant. To determine whether M responses of subjects at different IQ levels are qualitatively different, M responses from psychiatric patients at IQ levels of 80, 100, and 120 were ranked by three groups of judges (senior psychologists, interns, and secretaries) as to intelligence. The results disclosed that for the verbatim M responses all groups of judges were able to exceed chance expectancy. When the obvious clues of vocabulary and grammar were removed, only the psychologists were able to exceed chance expectancy. When the M responses were merely described by giving the sex of the mover and the type of movement, all groups responded at a chance level.

Tanaka (1958) found a positive correlation between M and IQ when he used one hundred delinquent boys as subjects. He found the correlations to be higher with verbal IQ than with non-verbal IQ.

Relationships between H and M in This Study

M has been studied in relation to inhibition on the basis of a sensory-tonic theory (Levine, Glass, and Meltzoff, 1957; Levine and Meltzoff, 1956; Levine, Spivack, and Wight, 1959; Meltzoff and Litwin, 1956; Meltzoff, Singer, and Korchin, 1953; Singer and Herman, 1954; Singer, Meltzoff, and Goldman, 1952; and Singer and Spohn, 1954). H has not been studied in relation to inhibition since the sensory-tonic theory underlying earlier studies has involved displacement of movement which is more directly related to M than to H. Therefore, H has been considered to be a less pertinent area for investigation than has M.

However, Rorschach theorists consider H and M to be related in many ways, so that the relationship of H to inhibition is open to investigation. H, as well as M, may be considered relevant to the earlier sensory-tonic studies of movement and movement tendencies. Thus, dealing with the human percept may then be regarded as a situation provided to measure movement tendencies or the handling of impulses. Further, both H and M may be related to inhibition on the basis of a theory which involves H, M, and inhibition as related measures of emotional adjustment, if one reasons in the following manner.

Clinicians agree that difficulties in the handling of H and M on the Rorschach often appear to be related to a poor emotional adjustment and a consequent poor handling of interpersonal relationships. Since

difficulties in the handling of M on the Rorschach appear to be related to poor ability to handle impulses and to inhibit (Biere and Blacker, 1956; Levine, Glass, and Meltzoff, 1957; Levine and Meltzoff, 1956; Levine, Spivack, and Wight, 1959; Meltzoff and Litwin, 1956; Meltzoff, Singer, and Korchin, 1953; Shipola and Taylor, 1953; Singer and Herman, 1954; Singer, Meltzoff, and Godlman, 1952; and Singer and Spohn, 1954), and since poor handling of impulses is often considered to be related to a poor handling of interpersonal relationships (Klopfer, 1956), it may well be that the handling of H on the Rorschach, as well as of M, is related to ability to inhibit. Thus, poor handling of impulses may be considered related to poor emotional adjustment, to poor handling of interpersonal relationships, and to poor handling of human percepts and human movement percepts in test situations. It thus follows that poor inhibitors, who handle impulses less well than do good inhibitors, would have more difficulty in dealing with interpersonal relationships and in handling human content, either active or passive, on the Rorschach.

Human movement percepts are considered by Rorschach authorities to be more threatening than more passive human content in relation to ink blots. Therefore, it seems probable that M will be more closely related to inhibition than will H. If both H and M on the Rorschach are measures which discriminate between good and poor inhibitors, then the handling of humans and human activity could also be discriminating measures for good and poor inhibitors in other test situations. In the present study, the Kinget Drawing Test will be used as the means of eliciting H and M.

Structure versus Less Structure

The Rorschach is used in diagnosis because it is believed that such a relatively unstructured situation arouses impulses and that the individual's responses reveal something about his impulses and the manner in which he controls them. The Rorschach, a relatively unstructured test, arouses impulses but provides very few clues for their handling. Thus, the handling of such impulses must come from the individual himself. In a completely structured situation, impulses are aroused, but more complete cues for the handling of impulses are provided. For example, in responding to the TAT cards, a situation considered to be more structured than the Rorschach (Klopfer, 1956), the individual may be able to respond freely since the impulses, actions, and feelings he is describing presumable are not his own, but are those of the people in the picture.

Handling of impulses aroused in less structured situations seems to be more difficult than those aroused by more structured situations (Klopfer, 1956, p. 603; Lawton, 1956; and Piotrowski, 1957). Theorists tend to agree that the less structured the stimulus, the more an individual's response will be colored by personal thoughts and feelings. There apparently is a greater demand upon the individual to organize impulses aroused by less structured situations. The less structured the situation, the more the responses will be related to the effectiveness with which the individual can inhibit impulses. When subjects are exposed to relatively more structured situations, it may be that less demand is made upon the ability to inhibit.

On the Kinget, there are possibly more clues to indicate direction of response than there are on the Rorschach. The relatively higher degree

of structure would, therefore, not force the subject to rely to as great an extent upon his own resources, but would allow him to follow the directions given. Such a test might not differentiate between good and poor inhibitors as well as would a less structured test.

CHAPTER II

PROBLEM

This study is an investigation of relationships between inhibition and the production of human figures and human figures in movement. Inhibition was defined in terms of performance on the Digit Symbol subtest of the Wechsler-Bellevue Intelligence Scale and in terms of compulsory immobilization prior to the completion of the Kinget. The production of humans and of humans in movement was studied in relation to order and frequency of drawing of humans and humans in movement on the Kinget.

Although most studies of inhibition have been limited to the relationship of M to inhibition (Levine, Glass, and Meltzoff, 1957; Levine and Meltzoff, 1956; Levine, Spivack, and Wight, 1959; Meltzoff and Levine, 1954; Meltzoff, Singer, and Korchin, 1953; Singer and Herman, 1955; Singer, Meltzoff, and Goldman, 1952; and Singer and Spohn, 1954), it appears that the poor inhibitor, who does not handle impulses well, is likely to have difficulty in interpersonal relationships and will therefore find it difficult to deal with any kind of human response, be it humans or humans in activity, on the Kinget. Therefore, this study will include both H and M responses in relation to inhibition.

Levine, Glass, and Meltzoff (1957) found a mean IQ score that was nine points higher for non-reversers than for reversers. Levine, Spivack,

and Wight (1959) found non-reversers to have a mean IQ score that was eight points higher than the mean score of reversers. It is possible that this difference in IQ score may be the result of having used the same test both as a measure of intelligence and as the means of selection of reversers and non-reversers. Since subjects in both studies were selected on the basis of correct or incorrect responses to the Digit Symbol subtest of the Wechsler-Bellevue Intelligence Scale, poor inhibitors (reversers) automatically scored lower on the total test since they responded incorrectly on one item.

Another factor which may be involved in the use of the same test as both a measure of intelligence and as the means of selection of reversers and non-reversers is that the lower mean IQ score of reversers may be in part a function of statistical probability. Based on extensive empirical findings of Terman and Merrill (1937), it is assumed when prorating on an intelligence test that the subject who performs correctly on one item is more likely to perform correctly on another than is the subject who does not respond correctly on the first. Thus, when prorating items not administered, higher scores are given when more of the administered items are passed than when they are not passed. On the Stanford-Binet Intelligence Scale it is assumed that the subject who passed four of the six subtests at an age level is more likely to pass the other two than is the subject who passed only two of the four administered items.

Poor inhibitors (reversers) may be less well equipped to respond on intelligence tests than good inhibitors and may be unable to inhibit inappropriate responses. Poor inhibitors would then score lower on intelligence tests than would good inhibitors (non-reversers). The

potential intelligence level of good and poor inhibitors may be comparable, with poor inhibitors responding less effectively to the intelligence test.

Levine, Spivack, and Wight (1959) have shown M and intelligence to be related. Thus it is impossible to know what the findings of Levine, Glass, and Meltzoff (1957) and Levine, Spivack, and Wight (1959) mean since the difference in mean IQ between reversers and non-reversers remains to be explained.

Subjects in many of the studies cited have been drawn from disturbed adult populations. The present study used normal fifth grade students as subjects because to date, results of studies of the relationship of H and M to the inhibition process done with younger subjects have been inconclusive (Levine, Glass, and Meltzoff, 1957; McCully, 1961; and Spivack, Levine, Fuschillo, and Travernier, 1959). Normal, rather than disturbed subjects were used in order to determine the universality of the relationship between H and M and the inhibition process. In addition, normal subjects were chosen for this study because of the importance of the relationship between M and intelligence. IQ scores obtained from psychiatric subjects may be seriously impaired, so that results obtained from such subjects may be questionable.

Earlier investigations have found that measures of handling human content and inhibition discriminate among normal subjects (Biere and Blacker, 1956; Meltzoff and Levine, 1954; Meltzoff and Litwin, 1956; Meltzoff, Singer, and Korchin, 1953; Shipola and Taylor, 1953; and Singer, Meltzoff, and Goldman, 1952) and that although M production is usually thought of in terms of discriminating between normality and

disturbance, such measures are sensitive enough to discriminate among a normal population as well. Klopfer (1956, p. 305) explains this discrimination by stating, "The development of constructive ego functions has to reach a maturity level that lies beyond the reach of 80 or 90% of the general population in order to enter the process of self realization for which the production of M is most indicative". Kinget (1952) found wide variations in the handling of human figures among normal subjects. In fact, some normal subjects in her sample drew no human figures at all.

In this study, one task was used as the means of eliciting H and M responses; i.e., the completion of the Kinget. The Kinget has received little notice in the literature, but there are several factors which point to its potential usefulness. It is suitable for group administration, it takes a relatively short time to administer (the mean time for completion of the test by adults is twenty minutes), and the administration of the test is simple. The categories included in the scoring system are foreign to the thinking of most psychologists. This factor perhaps in part accounts for the Kinget's being ignored. One aim of the present study is to adapt parts of a more familiar scoring system; i.e., that of the Rorschach, to the Kinget. It is hoped that such a step will make the Kinget more useful.

Since a relationship between inhibition and the handling of human content has been established when the Rorschach has been used as the means of eliciting human content, it is logical to assume that a relationship between the inhibition process and the handling of human content exists when the Kinget is the source of such content. On the Kinget, there are eight opportunities for the production of human content and

wide variation is found among subjects in regard to such responses. Some subjects draw no humans while others draw portraits, full figures, or humans engaged in some activity. If inhibition is always involved when dealing with human content, then it is logical to assume that good inhibitors will draw more humans and humans in activity and will draw them earlier in sequence than will subjects who do not inhibit as well.

Compulsory immobilization of subjects prior to the administration of the Rorschach results in an increase in the number of M and H responses elicited. It is believed that such immobilization forces the subject to mobilize his inner resources and allows time for the subject to deal with human content. Since the Kinget test also elicits responses involving people and people doing things, compulsory immobilization prior to the Kinget is likely to result in increased production of H and M on this test as on the Rorschach.

Statement of Problem

This study is an investigation of the inhibition process as measured by the drawing of human figures and human figures in activity on the Kinget by reversers and non-reversers. Half of the reversers and half of the non-reversers were immobilized prior to the administration of the Kinget in an attempt to increase inhibition level.

Hypotheses

It was hypothesized that:

1. Reversers draw fewer human figures on the Kinget than do non-reversers.

2. Reversers draw fewer human figures in activity on the Kinget than do non-reversers.

3. Reversers draw human figures later in sequence on the Kinget than do non-reversers.

4. Reversers draw human figures in activity later in sequence on the Kinget than do non-reversers.

5. Following compulsory immobilization, reversers draw fewer human figures on the Kinget than do non-reversers following compulsory immobilization.

6. Following compulsory immobilization, reversers draw fewer human figures in activity on the Kinget than do non-reversers following compulsory immobilization.

7. Following compulsory immobilization, reversers draw human figures later in sequence than do non-reversers following compulsory immobilization.

8. Following compulsory immobilization, reversers draw human figures in activity later in sequence than do non-reversers following compulsory immobilization.

9. Reversers draw fewer human figures on the Kinget than do non-reversers when both groups complete the test in normal fashion.

10. Reversers draw fewer human figures in activity on the Kinget than do non-reversers when both groups complete the test in normal fashion.

11. Reversers draw human figures later in sequence on the Kinget than do non-reversers when both groups complete the test in normal fashion.

12. Reversers draw human figures in activity later in sequence than do non-reversers when both groups complete the test in normal fashion.

13. Following compulsory immobilization, subjects draw more human figures on the Kinget than do subjects completing the test in normal fashion.

14. Following compulsory immobilization, subjects draw more human figures in activity on the Kinget than do subjects completing the test in normal fashion.

15. Following compulsory immobilization, subjects draw human figures on the Kinget earlier in sequence than do subjects completing the test in normal fashion.

16. Following compulsory immobilization, subjects draw human figures in activity on the Kinget earlier in sequence than do subjects completing the test in normal fashion.

17. Following compulsory immobilization, reversers draw more human figures than do reversers completing the test in normal fashion.

18. Following compulsory immobilization, reversers draw more human figures in activity than do reversers completing the test in normal fashion.

19. Following compulsory immobilization, non-reversers draw more human figures than do non-reversers completing the test in normal fashion.

20. Following compulsory immobilization, non-reversers draw more human figures in activity than do non-reversers completing the test in normal fashion.

CHAPTER III

METHOD

Subjects

The subjects in this study were one hundred and twelve fifth grade students from two schools in Norman, Oklahoma, and from four schools in Oklahoma City, Oklahoma. The one hundred and twelve subjects were selected from three hundred and twelve students who were administered the Digit Symbol subtest of the Wechsler-Bellevue Intelligence Scale Form I. The Digit Symbol subtest was administered in four classrooms in the Norman schools and in six classrooms in the Oklahoma City schools.

The time allowed for the completion of the Digit Symbol subtest of the Wechsler-Bellevue is 90 seconds. However, the same subtest is included in the Cornell-Coxe Performance Ability Scale (1934) which is used in the testing of children from kindergarten age through the eighth grade level. The time limit on the subtest on the Cornell-Coxe is 120 seconds. The latter time limit was selected as being a more appropriate one for the subjects of this study.

Reversers and Non-reversers

A subject was considered to be a reverser if he reversed one or more of the ten reversed N symbols on the Digit Symbol subtest. Studies

in which adults have served as subjects have used the same criterion of one or more reversals in the selection of reversers. Cornell and Coxe (1934) point out that although zero scores on the Digit Symbol subtest were not uncommon among adults tested, that they found no zero scores among school children, with the exception of a few in kindergarten. They reported that children do increasingly better on the test up to the age of 14 or 15 and from there on their scores seem to decrease. It was felt, therefore, that a criterion of one reversed N was a legitimate one for the reversers selected for the present study.

Of the two hundred and fifty-one subjects who correctly reproduced the reversed N of the Digit Symbol subtest, fifty-six were matched for chronological age and California Test of Mental Maturity IQ scores with the reversers. These subjects were the non-reverser groups.

Experimental Procedure

Reversers and non-reversers were divided into two groups each. One group each of reversers and non-reversers were administered the Kinget in the fashion prescribed by Kinget (1952, pp. 27-32). The remaining groups of reversers and non-reversers were asked to put their heads on their desks for five minutes prior to the completion of the test. Directions for the test were given before the period of immobilization and the test was then completed in regular fashion.

The completed Kingets from all groups were scored for the presence of responses involving human figures and human figures in activity. Drawings of such human-like creatures as robots or monsters were considered to be human responses for all groups. Parts of humans other than faces

were not considered to be human responses. Responses were scored as M responses when the subject's verbal description clearly stated that movement was involved; e.g., "a boy playing ball". Tabulations of the sequence of the production of H and M responses were also made.

Kinget (1952, p. 27) states that her test is ". . . suitable for administration to groups as well as to individuals since the core of its diagnostic value lies in the graphic product, not in verbal associations with the latter". Group administrations of the Kinget were used in the present study. Subjects were seated far enough apart so as to prevent copying.

In most cases, the Digit Symbol subtest and the Kinget were administered the same day. However, in some cases, school activities intervened and it was necessary to complete the testing at a later date. In no case was the intervening period longer than a week and the administration of both the Digit Symbol subtest and the Kinget was uninterrupted.

CHAPTER IV

RESULTS

Table 31 in the Appendix shows the distribution of California Test of Mental Maturity IQ scores and chronological ages for reverser and non-reverser groups. The four groups of subjects (immobilized reversers and non-reversers and non-immobilized reversers and non-reversers) were matched for both chronological age and IQ in order to avoid differences in response resulting from differences in intelligence level and chronological age. All subjects included in the sample scored in the dull normal, normal, or bright ranges of intelligence and were between chronological ages 10-0 and 12-3.

In Hypothesis 1 it is stated that reversers will draw fewer human figures on the Kinget than will non-reversers. Table 32 in the Appendix shows the number of H responses produced by reversers and non-reversers on the Kinget. An analysis of this data reveals that there are significant differences between reversers and non-reversers in the production of H responses. Table 1 shows a Chi-square value which is significant at the .05 level. Therefore, the hypothesis that reversers produce fewer H responses than do non-reversers is accepted. The .05 level of confidence will be used throughout this study as the required level of significance for the acceptance of hypotheses.

Table 1

Chi-square Test of the Non-reversers and the Reversers for Number of H Responses to the Kinget

Number of H	Number of Subjects		Total
	Non-reversers	Reversers	
0 - 1	14	23	37
2 - 6	42	33	75
Total	56	56	112

Note.--df = 1, $x^2 = 4.36$, $p < .05$

Table 2

Chi-square Test of the Non-reversers and the Reversers for Number of M Responses to the Kinget

Number of M	Number of Subjects		Total
	Non-reversers	Reversers	
0 - 1	41	53	94
2 - 5	15	3	18
Total	56	56	112

Note.--df = 1, $x^2 = 9.52$, $p < .005$

In Hypothesis 2 it is stated that reversers will produce fewer M responses on the Kinget than will non-reversers. Table 33 in the Appendix shows the number of M responses produced by reversers and non-reversers. An analysis of this data revealed that there are significant differences between reversers and non-reversers in the production of M responses. Table 2 shows a Chi-square value which is significant. Therefore, the hypothesis that reversers will produce fewer M responses than do non-reversers is accepted.

Combined human and human movement responses were analysed in addition to separate human and human movement responses. Following Rorschach scoring procedures, human movement responses were not counted as human responses. A subject who produced few M responses may have been inadequately rated in terms of his ability to handle human content in that he may have produced several H responses. Therefore, the combined number of H and M responses were totaled for each subject and were analyzed throughout the study as another possible measure of a subject's ability to handle human content.

Table 34 in the Appendix shows the combined number of H and M responses produced by reversers and non-reversers. Table 3 shows a Chi-square value for combined H and M responses which is significant. This result provides further support for the acceptance of the hypotheses that reversers will produce fewer H and M responses than will non-reversers.

In Hypothesis 3 it is stated that reversers will draw human figures later in sequence on the Kinget than will non-reversers. Table 35 in the Appendix shows the order of production of H responses by reversers and non-reversers. Table 4 shows a Chi-square value which is

Table 3

Chi-square Test of the Non-reversers and the Reversers for Number of H and M Responses to the Kinget

Number of HM	Number of Subjects		Total
	Non-reversers	Reversers	
0 - 2	8	41	49
3 - 7	48	15	63
Total	56	56	112

Note.--df = 1, $x^2 = 39.5$, $p < .001$

Table 4

Chi-square Test of the Non-reversers and the Reversers for Order of H Responses to the Kinget

Order of H	Number of Subjects		Total
	Non-reversers	Reversers	
1 - 2	42	31	73
3 - 8	13	16	29
Total	55	47	102

Note.--df = 1, $x^2 = 1.32$, $p > .05$

not significant. Therefore, the hypothesis that reversers will produce H responses later in sequence than will non-reversers is rejected.

In Hypothesis 4 it is stated that reversers will draw human figures in activity later in sequence than will non-reversers. Table 36 in the Appendix shows the order of production of M responses by reversers and non-reversers on the Kinget. Table 5 shows a Chi-square value which is not significant. Therefore, the hypothesis that reversers will draw human figures in activity later in sequence than will non-reversers is rejected.

Table 37 in the Appendix shows the combined order of H and M responses made by reversers and non-reversers. Table 6 shows a Chi-square value which is significant. This result provides support for the hypotheses that reversers will produce H and M responses later in sequence than will non-reversers even though there were no significant differences for either H or M separately.

In Hypothesis 5 it is stated that following compulsory immobilization reversers will draw fewer human figures on the Kinget than will non-reversers following compulsory immobilization. Table 44 in the Appendix shows the number of H responses produced by reversers and non-reversers following compulsory immobilization. Table 7 shows a Chi-square value which is not significant. Therefore, the hypothesis that reversers will draw fewer human figures on the Kinget than will non-reversers when both groups complete the test following compulsory immobilization is rejected.

In Hypothesis 6 it is stated that reversers will draw fewer human figures in activity than will non-reversers when both groups complete the

Table 5

Chi-square Test of the Non-reversers and the Reversers for Order of M Responses to the Kinget

Order of M	Number of Subjects		Total
	Non-reversers	Reversers	
1 - 2	15	4	19
3 - 8	25	3	28
Total	40	7	47

Note.--df = 1, x^2 = .68, $p > .05$

Table 6

Chi-square Test of the Non-reversers and the Reversers for Order of HM Responses to the Kinget

Order of HM	Number of Subjects		Total
	Non-reversers	Reversers	
1 - 2	50	34	84
3 - 8	6	15	21
Total	56	49	105

Note.--df = 1, x^2 = 6.45, $p < .02$

Table 7

Chi-square Test of the Immobilized Non-reversers and the Reversers for Number of H Responses to the Kinget

Number of H	Number of Subjects		Total
	Non-reversers	Reversers	
0 - 2	14	21	35
3 - 6	14	7	21
Total	28	28	56

Note.--df = 1, $x^2 = 3.72$, $p < .10$

Table 8

Chi-square Test of the Immobilized Non-reversers and the Reversers for Number of M Responses to the Kinget

Number of M	Number of Subjects		Total
	Non-reversers	Reversers	
0	11	27	38
1 - 5	17	1	18
Total	28	28	56

Note.--df = 1, $x^2 = 20.94$, $p < .001$

test following compulsory immobilization. Table 45 in the Appendix shows the number of M responses made by immobilized reversers and non-reversers. Table 8 shows a Chi-square value which is significant. Therefore, the hypothesis that reversers will produce fewer human figures in activity on the Kinget than will non-reversers when both groups complete the test following compulsory immobilization is accepted.

Table 46 in the Appendix shows the number of combined H and M responses produced by immobilized reversers and non-reversers. Table 9 shows a Chi-square value which is significant. This result provides further support for the acceptance of the hypotheses that reversers will produce fewer responses dealing with human content than will non-reversers when both groups complete the test following compulsory immobilization.

In Hypothesis 7 it is stated that reversers will draw human figures later in sequence than will non-reversers when both groups complete the test following compulsory immobilization. Table 47 in the Appendix shows the order in which immobilized reversers and non-reversers produced H responses. Table 10 shows a Chi-square value which is not significant. Therefore, the hypothesis that immobilized reversers will produce H responses later in sequence than will immobilized non-reversers is rejected.

In Hypothesis 8 it is stated that reversers will produce human figures in activity later in sequence than will non-reversers when both groups complete the test following compulsory immobilization. Table 48 in the Appendix shows the order of production of M responses by immobilized reversers and non-reversers. Table 11 shows a Chi-square value which is not significant. Therefore, the hypothesis that reversers will draw human figures in activity later in sequence than will non-reversers

Table 9

Chi-square Test of the Immobilized Non-reversers and the Reversers for Number of HM Responses to the Kinget

Number of HM	Number of Subjects		Total
	Non-reversers	Reversers	
0 - 2	6	21	27
3 - 7	22	7	29
Total	28	28	56

Note.--df = 1, $x^2 = 16.12$, $p < .001$

Table 10

Chi-square Test of the Immobilized Non-reversers and the Reversers for Order of H Responses on the Kinget

Order of H	Number of Subjects		Total
	Non-reversers	Reversers	
1 - 2	21	17	38
3 - 8	6	7	13
Total	27	24	51

Note.--df = 1, $x^2 = .28$, $p > .05$

when both groups complete the test following compulsory immobilization is rejected.

Table 49 in the Appendix shows the order in which immobilized reversers and non-reversers produce combined H and M responses on the Kinget. Table 12 shows a Chi-square value which is not significant. This result provides further evidence for the rejection of the hypotheses which state that immobilized reversers will deal with human content later in sequence than will immobilized non-reversers.

In Hypothesis 9 it is stated that reversers will draw fewer human figures on the Kinget than will non-reversers when both groups complete the test in normal fashion. Table 44 in the Appendix shows the number of H responses made by non-immobilized reversers and non-reversers. Table 13 shows a Chi-square value which is significant. Therefore, the hypothesis that reversers will draw more human figures on the Kinget than will non-reversers when both groups complete the test in normal fashion is accepted.

In Hypothesis 10 it is stated that reversers will draw fewer human figures in activity on the Kinget than will non-reversers when both groups complete the test in normal fashion. Table 45 in the Appendix shows the number of M responses made by non-immobilized reversers and non-reversers. Table 14 shows a Chi-square value which is significant. Therefore, the hypothesis that reversers will draw fewer human figures in activity on the Kinget than will non-reversers when both groups complete the test in normal fashion is accepted.

Table 46 in the Appendix shows the number of combined H and M responses made by non-immobilized reversers and non-reversers. Table

Table 11

Chi-square Test of the Immobilized Non-reversers and the Reversers for Order of M Responses to the Kinget

Order of M	Number of Subjects		Total
	Non-reversers	Reversers	
1 - 2	4	0	4
3 - 8	13	1	14
Total	17	1	18

Note.--df = 1, x^2 = .46, p > .05

Table 12

Chi-square Test of the Immobilized Non-reversers and the Reversers for Order of HM Responses to the Kinget

Order of HM	Number of Subjects		Total
	Non-reversers	Reversers	
1 - 2	23	17	40
3 - 8	4	8	12
Total	27	25	52

Note.--df = 1, x^2 = 2.13, p > .05

Table 13

Chi-square Test of the Non-immobilized Non-reversers and the Reversers for Number of H Responses to the Kinget

Number of H	Number of Subjects		Total
	Non-reversers	Reversers	
0 - 2	17	24	41
3 - 8	11	4	15
Total	28	28	56

Note.--df = 1, x^2 = 4.44, $p < .05$

Table 14

Chi-square Test of the Non-immobilized Non-reversers and the Reversers for Number of M Responses to the Kinget

Number of M	Number of Subjects		Total
	Non-reversers	Reversers	
0 - 1	18	25	43
2 - 5	10	3	13
Total	28	28	56

Note.--df = 1, x^2 = 4.92, $p < .05$

15 shows a Chi-square value which is significant. This result provides further support for the acceptance of the hypotheses that reversers will produce fewer H and M responses than will non-reversers.

In Hypothesis 11 it is stated that reversers will draw human figures later in sequence on the Kinget than will non-reversers when both groups complete the test in normal fashion. Table 47 in the Appendix shows the order of H responses made by non-immobilized reversers and non-reversers. Table 16 shows a Chi-square value which is not significant. Therefore, the hypothesis that reversers will draw human figures later in sequence than will non-reversers when both groups complete the test in normal fashion is rejected.

In Hypothesis 12 it is stated that reversers will draw human figures in activity later in sequence than will non-reversers when both groups complete the test in normal fashion. Table 48 in the Appendix shows the order of production of M responses by non-immobilized reversers and non-reversers. Table 17 shows a Chi-square value which is not significant. Therefore, the hypothesis that non-immobilized reversers will draw human figures in activity later in sequence than will non-immobilized non-reversers is rejected.

Table 49 in the Appendix shows the order of production of combined H and M responses by non-immobilized reversers and non-reversers. Table 18 shows a Chi-square value which is significant. This result provides support for the acceptance of the hypotheses that non-immobilized reversers will deal with human content later in sequence than will non-immobilized non-reversers.

Table 15

Chi-square Test of the Non-immobilized Non-reversers and the Reversers for Number of HM Responses to the Kinget

Number of HM	Number of Subjects		Total
	Non-reversers	Reversers	
0 - 1	0	12	12
2 - 7	28	16	44
Total	28	28	56

Note.--df = 1, x^2 = 15.26, $p < .001$

Table 16

Chi-square Test of the Non-immobilized Non-reversers and the Reversers for Order of H Responses to the Kinget

Order of H	Number of Subjects		Total
	Non-reversers	Reversers	
1 - 2	21	14	35
3 - 8	7	9	16
Total	28	23	51

Note.--df = 1, x^2 = .84, $p > .05$

Table 17

Chi-square Test of the Non-immobilized Non-reversers and the Reversers for Order of M Responses to the Kinget

Order of M	Number of Subjects		Total
	Non-reversers	Reversers	
1 - 2	11	4	15
3 - 8	12	2	14
Total	23	6	29

Note.--df = 1, x^2 = .83, $p > .05$

Table 18

Chi-square Test of the Non-immobilized Non-reversers and the Reversers for Order of HM Responses to the Kinget

Order of HM	Number of Subjects		Total
	Non-reversers	Reversers	
1 - 2	27	17	44
3 - 8	1	7	8
Total	28	24	52

Note.--df = 1, x^2 = 5.82, $p < .02$

In Hypothesis 13 it is stated that following compulsory immobilization subjects will draw more human figures on the Kinget than will subjects completing the test in normal fashion. Table 38 in the Appendix shows the number of H responses produced by immobilized and non-immobilized subjects. Table 19 shows a Chi-square value which is not significant. Therefore, the hypothesis that subjects will produce more H responses following compulsory immobilization is rejected.

In Hypothesis 14 it is stated that following compulsory immobilization subjects will produce more human figures in activity than will subjects completing the test in normal fashion. Table 39 in the Appendix shows the number of M responses produced by immobilized and non-immobilized subjects. Table 20 shows a Chi-square value which is significant. Therefore, the hypothesis that following compulsory immobilization subjects will produce more human figures in activity is accepted.

Table 40 in the Appendix shows the number of combined H and M responses produced by immobilized and non-immobilized subjects. Table 21 shows a Chi-square value which is not significant. This result provides further support for the rejection of the hypotheses that following compulsory immobilization subjects will produce more human figures and human figures in activity than when the test is completed in normal fashion.

In Hypothesis 15 it is stated that following compulsory immobilization subjects will draw human figures earlier in sequence than will subjects completing the test in normal fashion. Table 41 in the Appendix shows the order of production of human figures by immobilized and non-immobilized subjects. Table 22 shows a Chi-square value which is not

Table 19

Chi-square Test of the Immobilized and Non-immobilized Subjects for Number of H Responses to the Kinget

Number of H	Number of Subjects Immobilized	Non-immobilized	Total
0 - 1	18	19	37
2 - 6	38	37	75
Total	56	56	112

Note.--df = 1, x^2 = .03, $p > .05$

Table 20

Chi-square Test of the Immobilized and Non-immobilized Subjects for Number of M Responses to the Kinget

Number of M	Number of Subjects Immobilized	Non-immobilized	Total
0 - 1	51	43	94
2 - 5	5	13	18
Total	56	56	112

Note.--df = 1, x^2 = 4.22, $p < .05$

Table 21

Chi-square Test of the Immobilized and Non-immobilized Subjects for Number of HM Responses to the Kinget

Number of HM	Number of Subjects Immobilized	Non-immobilized	Total
0 - 2	27	22	49
3 - 7	29	34	63
Total	56	56	112

Note.--df = 1, x^2 = .88, $p > .05$

Table 22

Chi-square Test of the Immobilized and Non-immobilized Subjects for Order of H Responses on the Kinget

Order of H	Number of Subjects Immobilized	Non-immobilized	Total
1 - 2	38	35	73
3 - 8	13	16	29
Total	51	51	102

Note.--df = 1, x^2 = .44, $p > .05$

significant. Therefore, the hypothesis that following compulsory immobilization subjects will produce H responses earlier in sequence than will subjects completing the test in normal fashion is rejected.

In Hypothesis 16 it is stated that following compulsory immobilization subjects will draw human figures in activity on the Kinget earlier in sequence than will subjects completing the test in normal fashion. Table 42 in the Appendix shows the order of production of the first human figures in activity by immobilized and non-immobilized subjects. Table 23 shows a Chi-square value which is significant. Therefore, the hypothesis that following compulsory immobilization subjects will draw human figures in activity earlier in sequence than will subjects completing the test in normal fashion is accepted.

Table 43 in the Appendix shows the order of production of the first combined H and M responses by immobilized and non-immobilized subjects. Table 24 shows a Chi-square value which is not significant. This result provides further support for the rejection of the hypotheses that following compulsory immobilization subjects will deal with human content earlier in sequence than will subjects completing the test in normal fashion.

In Hypothesis 17 it is stated that following compulsory immobilization reversers will draw more human figures on the Kinget than will reversers completing the test in normal fashion. Table 44 in the Appendix shows the number of H responses produced by immobilized reversers and non-immobilized reversers. Table 25 shows a Chi-square value which is not significant at the .05 level. However, the obtained value is significant at the .10 level. Therefore, the hypothesis that immobilized

Table 23

Chi-square Test of the Immobilized and Non-immobilized Subjects for Order of M Responses to the Kinget

Order of M	Number of Subjects Immobilized	Non-immobilized	Total
1 - 2	4	15	19
3 - 8	14	14	28
Total	18	29	47

Note.--df = 1, $x^2 = 3.93$, $p < .05$

Table 24

Chi-square Test of the Immobilized and Non-immobilized Subjects for Order of HM Responses to the Kinget

Order of HM	Number of Subjects Immobilized	Non-immobilized	Total
1 - 2	44	40	84
3 - 8	8	13	21
Total	52	53	105

Note.--df = 1, $x^2 = 1.35$, $p > .05$

reversers will produce more H than will non-immobilized reversers is rejected.

In Hypothesis 18 it is stated that following compulsory immobilization reversers will produce more human figures in activity than will reversers completing the test in normal fashion. Table 45 in the Appendix shows the number of M responses produced by immobilized reversers and non-immobilized reversers. Table 26 shows a Chi-square value which is significant. Therefore, the hypothesis that immobilized reversers will produce more M responses than will non-immobilized reversers is accepted.

Table 46 in the Appendix shows the combined H and M responses made by immobilized and non-immobilized reversers. Table 27 shows a Chi-square value which is not significant. This result provides further support for the rejection of the hypothesis that immobilized reversers will produce more human responses than will non-immobilized reversers.

In Hypothesis 19 it is stated that following compulsory immobilization non-reversers will draw more human figures than will non-reversers completing the test in normal fashion. Table 44 in the Appendix shows the number of H responses produced by immobilized and non-immobilized non-reversers. Table 28 shows a Chi-square value which is not significant at the .05 level. The obtained value is significant at the .10 level. Therefore, the hypothesis that immobilized non-reversers will produce more H responses than will non-immobilized non-reversers is rejected.

Table 25

Chi-square Test of the Immobilized and Non-immobilized Reversers for Number of H Responses to the Kinget

Number of H	Number of Subjects Immobilized	Non-immobilized	Total
0 - 1	8	15	23
2 - 6	20	13	33
Total	28	28	56

Note.--df = 1, $x^2 = 3.60$, $p > .05$

Table 26

Chi-square Test of the Immobilized and Non-immobilized Reversers for Number of M Responses to the Kinget

Number of M	Number of Subjects Immobilized	Non-immobilized	Total
0	22	27	49
1 - 4	6	1	7
Total	28	28	56

Note.--df = 1, $x^2 = 4.06$, $p < .05$

Table 27

Chi-square Test of the Immobilized and Non-immobilized Reversers for Number of HM Responses to the Kinget

Number of HM	Number of Subjects Immobilized	Non-immobilized	Total
0 - 2	20	21	41
3 - 6	8	7	15
Total	28	28	56

Note.--df = 1, x^2 = .08, $p > .05$

Table 28

Chi-square Test of the Immobilized and Non-immobilized Non-reversers for Number of H Responses to the Kinget

Number of H	Number of Subjects Immobilized	Non-immobilized	Total
0 - 1	4	10	14
2 - 8	24	18	42
Total	28	28	56

Note.--df = 1, x^2 = 3.40, $p > .05$

In Hypothesis 20 it is stated that following compulsory immobilization non-reversers will produce more human figures in activity than will non-reversers completing the test in normal fashion. Table 45 in the Appendix shows the number of M responses made by immobilized and non-immobilized non-reversers. Table 29 shows a Chi-square value which is not significant. Therefore, the hypothesis that immobilized non-reversers will produce more M responses than will non-immobilized non-reversers is rejected.

Table 46 in the Appendix shows the combined number of H and M responses made by immobilized and non-immobilized non-reversers. Table 30 shows a Chi-square value which is not significant. This result provides further evidence for the rejection of the hypotheses that immobilized non-reverserswill produce more H and M responses than will non-immobilized non-reversers.

Table 29

Chi-square Test of the Immobilized and Non-immobilized Non-reversers for Number of M Responses to the Kinget

Number of M	Number of Subjects		Total
	Immobilized	Non-immobilized	
0 - 1	18	23	41
2 - 5	10	5	15
Total	28	28	56

Note.--df = 1, $x^2 = 2.26$, $p > .05$

Table 30

Chi-square Test of the Immobilized and Non-immobilized Non-reversers for Number of HM Responses to the Kinget

Number of HM	Number of Subjects		Total
	Immobilized	Non-immobilized	
0 - 2	2	6	8
3 - 7	26	22	48
Total	28	28	56

Note.--df = 1, $x^2 = 2.32$, $p > .05$

CHAPTER V

DISCUSSION

Relationships between reversing and production of M on the Rorschach have been found consistently by Singer and his co-workers (Levine, Glass, and Meltzoff, 1957; Levine and Meltzoff, 1956; Levine, Spivack, and Wight, 1959; Meltzoff and Litwin, 1956; and Singer and Spohn, 1954) with reversers producing fewer M than non-reversers. No published studies exist in which the relationship between reversing and production of M on the Kinget has been investigated. Since both the Rorschach and the Kinget elicit human and human movement responses, it is not illogical to suppose that the same relationship between M production and reversing which exists on the Rorschach will exist when human content responses are elicited by the Kinget.

Three significant Chi-square values were obtained which showed that a relationship between reversing and M production does exist when the Kinget is used as the means of eliciting M responses. These results provide further demonstration of the universality of the relationship between the ability to inhibit inappropriate responses; i.e., the correct reproduction of the reversed N on the Digit Symbol subtest of the Wechsler-Bellevue, and the production of the adaptive response M. Three factors point out this universality. Results of previous studies have

shown that a relationship between reversing and M production exists on the Rorschach. The present study demonstrates that such a relationship holds for another test, the Kinget. This fact provides evidence that the relationship between reversing and the ability to deal with human content is not simply an artifact of the tests utilized, but that such a relationship does exist.

In previous studies the relationship between reversing and M production has not been supported when young subjects were used (Levine, Spivack, and Wight, 1959; McCully, 1961; Spivack, Levine, Fuschillo, and Travernier, 1959; and Spivack, Levine, and Sprigle, 1959). Since the present study in which fifth grade students served as subjects did find that a relationship exists between reversing and M production, then the relationship between the inhibition process and M production must have the same meaning for children that it has for adults.

In previous studies, disturbed persons have been used as subjects. Since M production has been shown to be related to intelligence (Levine, Glass, and Meltzoff, 1957; Levine, Spivack, and Wight, 1959; and Spivack, Levine, and Sprigle, 1959), it is necessary that the relationship between M production and inhibition be demonstrated for normal subjects since IQ scores for disturbed subjects are frequently unreliable. Controls for intelligence level were exercised in the present study in order to hold constant this important factor.

The three significant Chi-square values which were obtained which demonstrated a relationship between reversing and M production included a comparison of immobilized reversers and non-reversers and non-immobilized reversers and non-reversers as well as a comparison of all reversers

with all non-reversers. The fact that all three comparisons were significant demonstrates again the universality of the relationship between the ability to inhibit and the ability to deal with human content.

The obtained Chi-square values for the relationship between reversing and the sequence of M production were not significant. Studies in which the Rorschach was used as the means of eliciting M did not deal with the question of sequence of M production, so it is not possible to relate the findings of the present study to previous research. The actual number of M responses produced by non-reversers (good inhibitors) was small. This fact in itself could help to account for the lack of significance of the relationship between sequence of M production and reversing.

The relationship between reversing and the sequence of combined H and M responses was found to be significant. This finding indicates that a difference does exist between good and poor inhibitors in regard to the sequence of their dealing with responses involving human content even though the relationship between reversing and sequence of M alone was not significant.

Two significant Chi-square values were obtained which showed that poor inhibitors (reversers) produce fewer H responses than do good inhibitors. The third Chi-square test of the relationship between reversing and H production was significant at the .10 level, thus indicating a trend in the expected direction. The subjects in the group in question were immobilized prior to the completion of the Kinget. Since compulsory immobilization prior to the completion of the Rorschach results in increased production of M (Meltzoff and Levine, 1954; Meltzoff, Singer, and Korchin, 1953; Singer and Herman, 1954; and Singer, Meltzoff,

and Goldman, 1952), it is not surprising that such immobilization resulted in a sufficient increase in the production of human responses by reversers so as to render the relationship between reversing and H production insignificant. Because the relationship between M production and reversing was found to be significant, the number of H would automatically be reduced since movement responses were not counted as human responses and since there are only eight opportunities for production of either H or M.

Previous studies of the relationship between the inhibition process and the ability to deal with human content have restricted their investigations to the M response. Therefore, it is impossible to compare findings of the present study in regard to the relationship between H production and reversing with those of previous studies. The concern in previous studies has been with displacement of movement since these studies were based on the sensory-tonic theory. Since dealing with the human percept provides an opportunity for the handling of impulses, H may legitimately be investigated within a sensory-tonic theory.

The relationship between combined H and M responses and reversing were found to be significant. These findings support the hypothesis that a relationship does exist between the ability to deal with human content on the Kinget and the ability to inhibit inappropriate responses.

The relationship between sequence of H production and reversing was not significant. However, the sequence of combined H and M responses and reversing were significantly related in two cases. When both reversers and non-reversers were immobilized prior to completion of the Kinget, the relationship of the sequence of combined H and M responses

and reversing was not significant. Since immobilization tends to increase M production on the Rorschach, then it is not surprising that immobilization forced even poor inhibitors (reversers) to deal with human content earlier in sequence.

The findings of the present study in regard to the relationship between inhibition and the production of responses involving human content, whether movement or not, are consistent with the findings of previous studies and provide further support for the belief that the ability to inhibit inappropriate responses is related to the ability to deal with human content in testing situations. The findings of this study add another dimension to previous studies since the present study demonstrates the relationship of the inhibition process to the production of human responses as well as to the production of human movement responses. Thus the H response, at least in the case of children, may be a sensitive measure of the ability of subjects to inhibit long enough to produce adaptive responses. The ability to deal with human content on the Rorschach is considered desirable and indicative of good ability to relate to other people in everyday life. The findings of the present study indicate that the Kinget taps the same kinds of abilities as does the Rorschach and may be, because of its ease of administration and relatively short length of time required for completion, a more desirable test for use with children than is the Rorschach.

It has long been recognized that the more inhibited is muscular activity, the more active becomes kinesthetic imagery. The work of Vold (Piotrowski, 1957) demonstrated that artificial restriction of sleepers increased dream activity. More recent studies by Singer and co-workers

and others (Meltzoff and Levine, 1954; Meltzoff, Singer, and Korchin, 1953; Neel, 1960; Singer and Herman, 1954; and Singer, Meltzoff, and Goldman, 1952) have found that compulsory immobilization of subjects prior to the completion of the Rorschach results in increased production of M. There are no published studies relating compulsory immobilization to increased M production on the Kinget.

Three significant Chi-square values were obtained in the present study which relate compulsory immobilization and increased production of M on the Kinget. In only one case was the hypothesis that immobilization would result in increased M production rejected. When immobilized non-reversers were compared with non-immobilized non-reversers, no significant differences in M production were found. There are several possible explanations for this result. The physical activity involved in the completion of the Kinget may have provided sufficient release of tension for the immobilized subjects so that M production was not increased significantly. It has been demonstrated that M responses are produced on the Rorschach following an optimum delay period (Beck, 1952; Klopfer, 1956; and Matarazzo and Mensh, 1952). Responses following too short a period of time or too long a period of time are less adaptive responses and do not involve human movement. It is possible that the delay period used in the present study was too long for the non-reversers (good inhibitors). It is possible that a shorter delay time would have resulted in increased M production by these good inhibitors who may not have needed five minutes in which to handle the impulses aroused by the test. When poor inhibitors (reversers) were immobilized, increased M production resulted. This group may have needed the full five minutes in order to

handle the impulses aroused by the test. Further investigation is needed in order to determine the optimum period of immobility.

It is believed by theorists (Klopfer, 1954 and Piotrowski, 1957) and has been demonstrated by studies (Lawton, 1956) that subjects experience greater difficulty handling impulses aroused by relatively unstructured situations. The Rorschach is one such situation. The Kinget probably offers a higher degree of structure than does the Rorschach. It would thus be possible for the subject to express himself more freely on the Kinget than on the Rorschach since the Kinget may provide more clues for response than does the Rorschach. Therefore, one would be less likely to observe differences between immobilized and non-immobilized groups in relation to M production.

The relationships between increased production of H and immobilization were not significant. Since the underlying theory of the study involves the displacement of movement and does not relate to human content per se, this result is not surprising. Human responses are considered to be related to emotional adjustment and are not directly related to the handling of impulses. M is considered to be a better measure of a subject's ability to handle impulses than is H and passive human content responses are thought to be less threatening than are human movement percepts. Thus it seems likely that inhibition is more closely related to M than to H. Therefore, when subjects were immobilized for five minutes prior to the completion of the Kinget, this delay period apparently did force them to deal with impulses aroused by the test and resulted in an increased production of movement responses. Since the delay period did not result in significant increase in the production of H responses,

it seems likely that H is not directly related to inhibition in the same manner in which M is related.

CHAPTER VI

SUMMARY

In previous studies relationships have been found between reversing and M on the Rorschach and between compulsory immobilization and M. Several questions have arisen about the studies of the relationship between M and reversing in that psychiatric subjects were always used, no controls for intelligence level were exercised, and random selection methods revealed IQ differences between reversers and non-reversers with reversers having lower IQ scores. The meaning of the differences in intelligence level was confused because the same measure was used in obtaining of IQ scores and in the selection of reversers and because the IQ scores of psychiatric subjects are universally unreliable and unstable. The relationship between M and intelligence level for psychiatric subjects is uncertain, so that the meaning of the obtained relationships between reversing and M has not been clear. The relationship between reversing and M has not been upheld when children served as subjects. The studies of the relationship between M on the Rorschach and immobilization have used college students as subjects. There are no published studies which relate reversing or immobilization to production of human movement responses on the Kinget.

In the present study normal fifth grade students were used as subjects. These subjects were used in order to determine the universality of the relationship between reversing and M production. Groups of subjects were matched for chronological age and intelligence in order to avoid the confusion resulting from previous studies where such controls were not exercised.

Little is known about the Kinget test and to date there are no published studies which investigate the relationship between either reversing or immobilization and production of human content responses on this test. Since the Kinget provides eight opportunities for the production of such responses and because it is quick and easy to administer, this test was selected as the means of eliciting human content responses in the present study.

None of the previous studies have investigated the relationship between reversing and H production or between immobilization and H production. Since passive human content is related to active human content, the investigation of the relationship of H production to reversing and to immobilization seemed a fruitful area for investigation.

The hypothesized relationships between M and H production and reversing were found to be significant in most instances. The hypothesized relationships between M production and immobilization were also found to be significant. The hypothesized relationships between immobilization and H production were not significant. However, one trend in the expected direction was found.

Thus the Kinget test appears to be an adequate measure of the ability to handle human movement in relation to the inhibition measures

of N-reversing and compulsory immobilization. This test also appears to be a good measure of the ability to handle human content in relation to the inhibition task of N-reversing, but not in relation to immobilization. These findings greatly increase the usefulness of this instrument since psychologists are interested in the ability of people to handle impulses and to inhibit inappropriate responses. In the past, the Rorschach has been used as the means of determining subjects' ability to handle impulses. As more is learned about the Kinget, its usefulness can be increased further.

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APPENDIX

Table 31

Chronological Age and California Test of Mental Maturity IQ Scores of Subjects

Immobilized				Non-immobilized			
Non-reversers		Reversers		Non-reversers		Reversers	
CA	IQ	CA	IQ	CA	IQ	CA	IQ
10-4	113	10-5	113	10-6	101	11-2	100
10-7	111	10-6	110	11-4	88	10-11	83
10-11	127	10-5	127	10-7	110	10-5	110
11-8	97	11-1	96	10-9	102	11-3	97
11-0	105	10-10	105	10-9	94	10-8	107
10-9	114	10-7	114	10-6	124	10-11	122
10-5	130	11-0	111	11-1	119	11-0	112
10-11	111	10-4	128	10-11	124	10-5	124
11-3	103	11-0	102	10-3	121	11-0	115
10-7	111	10-8	111	10-6	118	11-1	115
10-10	116	10-5	117	10-5	135	10-6	127
10-5	121	11-0	124	10-8	104	11-1	108
10-7	114	11-0	115	10-4	106	11-5	104
10-11	114	10-7	107	10-8	106	10-7	98
11-1	123	10-4	109	10-6	101	11-1	103
11-3	93	11-0	121	12-3	86	11-5	87
10-7	115	11-1	94	11-1	97	10-11	100
10-7	96	12-1	97	11-2	114	10-6	114
10-6	106	10-8	104	10-11	104	11-1	96
11-1	104	10-6	103	11-4	97	10-4	109
10-6	123	10-10	97	10-8	103	10-11	95
11-1	108	10-4	132	10-5	122	10-9	115
10-5	141	10-9	125	11-5	107	11-4	108
10-7	120	10-11	129	10-7	104	10-4	97
10-8	130	10-11	120	10-10	89	10-0	109
11-7	115	10-11	142	10-8	104	10-10	100
11-1	115	10-10	105	10-7	107	10-5	94
10-8	100	10-10	108	10-4	103	10-3	104

Table 32

Number of H Responses by Non-reversers and Reversers

Number of H	Non-reversers	Reversers
0	1	10
1	13	13
2	17	22
3	9	6
4	10	3
5	3	1
6	3	1
Total	56	56

Table 33

Number of M Responses by Non-reversers and Reversers

Number of M	Non-reversers	Reversers
0	16	49
1	25	4
2	12	2
3	1	0
4	1	1
5	1	0
Total	56	56

Table 34

Number of HM Responses by Non-reversers and Reversers

Number of HM	Non-reversers	Reversers
0	0	7
1	1	13
2	7	21
3	21	8
4	13	4
5	8	2
6	4	1
7	2	0
Total	56	56

Table 35

Order of H Responses by Non-reversers and Reversers

Order of H	Non-reversers	Reversers
0	1	9
1	28	22
2	14	9
3	3	4
4	3	3
5	2	4
6	1	2
7	2	2
8	2	1
Total	56	56

Table 36

Order of M Responses by Non-reversers and Reversers

Order of M	Non-reversers	Reversers
0	16	49
1	7	1
2	8	3
3	7	0
4	6	1
5	4	1
6	5	1
7	2	0
8	1	0
Total	56	56

Table 37

Order of HM Responses by Non-reversers and Reversers

Order of HM	Non-reversers	Reversers
0	0	7
1	35	23
2	15	11
3	3	4
4	1	4
5	1	3
6	0	2
7	0	2
8	1	0
Total	56	56

Table 38

Number of H Responses by Immobilized and Non-immobilized Subjects

Number of H	Immobilized	Non-immobilized
0	6	5
1	12	14
2	17	22
3	7	8
4	6	7
5	4	0
6	4	0
Total	56	56

Table 39

Number of M Responses by Immobilized and Non-immobilized Subjects

Number of M	Immobilized	Non-immobilized
0	38	27
1	13	16
2	4	10
3	0	1
4	0	2
5	1	0
Total	56	56

Table 40

Number of HM Responses by Immobilized and Non-immobilized Subjects

Number of HM	Immobilized	Non-immobilized
0	3	4
1	6	8
2	18	10
3	12	17
4	7	10
5	5	5
6	4	1
7	1	1
Total	56	56

Table 41

Order of H Responses by Immobilized and Non-immobilized Subjects

Order of H	Immobilized	Non-immobilized
0	5	5
1	24	26
2	14	9
3	4	3
4	2	4
5	2	4
6	2	1
7	2	2
8	1	2
Total	56	56

Table 42

Order of M Responses by Immobilized and Non-immobilized Subjects

Order of M	Immobilized	Non-immobilized
0	38	27
1	2	6
2	2	9
3	3	4
4	5	2
5	0	5
6	4	2
7	1	1
8	1	0
Total	56	56

Table 43

Order of HM Responses by Immobilized and Non-immobilized Subjects

Order of HM	Immobilized	Non-immobilized
0	3	4
1	26	32
2	14	12
3	5	2
4	2	3
5	2	2
6	2	0
7	1	1
8	1	0
Total	56	56

Table 44

Number of H Responses by Immobilized and Non-immobilized Reversers and Non-reversers

Number of H	Immobilized		Non-immobilized	
	Non-reversers	Reversers	Non-reversers	Reversers
0	1	5	0	5
1	9	3	4	10
2	4	13	13	9
3	3	4	6	2
4	5	1	5	2
5	3	1	0	0
6	3	1	0	0
Total	28	28	28	28

Table 45

Number of M Responses by Immobilized and Non-immobilized Reversers and Non-reversers

Number of M	Immobilized		Non-immobilized	
	Non-reversers	Reversers	Non-reversers	Reversers
0	11	27	5	22
1	12	1	13	3
2	4	0	8	2
3	0	0	1	0
4	0	0	1	1
5	1	0	0	0
Total	28	28	28	28

Table 46

Number of HM Responses by Immobilized and Non-immobilized Reversers and Non-reversers

Number of HM	Immobilized		Non-immobilized	
	Non-reversers	Reversers	Non-reversers	Reversers
0	0	3	0	4
1	1	5	0	8
2	5	13	2	8
3	8	4	13	4
4	6	1	7	3
5	4	1	4	1
6	3	1	1	0
7	1	0	1	0
Total	28	28	28	28

Table 47

Order of H Responses by Immobilized and Non-immobilized Reversers and Non-reversers

Order of H	Immobilized		Non-immobilized	
	Non-reversers	Reversers	Non-reversers	Reversers
0	1	4	0	5
1	14	10	14	12
2	7	7	7	2
3	2	2	1	2
4	1	1	2	2
5	0	2	2	2
6	1	1	0	1
7	1	1	1	1
8	1	0	1	1
Total	28	28	28	28

Table 48

Order of M Responses by Immobilized and Non-immobilized Reversers and Non-reversers

Order of M	Immobilized		Non-immobilized	
	Non-reversers	Reversers	Non-reversers	Reversers
0	11	27	5	22
1	2	0	5	1
2	2	0	6	3
3	3	0	4	0
4	5	0	1	1
5	0	0	4	1
6	3	1	2	0
7	1	0	1	0
8	1	0	0	0
Total	28	28	28	28

Table 49

Order of HM Responses by Immobilized and Non-immobilized Reversers and Non-reversers

Order of HM	Immobilized		Non-immobilized	
	Non-reversers	Reversers	Non-reversers	Reversers
0	0	3	0	4
1	16	10	19	13
2	7	7	8	4
3	3	2	0	2
4	1	1	0	3
5	0	2	1	1
6	0	2	0	0
7	0	1	0	1
8	1	0	0	0
Total	28	28	28	28