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SOME FACTORS RELATED TO RESPONSE DELAY

AND ACADEMIC ACHIEVEMENT

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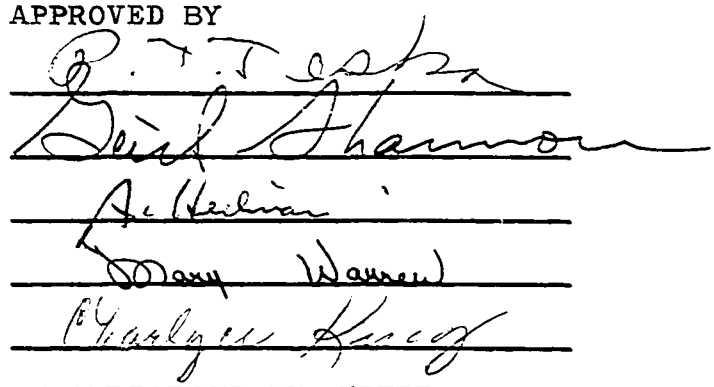

DISSERTATION COMMITTEE

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SOME FACTORS RELATED TO RESPONSE DELAY AND ACADEMIC ACHIEVEMENT

CHAPTER I

INTRODUCTION AND PROBLEM

Attempts have been made to establish relationships between academic achievement and intelligence scores, achievement and personality adjustment, and intelligence scores and personality adjustment. Several approaches to these problems have been tried in various types of settings.

An investigation by Ratchick,[1] in an attempt to relate achievement to intelligence quotients, found significant differences between pupils with low achievement and high intelligence quotients as compared with those with high achievement and high intelligence quotients. He studied two groups of 26 pupils matched in sex, age, and I.Q. The experimental group was composed of pupils with intelligence quotients of 110 or more and academic grade

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[1]Irving Ratchick, "Achievement and Capacity: A Comparative Study of Pupils with Low Achievement and High Intelligence Quotients in a Selected New York City High School (unpublished doctoral dissertation, University of Colorado, 1957).

of 70 or less for three terms, and the control group consisted of pupils with intelligence quotients of 110 or more and an academic grade of 85 or more for three terms. A battery of instruments was administered to both groups for comparisons in reference to personal problems, reading ability, achievement, and personality.

Ratchick found that significant differences existed between the two groups in reference to parts of the Mooney Problem Check List (high school form), The Iowa Silent Reading Test, Otis Group Intelligence Scale, and the Kuder Preference Record. He also found that among members of the experimental group absences in high school were more prevalent and fewer of the mothers of these subjects were graduated from college or preferred reading as a hobby. However, Ratchick found no single element to be related to all cases of under-achievement.

Jansen[2] pursued this study further. He sought to determine whether non-achieving students of low scholastic ability are not also handicapped in non-intellectual areas of college life, and to discover to what degree their adjustment problems differed from those of other student groups.

Four hundred fifty-eight students during their first semester at Brigham Young University, 1955-56, were grouped

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[2]Vern H. Jansen, "Analysis and Comparison of the Adjustment Problems of Non-Achieving College Students of Low Scholastic Ability and Other Groups of Achieving and Non-Achieving Students" (unpublished doctoral dissertation, University of Colorado, 1957).

as follows:

1. Non-achieving students of low scholastic ability
2. Achieving students of low scholastic ability
3. Non-achieving students of high scholastic ability
4. Achieving students of high scholastic ability

Group comparisons were made on the basis of scores derived from the Minnesota Multiphasic Personality Inventory, The Kuder Preference Record, the Mooney Problem Check List, and the College Inventory of Academic Adjustment. The groups were also compared with respect to their participation in certain extracurricular activities, based upon information secured from a questionnaire.

Jansen[3] found that non-achieving students of low scholastic ability indicated more adjustment problems than other groups with which they were compared. The gifted achievers were inclined to express fewer adjustment problems than the other three groups. The conclusions indicated that non-achieving students of low scholastic ability were not only handicapped academically, but were also at a disadvantage with respect to non-intellectual areas of college life.

Current research indicates that there are variables other than intelligence quotient and personality factors that affect academic achievement of students.

Another type of approach to the problem is found in

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[3] Ibid.

certain clinical studies that have dealt with the response delay process. One measure of response delay is cognitive inhibition time, which is a measure of the length of time it takes an individual to delay response to a learned word association and to respond with a new word. Paired word associations such as black-white, boy-girl are given to the subject. The subject learns to respond with the second word when the first one is presented to him. After learning has occurred, the subject is then instructed to respond with any word other than the learned association. In order to do so, he must delay the learned response and substitute a new response in its place. Cognitive inhibition time is the time which elapses between the stimulus word and the response.

Cognitive inhibition time was used by Galloway,[4] and Meltzoff, Levine, and Glass[5] in various studies of response delay. In these studies it was coupled with comparisons of the Rorschach M or human movement and with the pattern of reversal of the mirror image N on the Wechsler-Bellevue digit symbol subtest. Agreement is not complete among these researchers. The Galloway study seems to

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[4]James R. Galloway, "A Comparative Study of the Inhibition Process in Delinquent and Non-Delinquent Females" (unpublished doctoral dissertation, University of Oklahoma, 1958).

[5]M. Levine, H. Glass, and D. Meltzoff, "The Inhibition Process, Rorschach Human Movement Response, and Intelligence," Journal of Consulting Psychology, XXI (1957), pp. 41-45.

indicate that there is little correlation between delinquents, presumed to be poorly adjusted, and reversal of the mirror image N, presumed to exhibit patterns of response delay leading to inappropriate response. In these results Galloway is largely supported by Vane and Eisen[6] and by Glueck and Glueck.[7] He also reported that a certain class of reversers of the mirror image N showed a trend toward shorter cognitive inhibition time and produced more Rorschach M. This finding is contrary to the results that might be expected from the implications of studies by Meltzoff, Levine, and Glass. These studies should be briefly reviewed to clarify these concepts.

Galloway[8] made a comparative study of the inhibition process in delinquent and non-delinquent females. He reported among his conclusions that there were no significant differences in inhibition time between subjects reversing the mirror-image N in the Digit Symbol subtest of the Wechsler-Bellevue Intelligence Scale and those who did not; however, he found that within the low socio-economic class the reversers showed a consistent trend toward a shorter

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[6]Julia R. Vane and Virginia W. Eisen, "Wechsler-Bellevue Performance of Delinquent and Non-Delinquent Girls," Journal of Consulting Psychology, XVIII, No. 3 (1954), pp. 221-25.

[7]Sheldon Glueck and Eleanor Glueck, Unraveling Juvenile Delinquency (New York: The Commonwealth Fund, 1950), p. 207.

[8]Galloway, op. cit.

cognitive inhibition time and tended to produce more human movement (M) responses on the Rorschach.

The Ratchick[9] study established that adjustment problems are associated with academic achievement and Jansen[10] indicated that such adjustment problems are more prevalent among students of low scholastic ability. The Galloway comparative study bore out an earlier study by Vane and Eisen,[11] which concluded that the Digit Symbol subtest of the Wechsler-Bellevue Scale was not an adequate means of differentiating delinquents from non-delinquents when age, intelligence, and socio-economic background were equated. The Vane and Eisen study of an experimental group of 100 delinquent females between the ages of 16 and 25 with I.Q.'s between 70 and 110 as compared to a control group of 38 non-delinquent females of the same age and I.Q. range, attempted to uncover a characteristic pattern of responses in mean verbal, performance, and full I.Q.'s, and in mean weighted subtests. One difference found was the superiority of the non-delinquents over the delinquents in Digit Symbol subtest. Wechsler noted that:

> Neurotic and unstable individuals also tend to do rather poorly on the Digit Symbol. Neurotic subjects do badly on this test because they have difficulty in

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[9]Ratchick, op. cit.

[10]Jansen, op. cit.

[11]Vane and Eisen, op. cit.

> concentrating and applying themselves for any length of time and because of their emotional reactivity to any task requiring persistent effort. The poor performance of the neurotic represents a lessened mental efficiency rather than an impairment of intellectual ability.[12]

Vane and Eisen[13] indicated that delinquent girls do show inability for sustained effort in simple, relatively monotonous tasks and often verbalize their resistance to such tasks. The investigation by Glueck and Glueck[14] gave the same results. Their conclusion was that impulsive emotionally labile persons would not perform as well on the Digit Symbol as stable persons. The delinquents as a group are more labile emotionally, though possibly possessing greater skill in motor capacity.

These studies indicate a relationship between adjustment and results of the Digit Symbol tests. A relationship between reversal of the mirror image N and poor adjustment seems to be demonstrated. However, the Galloway, Vane and Eisen, and Glueck and Glueck studies seem to indicate that, with the intelligence tests used, differences in adjustment were not related to differences in intelligence. It would appear that results of the Digit Symbol test reveal difference in adjustment more than results of intelligence tests. Differences in response delay patterns should, therefore,

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[12]Vane and Eisen, op. cit.

[13]Ibid.

[14]Glueck and Glueck, op. cit.

bear little significant relationship to the ability level of the individual. The present study will attempt to verify this inference as a hypothesis.

In an explanation of inhibition, Rapaport[15] names inhibition of action designed to gratify immediate needs as a primary condition for the development of fantasy. Symbolization, fantasy, and planning require the delay and control of immediate response on a behavioral level. He believes young children are lacking in this ability to inhibit motor activity, but with maturation he reports there is a gradual emergence of human movement (M) responses as measured in the Rorschach test and as associated with controlled behavior. Certain psychotic groups display faulty inhibition of thoughts and motor behavior and are correspondingly unable to produce M responses on the Rorschach. Meltzoff and Levine hypothesized that there was a direct relationship between motor inhibition and the inhibition of a cognitive process.[16]

Eighty volunteer male and female university subjects were divided at the median of the distribution into long and short motor inhibition time groups. The subjects least able to inhibit motor activity took significantly longer times to inhibit associations and to produce an appropriate cognitive

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[15]David Rapaport, Diagnostic Psychological Testing, Vol. II (Chicago: The Year Book Publishers, 1949).

[16]Julian Meltzoff and Murray Levine, "The Relationship between Motor and Cognitive Inhibition," Journal of Consulting Psychology, XVIII (1954), 355-58.

response. It was concluded that subjects with greater ability to inhibit motor activity voluntarily are able to inhibit learned associations and to produce new ones more quickly than those less adept at inhibiting motor activity.

The reversal of the mirror-image N symbol on the Wechsler-Bellevue Digit Symbol subtest represents faulty inhibition of a learned association. The Meltzoff and Levine investigation implies that those who reverse the N should logically be less adept at inhibiting motor activity and less able to produce appropriate response in terms of optimum response delay. Certainly the Meltzoff studies implied that reversers would be less able than non-reversers to produce M on the Rorschach.

On the Digit Symbol subtest of the Wechsler-Bellevue Intelligence Scale the subject either passes or fails according to his ability to inhibit a learned, inappropriate response. The subject is required to associate certain symbols with numerals. The numerals 1 to 9 are shown with a different symbol representing each numeral. The numerals are then listed below, and the subject is required to copy the corresponding symbol below each numeral. He must copy each symbol exactly as it was formed above. The symbol for the numeral 2 is a mirror-image, or reversed N. Many subjects substitute incorrectly for numeral 2 an N instead of the mirror image. The subjects are called N-reversers or reversers. In terms of over-all adjustment the N-reverser's

inability to respond appropriately in the subtest might limit his ability to reject a series of possible responses and to select an appropriate response.

Levine, Glass, and Meltzoff state that "the correlation of M with intelligence suggests that the delay function of the ego or inhibition ability may be directly involved in intelligence test performance."[17] In a normal population, the N-reversers may represent subjects who fail to make a necessary adjustment in an habitual motor response. They may perceive the stimulus correctly but fail to inhibit the motor act of writing the familiar N or they may permit closure to take place too rapidly so that the normal N is actually perceived. It is also possible that the subject responds as if there were no difference between the stimulus as given and the normal N. In any of these cases it was hypothesized that the error was a function of insufficient delay or control of response tendency. In this event, reversers should produce fewer M responses and should have less ability to inhibit old associations and to substitute rapidly new ones for it (in contrast in both cases to a tendency detected by Galloway at certain class levels).

Levine, Glass, and Meltzoff administered to 274 veterans divided among reversers and non-reversers the Rorschach, the Wechsler-Bellevue, and Cognitive Inhibition

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[17] Levine, Glass, and Meltzoff, op. cit.

tests. The controls (non-reversers) had a significantly higher I.Q., 109.46 compared to 100.76. The data confirmed the analysis of the reversal error as a manifestation of poor ability to delay responses. Moreover the results suggested that inhibition ability was an important factor in earning a high score on the intelligence test. Levine, Glass, and Meltzoff[18] stated that there is a growing body of evidence to suggest that inhibition ability involves a stable process in the person extending beyond the immediate situation. Apparently there are processes extending across particular subtests of the Wechsler-Bellevue tests. The difficulty in validating the Wechsler-Bellevue tests may well have resulted from the attempt to impose arbitrary meanings on the subtests in place of examining manifestations of definable ego processes (Cognitive Inhibition Time, for example) involved in test performance. These findings by Levine, Glass, and Meltzoff suggest the importance of further inquiry into the area of response delay processes.

Levine, Spivack, and Wright[19] in a recent study revealed some further data on M responses on the Rorschach and intelligence. The study included adolescents with psychiatric diagnoses, hospitalized male veterans with psychotic

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[18] Ibid.

[19] Murray Levine, George Spivack, and Byron Wright, "The Inhibition Process, Rorschach Human Movement Responses, and Intelligence; Some Further Data," Journal of Consulting Psychology, XXIII (1959), No. 4, pp. 306-12.

diagnoses, and a group of adult male out-patients with psychotic diagnoses. The Wechsler-Bellevue Intelligence Scale, Form I, and the Wechsler Intelligence Scale for Children (WISC) were used.

The measure of intelligence test performance failure was the presence of one or more reversals of the mirror-image N, symbol for the number 2 in the W-B, Form I, Digit Symbol subtest. An attempt was made to confirm previous findings by Levine et al. that the error of reversing the mirror-image N is related to general intelligence and to M.

It was found that non-reversers had a mean I.Q. of 101.3 whereas reversers had a mean I.Q. of 93.5. In the adolescent group the mean I.Q. of non-reversers was 98.9 and the mean I.Q. for reversers was 91.7.

This study reaffirms all previous findings on M responses on the Rorschach and N reversing on the Wechsler-Bellevue Digit Symbol subtest except for adolescents.

Many researchers have attempted to ferret out some of the factors that affect response to stimuli. Some individuals respond immediately to stimuli, others react more slowly. The manner of reacting differently from the determined mode of a group has been called displacement. A displacement is defined by Teska[20] as a difference in response

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[20]James Teska, "Effects of Attitudes on Perception of Coin Size" (unpublished Master's thesis, University of Oklahoma, 1959), p. 20.

position from the most frequently given position: "A displacement is inferred to be a difference in the stimulus value of a particular object to a particular subject from the value of that object as determined by the modal response of all subjects."

Teska devised a picture card series to observe the response of subjects to situations where money was involved. The basic hypothesis was that subjects with strong attitudes toward money would overestimate the size of coins more than those subjects with weak attitudes toward money. Two groups of children were selected, one group with weak attitudes toward money and another group with strong attitudes toward money. The picture card series was one of two techniques employed in selection of these subjects for his study. The second technique was selection of subjects by teachers. The teachers were given certain criteria to use as a guide in selecting subjects that they considered to have strong or weak attitudes toward money.

The picture card series was an indirect measure of attitudes toward money. It was made up of two sets of seven cards, each containing seven pictures. One set of seven cards related to money as an object. On each of these seven cards were six pictures of objects familiar to a ten-year-old child and one picture of a coin, each denomination being used at least once in the series. On each of the second set of seven cards were six pictures of people involved in

familiar activities and one picture of people involved in a money situation. The seven pictures were placed on each of the fourteen cards with the money object or situation located in different positions on different cards. The subject could name the objects or situations depicted on the card in any order that he chose. The order in which the subject gave his response was recorded.

The basic assumption underlying the use of the Picture Series Test is that for those subjects with weak attitudes toward money, the money object or situation would not stand out in the stimulus field. For subjects with strong attitudes toward money, the money item or situation would stand out in the stimulus field. The response order for those subjects with weak attitudes toward money should then be different from the response order of those subjects with strong attitudes toward money.

All the objects on the cards were seen in a particular position by a larger number of subjects than would be expected if only random selection were used. For the money items an analysis of displacement was made on the basis of displacement from the most frequently given position.

It was assumed by Teska that the money item would not stand out in the stimulus field for subjects with weak attitudes toward money. These subjects were anticipated to have most of their responses in the most frequently given position.

Teska further assumed that the money item would stand out in the stimulus for subjects with strong attitudes toward money. He expected these subjects to have many displacements from the most frequently given position; and subjects with moderate attitudes toward money, the average or normal persons, to have some, but not many, displacements from the most frequently given position.

It was concluded by Teska after using these two criteria for selection of subjects, teacher judgment and displacement on picture series test, that the picture series test may have differentiated between the children on the basis of characteristics other than attitude strength but related to feelings about money in some manner. His study established a correspondence between displacement and teacher judgment of strong and weak attitudes toward money.[21]

The explanation of the picture card series test by Teska is introduced in this study to reveal one of the numerous techniques employed in experiments with subjects for the purpose of understanding response to stimuli. There is evidence that a person responds to the whole structure of an outward stimulus rather than to component parts of the structure of the stimulus. When the stimulus is perceived, the individual organizes it in a manner that is acceptable to him. The resulting organization of the stimulus within

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[21] Ibid.

the individual arises in and is consistent with relations his past experiences have had for him. Thus, if a person sees a picture, he organizes the people or objects in the picture in a manner that for him has acceptable meaning. He might perceive a picture of a man and boy talking with each other as that of a father and son. His reaction to the picture will always be in accordance with whatever his experiences with his father have meant to him.

It can be assumed that if a person has had problems related to his relationship with his father these may be threatening to him and affect the time required for his response to a related stimulus. When such a subject sees a picture perceived as that of a father and son, the time required to organize the stimulus material and to respond appropriately may vary from the time required for response by a subject whose father-relationships did not develop threatening problems.

Adjusting is responding to stimuli. The over-all adjustment of an individual may be revealed by the time it takes him to respond to certain kinds of stimuli. Deviation from the normal pattern of response may reveal reaction to threat. The length of time that is necessary for the response of a person who perceives a stimulus as threatening varies in pattern from the time required of a person who does not perceive the stimulus as threatening.

The purpose of this study is to examine the differences, if any, which exist in the ability to delay responses and in other personality variables in groups of high-achieving and low-achieving female college freshmen. The term response delay is defined as delay of a response by an individual to a given stimulus.

For this study a picture card series was designed to compare responses of subjects to given stimuli. The subjects will also be compared according to scores on the Ohio State Psychological Examination and the Digit Symbol subtest of the Wechsler-Bellevue test.

The present study is designed to examine the differences that may exist in response delay patterns in groupings of subjects by Ohio State Psychological Examination (OSPE) score levels, by reverser and non-reverser designation and by high, medium, and low grade-point averages. The study will check the following hypotheses:

1. Reversers will displace on the Picture Card Series Test more than non-reversers.

2. Low-achieving subjects will displace more than high- and medium-achieving subjects.

3. Subjects with low OSPE scores will displace more negatively than subjects with high OSPE scores.

4. The first three hypotheses will be upheld for each of the four subtests of the total Picture Card Series Test.

5. The subjects as classified in hypotheses 1, 2, and 3 will display the same displacement patterns for each of the subtests as they display for the Picture Card Series Test when considered as a whole.

6. Reversers will displace negatively and non-reversers will displace positively.

7. Low-achieving subjects will displace negatively and high- and medium-achieving subjects will displace positively.

8. Subjects with low OSPE scores will displace negatively, and subjects with high and medium OSPE scores will displace positively.

9. Subjects whose achievement and OSPE scores differ will displace more than subjects whose achievement and OSPE scores correspond.

10. Reversers will have more extreme position responses than non-reversers.

11. Low-achieving subjects will have more extreme position responses than high- and medium-achieving subjects.

12. Low-achieving subjects will have more extreme position responses than subjects with high OSPE scores.

13. Reversers will deviate more from the mean elapsed time for response delay to first response.

14. Reversers will deviate more from mean elapsed time for response delay to conflict response than non-reversers.

15. Low-achieving subjects will deviate more from the mean elapsed time for response delay to first response than high-achieving subjects.

16. Low-achieving subjects will deviate more from mean elapsed time for response delay to conflict response than high-achieving subjects.

17. Subjects with low OSPE scores will deviate more from the mean elapsed time for response delay to first response than subjects with high OSPE scores.

18. Subjects with low OSPE scores will deviate more from the mean elapsed time for response delay to conflict response than subjects with high OSPE scores.

CHAPTER II

PROCEDURE OF THE STUDY

Selection of Subjects

Forty subjects were used in this study. These subjects were selected on the basis of their responses to the Digit Symbol subtest of the Wechsler-Bellevue Adult Intelligence Scale. The Digit Symbol subtest was administered to 258 female freshman college students enrolled in the second semester of the term of 1958-1959 in 43 English II classes at the University of Oklahoma. The testing proceeded until 51 students who reversed the mirror image N on the Digit Symbol subtest were found. Of the 51 who had one reversal or more, 20 were found who would agree to complete the study. From the 207 students who had not reversed on the Digit Symbol subtest, students selected at random were asked to volunteer until 20 had accepted. These 40 girls were the subjects for this experiment.

Classification of Subjects

These two groups of subjects, 20 reversers (students who had reversed the mirror image N on the Digit Symbol subtest) and 20 non-reversers, were classified as high,

medium, or low scholastic achievers. Achievement levels were based upon grade-point averages earned during the first semester: defined as high, a grade-point average of 2.80 or above; medium, 2.79 to 1.70; and low, 1.69 or below.

All of the subjects selected for the experiment were further classified according to the Ohio State Psychological Examination (OSPE) scores from 1 to 8 inclusive; among the subjects tested there were no scores above 8. The OSPE scores were available for these subjects since the University administers this test to all entering freshmen. The scores and grade-points were obtained from the files of the office of the University College.

Picture Card Series and Administration

As a technique to measure response delay, a picture series projective test was developed. This test consisted of forty-seven cards, each of which contained five randomly placed pictures. Four of the five pictures were of a common content matter, while the fifth picture differed in content. The fifth picture, called the conflict picture, was matched in all respects except content with the other four pictures.

The content of the conflict pictures was directed toward four problem areas. The first of these problem areas was represented by seventeen cards involving family or male situations, with as little as possible in the way of content in the four non-conflict pictures that might act to evoke

problem or threat response. The conflict picture was a family or male setting that suggested the presence of problem, threat, or discord.

The second problem area was represented by fifteen cards which showed family settings. The conflict picture on five of these cards showed female non-family settings, five showed male non-family settings, and five showed mixed non-family settings.

The third problem area was represented by ten cards involving boy-girl scenes with five of the conflict pictures being all girl and five all boy.

The fourth area was represented by five cards that were characterized by absence of any authority symbols or figures with the conflict pictures showing scenes involving such symbols or figures.

For purposes of analysis the forty-seven cards were grouped as follows:

1. 17 family, male
2. 15 family--non-family
3. 10 boy-girl
4. 5 authority--non-authority

This picture series test was constructed on the assumption that the individual, in responding to the whole of an outward stimulus, organizes it in a manner acceptable to him. It was assumed that each card in the picture series would evoke a total response even though the card contained

one picture with content that might be perceived as an area of problem or conflict. A subject for whom a particular card included a threatening picture might be expected to react differently to the stimulus of the whole card than the subject for whom the content of the conflict picture evoked no special problem or threat. The reaction to the conflict picture would be a part of the total reaction to the card.

The subject reacting to the content of the conflict picture might respond too soon by reacting to the conflict picture immediately. He might respond too late by postponing reference to the conflict picture to the last. By means of the picture series test as designed, the subjects differing from the modal response time were grouped and statistical comparisons made with their grade-point averages, OSPE levels, and reverser, non-reverser designation.

The Picture Card Series was administered individually to each subject with the following instruction:

> I am going to show you some cards with pictures on them. What I would like for you to do is take the card and just tell me what you see. Just tell me the first thing that strikes your eye, the second and so forth. Don't name what you see as if you were reading off the page. Just the first thing you see, the second and so on.

The series was presented in random order, and after the subject had responded to two or three of the cards, the instructions were, "Tell me what you see." A record was kept of the order in which each subject responded to the pictures on each card.

A time record was kept for each subject. Timing began when the subject first looked at the card. The time of first response was recorded; another time record was kept from the time the subject first looked at the card to her response to the conflict picture.

For each subject, then, the following experimental data were available: time to first response; total time to conflict picture response; and order of displacement, which was defined as deviation in response position of the conflict picture from the most frequently given response position for that picture. A displacement was assumed to be a difference in stimulus value of the conflict picture from the stimulus value of that picture as determined by the modal response of all subjects.[1]

This study was designed to examine the differences that may exist in response delay patterns of subjects designated as reversers and non-reversers, classified according to OSPE score levels and according to high, medium, and low grade-point achievement levels.

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[1]James Teska, "Effects of Attitudes on Perception of Coin Size" (unpublished Master's thesis, University of Oklahoma, 1959).

CHAPTER III

RESULTS

The data presented in the following pages is arranged according to three approaches to an understanding of the delay response patterns of the subjects. These approaches are: (1) an examination of the displacement patterns; (2) a study of the patterns shown by the subjects in choice of a first position response, last position response, and first and last positions, combined; and (3) a study of the elapsed time until the subject's first response to the picture and the total elapsed time until the subject's response to the picture that differed in its stimulus content from the remainder of the pictures on the card.

The examiner noted the order in which the subjects responded to the five pictures on each card and designated from one to five the position of the particular response that dealt with the picture that differed in its content from the remainder of the five pictures on each of the cards. This picture was labeled the "conflict" picture and the response to it was called the "conflict" response position. Displacement was then defined as a difference in "conflict"

response position from the most frequently given "conflict" response position. It was assumed in this study that displacement represented a difference in the stimulus value of the "conflict" picture to a particular subject from the stimulus value of the "conflict" picture as determined by the modal response of all the subjects.[1]

Since each card had five pictures, the subjects were responding to the total stimulus pattern of the card and not to the stimulus of the "conflict" picture alone. It was assumed that the response pattern of the subjects having few or no problems in the areas depicted by the "conflict" pictures would be determined by such factors as position of the picture on the card, contrasts of light and dark areas in the pictures, and by content other than the content of the "conflict" picture. It was assumed that these responses would group into definite modes for the response position of the "conflict" picture.

The response pattern of subjects with problems in the areas of the content of the "conflict" cards would presumably be influenced to a greater degree by this content and consequently less influenced by the position of the picture on the card, contrasts of light and dark areas, and by other content of the pictures. This response pattern of

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[1]James Teska, "Effects of Attitudes on Perception of Coin Size" (unpublished Master's thesis, University of Oklahoma, 1959).

the subjects toward the content of the "conflict" picture should result in their exhibiting displacement from the modal response. Displacement would be positive if the subject turned toward the "conflict" picture earlier than the mode of all subjects, or negative if the subject's reaction was to postpone response to the "conflict" picture to a later position than the modal response position. It was assumed that either positive or negative displacement patterns would be indicative of the existence of problems in the area of the "conflict" pictures.[2]

These assumptions were the basis for testing hypotheses calculated to determine if there were any significances in such displacement differences shown by the subjects and differences in their scores on the OSPE, their grade-point averages (GPA), and their designation as reversers or non-reversers.

Forty female second semester freshman students served as subjects. They were given the picture card series test consisting of forty-seven cards. The number of times that these subjects deviated from the most frequently given position of all subjects on each card was totaled for the forty-seven cards. The 40 Ss were grouped into 20 reversers and 20 non-reversers according to their responses to the Digit Symbol subtest of the Wechsler-Bellevue Scale. Then

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[2]Ibid.

the reversers were grouped into three categories according to grade-point average (GPA) for their first semester grades. The three categories for reversers and the number of Ss in each were: high-achieving reversers, 3; medium-achieving reversers, 6; and low-achieving reversers, 11. The non-reversers were: high-achieving, 8; medium-achieving, 10; and low-achieving, 2. High achieving was delimited as a GPA of 2.80 or above; medium-achieving GPA as 2.79 to 1.70; and low-achieving GPA, 1.69 or below. These six categories are tabulated in Table 1 according to OSPE (Ohio State Psychological Examination) scores from 1 to 8, inclusive. Among the reversers no OSPE scores above 8 were found; therefore, no non-reversers with OSPE scores above 8 were included.

Table 1 records all of these relationships. For example, the first square in Table 1 records the fact that there were three reversers of the N on Wechsler-Bellevue Subtest who were high (H) in GPA and at 8 level in the OSPE and that the first of these three subjects displaced in responding to the conflict pictures on 9 cards of the 47; the second subject displaced on 24 cards and the third subject on 27.

The data presented in Table 1 were used in determining Chi-squares which were checked for statistical significance. For this study the required level of statistical

TABLE 1

DISPLACEMENT TOTALS FOR 20 REVERSER SUBJECTS AND 20 NON-REVERSER SUBJECTS ACCORDING TO THEIR INDIVIDUAL OSPE SCORES AND GPA

OSPE	Reversers			Non-Reversers		
	H	M	L	H	M	L
8	9 24 27			37 30		
7		36 30		13		
6		27 23	18	33	33 21 26 37	
5			14	9 35 35 34	35 38 17 34 25	13
4					13	29
3		30 33	27 34 30 13 34			
2			34 24 26			
1			11			

significance was set at .05.[3]

Hypothesis 1 is that reversers will displace on the Picture Card Series test more than non-reversers. Table 2 shows the number of reversers and non-reversers deviating from the most frequently given position 25 or more times and less than 25 times (with 47 possible).

In this study no significant difference was found in displacement in reversers and non-reversers. Therefore, Hypothesis 1 is rejected.

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[3]Henry E. Garrett, Statistics in Psychology and Education (New York: Longmans, Green and Company, 1950), p. 242.

TABLE 2

COMPARISON OF THE DISPLACEMENT OF THE 20 REVERSERS AND 20 NON-REVERSERS

	Reversers	Non-Reversers	df	Chi^2	P
25 or more	12	14			
Less than 25	8	6	1	.439	.50

Hypothesis 2 to be tested is that low-achieving Ss will displace more than high- and medium-achieving subjects. Table 3 shows displacement by number of high-, medium-, and low-achieving subjects who displaced either 25 or more times or less than 25 times.

In Table 3 the displacements for high- and medium-achieving Ss were combined and compared with the displacements of low-achieving subjects. There was no statistical significance between GPA and displacement differences. Therefore, Hypothesis 2 is rejected. There was, however, a tendency for the high-medium achievers to displace proportionately more times than the low achievers.

The arithmetic mean of displacements was calculated as 26. Comparisons between number of subjects with displacements of 26 or more and less than 26 were made, and a comparison of 30 or more, and less than 30. The result of none of these comparisons permits the conclusion that the GPA for

TABLE 3

COMPARISON OF SUBJECTS ACCORDING TO GPA AND DISPLACEMENTS

	Displacements			Comparison		df	Chi^2	P
	H	M	L	HM	L			
25 or more	7	12	7	19	7			
24 or less	4	4	6	8	6	1	1.053	.30
26 or more	7	11	7	18	7			
25 or less	4	5	6	9	6	1	.615	.50
30 or more	6	9	4	15	4			
29 or less	5	7	9	12	9	1	2.161	.20

the Ss bears a significant relationship to the displacement differences. The three results together, however, suggest a tendency for the high and medium subjects combined to show a larger proportion of displacement than the lows.

Hypothesis 3 is that subjects with low OSPE scores will displace more than Ss with high OSPE scores. Table 4 shows the number of Ss with 30 or more and 15 or less displacements, and the number of Ss having 25 or more and 18 or less displacements.

TABLE 4

COMPARISON OF OSPE SCORE LEVELS
AND DISPLACEMENT TOTALS

	OSPE Score Levels					
	876	54321	8765	4321	87654	321
30 or more	7	12	13	6	13	6
15 or less	2	7	5	4	6	3
df	1		1		1	
Chi^2	.694		.4403		.0086	
P	.50		.50		.95	
25 or more	10	16	17	9	18	8
18 or less	3	8	7	4	8	3
df	1		1		1	
Chi^2	.424		.0103		.0452	
P	.50		.90		.80	

In this study no significant difference was found between displacements of subjects with low and high OSPE scores. Hypothesis 3 is rejected.

Table 5 presents the displacement totals of the subjects as shown in Table 1 separated into the displacement sub-totals by the card groupings: (1) conflict-family and

TABLE 5

INDIVIDUAL DISPLACEMENT TOTALS BY 4 PICTURE CARD GROUPS ACCORDING TO GRADE-POINT AVERAGE, OSPE SCORES, AND REVERSER AND NON-REVERSER PATTERNS

(Conflict-Family)

OSPE Level	Reversers			Non-Reversers		
	High GPA	Medium GPA	Low GPA	High GPA	Medium GPA	Low GPA
8	6 12 9			14 13		
7		13 11		4		
6		12 7	6	13	12 11 10 14	
5			7	6 13 13 12	11 12 8 14 9	6
4					6	8
3		11 13	11 13 12 6 13			
2			12 5 10			
1			6			

TABLE 5--Continued

(Family--Non-Family)

OSPE Level	Reversers			Non-Reversers		
	High GPA	Medium GPA	Low GPA	High GPA	Medium GPA	Low GPA
8	1 6 9			10 6		
7		11 8		4		
6		4 8	4	11	11 5 5 11	
5			2	0 11 8 11	11 12 3 11 8	4
4					3	11
3		9 12	7 12 10 2 8			
2			9 4 6			
1			1			

TABLE 5--Continued

(Boy-Girl)

OSPE Level	Reversers			Non-Reversers		
	High GPA	Medium GPA	Low GPA	High GPA	Medium GPA	Low GPA
8	1 7 2			9 7		
7		87		3		
6		75	6	6	6 3 88	
5			3	1 8 9 7	10 2 4 6 9	2
4					3	8
3		76	7 6 5 39			
2			8 46			
1			2			

TABLE 5--Continued

(Authority)

OSPE Level	Reverser			Non-Reverser		
	High GPA	Medium GPA	Low GPA	High GPA	Medium GPA	Low GPA
8	1 2 4			4 4		
7		44		2		
6		43	2	4	4 2 3 4	
5			2	2 4 5 4	5 3 4 2 4	1
4					1	2
3		32	2 3 5 1 4			
2			5 1 4			
1			2			

conflict male situations; (2) family--non-family situations; (3) boy-girl and (4) authority situations. These tables are used for further analysis of the data.

On the following pages are a series of tables numbered from 6 to 20 which convert the data presented in Table 5 into Chi-square, two-by-two tables, for analysis. Many more combinations were tallied and set up than are shown in these tables; however, the significant trends or differences can be seen in those chosen.

Hypothesis 4 to be tested is that the first three hypotheses will be upheld when considering the more specific stimulus fields of each of the four subtests of the Picture Card Series Test. Table 6 is concerned with the conflict-family-male picture cards. The results indicate that there are no significant displacement differences between reversers and non-reversers or between comparisons of various OSPE score levels. However, when the high- and medium-achieving subjects were combined and compared with the low-achieving group, the results were significant. Medium achievers contributed most to this result when medium-achievers were compared to low-achievers, the data revealed that medium achievers displaced significantly more than did low achievers. It appears that the high and medium achievers taken together displace proportionately more than do the subjects with a low grade-point average, and medium-achieving subjects alone displace significantly more. Hypothesis 4 is sustained.

TABLE 6

DISPLACEMENT TABLES RELATED TO FAMILY CONFLICT-MALE CONFLICT CARDS ON THE PICTURE SERIES TEST

Part I
Subjects Compared as Reversers and Non-Reversers and by GPA

Displacement Totals	Rs	Non-Rs	Achievers by Grade-Point Average			
			H&M	L	M	L
11 or more	11	12	18	4	11	5
7 or less	7	4	5	6	2	6
df	1		1		1	
Chi^2	.746		3.659		4.111	
P	.50		.10		.05	

Part II
Subjects Compared by OSPE Scores

Displacement Totals	OSPE Score Levels					
	876	54321	8765	4321	87654	321
11 or more	10	13	16	7	16	7
7 or less	4	7	7	4	8	3
df	1		1		1	
Chi^2	.155		.119		.358	
P	.70		.70		.50	
10 or more	11	14	17	8	17	8
6 or less	3	6	7	4	6	3
df	1		1		1	
Chi^2	.310		.448		.015	
P	.50		.50		.90	

However, Table 7 indicates on the family--non-family cards a tendency for fewer reversers to have large displacement totals than non-reversers, and for the high and medium achievers to have more large displacement totals than the low-achieving subjects.

Hypothesis 5 is that the Ss classified in Hypotheses 1, 2, and 3 will display the same displacement patterns for each of the subtests as they display for the Picture Card Series Test when considered as a whole.

Table 8 gives displacement totals on the 10 boy-girl picture cards. Differences in displacement of reversers and non-reversers and Ss with high-medium and low OSPE scores were not statistically significant.

Table 9, which relates to the authority cards of the Picture Series Test, shows more significant results. When comparing reversers and non-reversers or combinations of OSPE levels, no significant differences were found; however, the results were statistically significant when the high and medium achievers together were compared with the low achievers. The high and medium achievers have significantly more displacement than the low achievers. Hypothesis 5 is sustained.

The first nine tables showed displacement totals derived for each subject disregarding the direction of displacement. Table 10 shows net displacement totals derived for each subject by adding the positive displacements

TABLE 7

DISPLACEMENT TABLES RELATED TO 15 FAMILY--
NON-FAMILY PICTURE CARDS

Part I
Number of Subjects within Specified Displacement Limits
Compared as Reverser and Non-Reverser and as
High, Medium, and Low Achievers

	Displacement Totals									
	11 or more	7 or less	df	Chi^2	P	10 or more	6 or less	df	Chi^2	P
Rs	3	10	1	2.208	.10	4	9	1	1.872	.20
Non-Rs	8	8				10	8			
Ach. Groups										
H&M	9	10	1	2.084	.20	11	10	1	1.370	.20
L	2	8				3	7			

Part II
Number of Subjects within Specified Displacement Limits
Compared by OSPE Score Levels

OSPE Level	Displacement Totals									
	10 or more	6 or less	df	Chi^2	P	9 or more	7 or less	df	Chi^2	P
876	5	8	1	.405	.50	6	8	1	.0114	.70
54321	9	9				11	10			
8765	10	12	1	.00263	.95	11	12	1	.0149	.70
4321	4	5				6	6			
87654	11	12	1	.0478	.80	12	13	1	.305	.50
321	3	4				5	5			

TABLE 8

DISPLACEMENT TABLES RELATED TO 10 BOY-GIRL PICTURE CARDS

Part I
Number of Subjects within Specified Displacement Totals Compared as Reverser and Non-Reverser and as High, Medium, and Low Achievers

	Displacement Totals									
	7 or more	4 or less	df	Chi^2	P	8 or more	4 or less	df	Chi^2	P
Rs	8	6	1	.091	.80	3	6	1	1.244	.30
Non-Rs	10	6				8	6			
GPA										
H-M	14	7	1	1.296	.30	8	7	1	.284	.70
L	4	5				3	5			

Part II
Number of Subjects with Specified Displacement Totals Compared by OSPE Score Levels

OSPE Level	Displacement Totals									
	7 or more	4 or less	df	Chi^2	P	8 or more	3 or less	df	Chi^2	P
876	8	4	1	.370	.50	4	4	1	.000	.99
54321	10	8				7	7			
8765	13	8	1	.105	.70	8	8	1	.000	.99
4321	5	4				3	3			
87654	14	9	1	.031	.90	9	9	1	.000	.99
321	4	3				2	2			

TABLE 9

DISPLACEMENT TABLES RELATED TO 5 AUTHORITY PICTURE CARDS

Part I
Number of Subjects within Specified Displacement Limits Compared as Reverser and Non-Reverser and as High-Medium and Low Achievers

	Displacement Totals									
	4 or more	2 or less	df	Chi^2	P	3 or more	2 or less	df	Chi^2	P
Rs	8	9	1	.696	.50	11	9	1	.416	.50
Non-Rs	11	7				13				
GPA										
H-M	15	8	1	3.2303	.10	19	8	1	3.722	.05
L	4	8				5	8			
M	8	4	1	2.666	.10	12	4	1	2.977	.10
L	4	8				5	8			

Part II
Number of Subjects within Specified Displacement Limits Compared by OSPE Score Levels

OSPE Level	Displacement Totals				
	4 or more	2 or less	df	Chi^2	P
876	9	5	1	.9402	.30
54321	10	11			
8765	15	9	1	2.075	.10
4321	4	7			
87654	15	11	1	.472	.50
321	4	5			

TABLE 10

NET POSITIVE OR NET NEGATIVE DISPLACEMENT OF REVERSERS AND NON-REVERSERS BY GRADE-POINT AVERAGE GROUPS AND BY OSPE SCORE LEVELS

OSPE Level	Reversers			Non-Reversers		
	High	Medium	Low	High	Medium	Low
8	-7 +13 +4			-7 0		
7		-34 -2		-3		
6		+13 +3	-2	-25	+7 -7 -10 +3	
5			0	-3 +11 -9 +10	-1 +6 -3 +2 +3	-3
4					-5	+3
3		+20 -5	0 +1 -30 -8 -3			
2			+24 -2 +10			
1			-5			

and the negative displacements and recording the positive or negative differences.

Hypothesis 6 is that reversers will displace negatively and non-reversers will displace positively. Table 11 shows comparisons of subjects with positive or negative net displacement in selected classifications.

Differences between reversers and non-reversers in negative and positive displacements were not statistically significant. Hypothesis 6 is rejected.

Hypothesis 7 is that low-achieving subjects will displace negatively and high- and medium-achieving subjects will displace positively. From the results it appears that if the subjects of either medium achievement or medium OSPE scores responded to the contents of the conflict pictures, they did so in a response position closer to the first response position than to the modal response position of all subjects. Therefore, Hypothesis 7 is rejected. However, there was a tendency for the high-medium achievers to displace more positively than low achievers.

Hypothesis 8 is that Ss with low OSPE scores will displace negatively and high- and medium-achieving subjects will displace positively. The results in Table 11, Part II, show that when Ss with medium OSPE scores were compared for positive and negative displacements with Ss with high and low OSPE scores, the Ss with medium OSPE scores responded with significantly more displacements. Subjects with high

TABLE 11

NET DISPLACEMENT TOTALS OF SUBJECTS ON 47 CARDS OF THE PICTURE SERIES TEST

Part I
Comparison of Positive and Negative Net Displacement of Reversers and Non-Reversers; and High, Medium, and Low Achievers

	Rs	Non-Rs	H-M	L	M	L
Positive	8	9	13	4	9	4
Negative	10	10	13	7	7	7
df	1		1		1	
Chi^2	.0318		2.5078		1.032	
P	.90		.10		.30	
3 or more positive	7	8	12	3	8	3
3 or more negative	7	9	11	5	5	5
df	1		1		1	
Chi^2	.0266		.511		1.147	
P	.90		.50		.30	
2 or more positive	7	9	13	3	9	3
2 or more negative	10	9	12	7	6	7
df	1		1		1	
Chi^2	.274		1.393		2.163	
P	.70		.20		.20	

TABLE 11--Continued

Part II
Comparison of Positive and Negative Net Displacement by OSPE Score Levels

	8765	4321	87-321	654	87654	321
Positive	12	5	6	11	13	4
Negative	13	7	11	9	14	6
df	1		1		1	
Chi^2	.382		3.882		.194	
P	.50		.05		.70	

and low OSPE scores had significantly more negative displacements. Hypothesis 8 is rejected.

Hypothesis 9 is that subjects whose achievement and OSPE scores differ will displace more than Ss whose achievement and OSPE scores correspond.

Thirteen of the 40 subjects who took the Picture Series Test were at achievement levels different from their OSPE score level. These 13 were labeled "outs." The 27 who were at the same level of OSPE score and grade-point average were called "ins." Table 12 shows the individual displacement totals of the 40 "ins" and "outs" by reversers and non-reversers.

Chi-Squares are shown in Table 13 to show displacement differences by number of "ins" or "outs," subjects who were reversers and non-reversers. Although the "ins" showed a greater proportion of subjects with small displacement

TABLE 12

INDIVIDUAL TOTAL DISPLACEMENTS OF 20 REVERSERS AND 20 NON-REVERSERS ACCORDING TO "INS" AND "OUTS"

	Reversers	Non-Reversers
Ins	9 27 24 27 23 34 11 14 27 26 34 30 13 34	37 13 30 33 21 24 13 38 26 17 34 25 37
Outs	36 30 30 33 18 14	33 9 35 35 34 13 29

totals, none of these results was statistically significant. Therefore, Hypothesis 9 is rejected.

A further analysis of data concerning the differences between "ins" and "outs" appears in Table 14. This table shows the number of displacements of reverser "ins" compared with total displacements of reverser and non-reverser "outs," and displacements of non-reverser "ins" compared with total displacements of reversers and non-reverser "outs." The reverser "ins" displaced statistically significant fewer times than the "outs" who showed a larger proportion of their numbers having large displacement totals. Differences in displacement of non-reversers was not statistically significant.

Another approach to the displacement data is the study of first and last response positions. The picture cards used in the Picture Series Test were composed of five

TABLE 13

NUMBER OF SUBJECTS WITHIN SPECIFIED LIMITS COMPARED AS "IN" OR "OUT" REVERSERS AND NON-REVERSERS

	Reversers		Non-Reversers		Total	
	In	Out	In	Out	In	Out
27 or more	7	5	7	5	14	10
25 or less	7	1	6	2	13	3
df	1		1		1	
Chi^2	2.298		.586		.586	
P	.10		.50		.50	
28 or more	4	4	7	5	11	9
26 or less	7	1	6	2	13	3
df	1		1		1	
Chi^2	2.618		.586		2.756	
P	.10		.50		.10	
28 or more	4	5	7	5	11	10
18 or less	4	2	3	2	7	4
df	1		1		1	
Chi^2	.714		.00404		.371	
P						
31 or more	3	2	6	4	9	6
26 or less	7	1	6	1	13	3
df	1		1		1	
Chi^2	1.310		.450		1.696	
P	.30		.50		.20	
19 or more	10	4	10	5	20	9
18 or less	4	2	3	2	7	4
df	1		1		1	
Chi^2	.045		.0732		.103	
P	.80		.80		.70	
28 or more	4	4	7	5	11	8
27 or less	10	2	6	2	16	4
df	1		1		1	
Chi^2	2.539		.589		2.849	
P	.10		.50		.10	

TABLE 14

COMPARISON OF DISPLACEMENTS OF "IN" AND "OUT" REVERSERS WITH "IN" AND "OUT" NON-REVERSERS

	Reverser "Ins"	Reverser-Non-Reverser "Outs"		Non-Reverser "Ins"	Reverser-Non-Reverser "Outs"
28 or more	4	9	31 or more	6	6
26 or less	7	3	26 or less	6	3
df	1			1	
Chi^2	3.427			.583	
P	.05			.50	

randomly placed pictures, one of which pictures a conflict situation related to the content of the four non-conflict pictures. As the subjects were given the picture cards during the test, they turned their attention to the various pictures in turn until they had responded to each of the five pictures. A first response position refers to the subject's choice of the "conflict" picture as the first one to which she responded. A fifth or last response position designates the choice by the subject of the conflict picture as her fifth or last response to the picture card. The number of times that the subject reacted first to the conflict picture as a response to the picture cards was called the first response total, and the number of times she reacted

last, the fifth response total. It was assumed that subjects with a large first or fifth response total were reacting to the content of the conflict picture in a more definite fashion than those who merely deviated from the modal response position either positively or negatively. The first response or last response represented the extreme of positive or negative displacement. The extreme response total represents the number of times the subject responded to the conflict picture in the first or fifth position.

Hypothesis 10 is that reversers will have more extreme position responses than non-reversers. In order to test this hypothesis, the analysis of the data includes analysis of first and fifth responses and the analysis of extreme position responses.

Table 15 compares the number of first position responses of reversers with non-reversers, and in various combinations, high, medium, and low achievers. These comparisons are made for each of the groups of conflict situations and for totals. For example, in the column labeled total, there are 9 reversers who had first responses for the conflict picture cards on 10 or more cards (10+) and 8 reversers with 6 or fewer (6-) such responses.

As shown in Table 15, the differences between the reversers and non-reversers were not statistically significant. However, the results for the picture card group relating to family--non-family situations indicated that

TABLE 15

FIRST RESPONSES TO CONFLICT PICTURES OF REVERSERS AND NON-REVERSERS AND BY GRADE-POINT AVERAGE

	Total	Conflict	Family Non-Family	Boy-Girl	Authority
By Reverser Non-Reverser					
	10+ 6-	4+ 2-	3+ 2-	2+ 1-	2+ 1-
Rev	9 8	8 9	15 5	6 14	6 14
Non	9 6	10 6	9 11	7 13	9 11
df	1	1	1	1	1
Chi^2	.161	.792	3.750	.114	.960
P	.70	.30	.05	.70	.30
	10+ 7-	4+ 3-	4+ 2-		3+ 0
Rev	7 9	8 12	7 5		1 9
Non	7 6	10 10	4 11		4 7
df	1	1	1		1
Chi^2	.292	.404	2.769		2.386
P	.30	.50	.10		.10
By High, Medium, Low Grade-Point Average					
	10+ 6-	4+ 2-	3+ 2-		2+ 1-
H-M	15 7	15 7	16 11		12 15
L	4 7	3 8	8 5		3 10
df	1	1	1		1
Chi^2	3.039	4.950	.0189		1.709
P	.10	.02	.90		.20
	10+ 7-	4+ 3-	4+ 3-	2+ 1-	
H-M	15 7	15 12	7 11	8 19	
L	4 8	3 10	4 5	5 8	
df	1	1	1	1	
Chi^2	3.824	3.739	.076	.312	
P	.05	.05	.80	.50	
	10+ 7-	4+ 2-	4+ 2-	2+ 1-	2+ 1-
M	9 3	10 3	1 8	6 10	7 9
L	4 8	3 8	4 5	5 8	3 10
df	1	1	1	1	1
Chi^2	4.197	5.911	2.492	.0029	1.306
P	.05	.02	.10	.95	.30
	10+ 7-	4+ 3-	4+ 2-	2+ 1-	2+ 1-
M	9 3	10 6	1 8	6 10	7 9
H-L	10 12	8 16	10 8	7 17	8 16
df	1	1	1	1	1
Chi^2	2.749	3.299	4.909	.303	.444
P	.10	.05	.02	.50	.50

reversers had a statistically significant greater number of large first response totals than non-reversers. Among the other picture card groups the reversers had a smaller number of large first response. Therefore, in the results for the total number of first responses, a cancellation effect was produced.

Comparing scores of high, medium, and low achievers was complicated by the fact that the medium achievers had fewer first responses in the family--non-family group and more first response totals in the other groups, especially conflict group, than either the high or low achievers. When totaled again a cancellation effect resulted. Nevertheless, the results were not statistically significant. This cancelling effect took place also within the data pertaining to family--non-family picture cards, where the high and medium achievers, usually displaying the same tendencies, here showed opposite tendencies. High and low achievers taken together had more first response totals on two subtests but not on the total series.

It appears from Table 15 that the high and medium achievers chose first place responses significantly more times than the low achievers in the conflict area. The medium achievers diverged from this tendency in the family--non-family area, choosing statistically significant fewer first place responses than either the high or the low achievers. There were no significant differences among the

achievement groups in the boy-girl and authority areas. There seems to be a tendency toward a positive relationship between achievement level and reaction to the content of the conflict pictures in the two areas that related to family and between achievement and reaction to the content of all picture cards in the Picture Series Test. It is a relationship that must be analyzed later in reference to the remainder of the data.

In Table 16 are the results of Chi-Square analysis pertaining to fifth position responses. The only statistically significant differences were derived by comparing reversers and non-reversers within the first specified limit (7+ 6-). The non-reversers had statistically significant more fifth position responses. All other comparisons of specified limits of fifth responses of reversers and non-reversers give results that are statistically not significant. When the median of distribution of fifth position responses was used as a specified limit, the reversers and non-reversers had relatively equal proportions above and below this median. It must be assumed that there was no correlation between reverser--non-reverser status and differences in fifth position responses.

Table 16 indicates that high and medium achievers had significantly fewer fifth position responses when compared to the low achievers with reference to the family--non-family picture card group. Responses of medium achievers contributed

TABLE 16

NUMBER OF SUBJECTS WITH SPECIFIED FIFTH POSITION RESPONSES BY REVERSERS AND NON-REVERSERS AND BY HIGH, MEDIUM, AND LOW ACHIEVERS

	Total	Conflict	Family Non-Family	Boy-Girl	Authority
Picture Series Test Subtests					
	7+ 6-	4+ 2-	4+ 3-	3+ 2-	1+ 0
Rev	12 8	10 6	6 14	9 11	8 12
Non	19 1	6 12	6 14	8 12	8 12
df	1	1	1	1	1
Chi^2	7.101	2.892	.000	.102	.000
P	.01	.10	.99	.70	.99
	8+ 7-	4+ 3-	3+ 2-	4+ 3-	2+ 1-
Rev	10 10	10 10	13 7	4 16	2 17
Non	12 8	6 14	15 5	5 15	0 20
df	1	1	1	1	1
Chi^2	.404	1.666	.476	.143	3.478
P	.50	.20	.50	.70	
By High, Medium, and Low Achievers					
	10+ 7-	4+ 2-	3+ 2-	3+ 2-	1+ 0
H-M	8 12	9 14	19 8	10 17	11 16
L	7 6	7 5	9 4	7 6	5 8
df	1	1	1	1	1
Chi^2	.609	1.171	.0054	1.014	.019
P	.50	.30	.95	.30	.90
	7+ 6-	4+ 3-	4+ 3-	4+ 2-	
H-M	22 5	9 18	5 22	5 17	
L	9 4	7 6	7 6	4 6	
df	1	1	1	1	
Chi^2	.755	1.539	5.215	1.014	
P	.50	.20	.02	.30	
	8+ 7-	4+ 3-	4+ 3-	3+ 2-	1+ 0
M	9 7	5 11	2 14	7 9	5 11
L	7 6	7 6	7 6	7 6	5 8
df	1	1	1	1	1
Chi^2	.016	.994	3.531	.292	.165
P	.90	.30	.05	.70	.70
	8+ 7-	4+ 3-	4+ 3-	3+ 2-	1+ 0
M	9 7	5 11	2 14	7 9	5 11
H-L	13 11	11 13	10 14	10 14	11 13
df	1	1	1	1	1
Chi^2	.016	.850	3.888	.017	.868
P	.90	.30	.05	.90	.30

largely to this result, as was true of first-place position responses also (see Table 15); thus the medium achievers appear to displace closer to the mode on family--non-family cards than do the high or low achievers.

Table 17 compares the totals derived by adding together the first and fifth position responses. These will be called extreme responses.

Hypothesis 10 stated that reversers will have more extreme position responses than non-reversers. The results did not statistically support this hypothesis. Hypothesis 10 is rejected. However, there seemed to be a tendency for the reversers to have more extreme-position responses than non-reversers. There was also a tendency for reversers to follow the pattern of the low achievers, i.e., to show more extreme responses. Although the reversers have more extreme responses, however, the results for differences between reversers and non-reversers in extreme position response totals are not statistically significant.

Hypothesis 11 is that low-achieving Ss will have more extreme position responses than high- and medium-achieving Ss. Table 17 reveals that the only statistically significant results appeared for medium achievers on the family--non-family cards. The medium-achieving subjects had statistically significant fewer extreme responses for the family--non-family cards as compared with high or low achievers. This result was expected since the medium achievers also had statistically

TABLE 17

NUMBER OF SUBJECTS WITH EXTREME POSITION RESPONSES BY REVERSERS AND NON-REVERSERS AND BY HIGH, MEDIUM, AND LOW ACHIEVERS

	Total	Conflict	Family Non-Family	Boy-Girl	Authority
By Reverser and Non-Reverser, Picture Series Test Subtest					
	20+ 15-	9+ 7-	6+ 5-	4+ 3-	2+ 1-
Rev	11 5	10 9	16 4	10 10	10 10
Non	9 6	7 10	12 8	9 11	12 8
df	1	1	1	1	1
Chi^2	.259	.472	1.9047	.1002	.404
P	.70	.50	.20	.70	.50
	22+ 17-	8+ 6-	7+ 5-	3+ 2-	3+ 2-
Rev	9 6	11 6	11 4	13 7	6 14
Non	6 9	10 7	7 8	14 6	6 14
df	1	1	1	1	1
Chi^2	1.200	.114	2.222	.0023	.000
P	.30	.70	.10	.95	.99
By High, Medium, and Low Achievers					
	20+ 17-	8+ 6-	6+ 5-	3+ 2-	3+ 2-
H-M	13 10	15 7	17 10	18 9	9 18
L	7 5	6 6	11 2	9 4	3 10
df	1	1	1	1	1
Chi^2	.0105	1.086	1.959	.0263	.439
P	.90	.30	.20	.90	.50
	22+ 18-	7+ 6-	7+ 6-	4+ 2-	
H-M	8 12	20 7	10 17	13 9	
L	7 6	7 6	8 5	6 4	
df	1	1	1	1	
Chi^2	.808	1.6366	1.265	.0023	
P	.30	.20	.30	.95	
	22+ 18-	7+ 6-	7+ 6-	3+ 2-	2+ 1-
M	4 7	13 3	3 13	11 5	8 8
L	7 6	7 6	8 5	9 4	6 7
df	1	1	1	1	1
Chi^2	.733	2.516	5.577	.0007	.042
P	.50	.10	.02	.98	.80
	22+ 18-	7+ 6-	7+ 6-	3+ 2-	2+ 1-
M	4 7	13 3	3 13	11 5	8 8
H	4 5	7 4	7 4	7 4	8 3
df	1	1	1	1	1
Chi^2	.134	1.055	3.758	.071	1.394
P	.70	.30	.05	.80	.20
	22+ 18-	7+ 6-	7+ 6-	3+ 2-	2+ 1-
M	4 7	13 3	3 13	11 5	8 8
H-L	11 11	14 10	15 9	16 7	14 10
df	1	1	1	1	1
Chi^2	.366	2.298	10.551	.019	.269
P	.50	.10	.01	.90	.70

fewer first and fifth position responses. The results on the other subtests were not statistically significant. However, it is interesting to note that for the other cards the medium achievers had a tendency toward more extreme position responses. Hypothesis 11 is sustained.

Hypothesis 12 is that subjects with low OSPE scores will have more extreme position responses than Ss with high OSPE scores.

The data in Table 18 were not statistically significant. The data indicate no significant differences in extreme displacement according to OSPE levels. Hypothesis 12 is rejected. However, there was a tendency for Ss with low OSPE scores to show more extreme positive responses than high OSPE Ss.

There remains one more approach to the determination of significant differences in response among the three sets of variables under consideration: reverser--non-reverser, high, medium, and low achievers, and OSPE score levels. Hypothesis 13 is that reversers will deviate more from the mean elapsed time for response delay to first response. A comparison was made of the number of subjects for each of these variables who were over or under a specified time limit in average elapsed time per card to their first response to any of the pictures. The elapsed time per card to the first response to any picture on the card will be called the first response time. The data are presented in

TABLE 18

COMPARISONS OF FIRST AND LAST RESPONSE TOTALS WITH OSPE SCORE LEVELS

	OSPE Score Level Combinations					
	876	54321	8765	4321	87654	321
Part I: First Position Totals						
8 or more	11	14	19	6	20	5
6 or less	5	9	8	6	9	5
df	1		1		1	
Chi^2	.226		1.498		1.189	
P	.10		.20		.30	
Part II: Last Position Totals						
8 or more	9	13	15	7	16	6
7 or less	7	11	12	6	13	5
df	1		1		1	
Chi^2	.016		.0103		.001	
P	.90		.90		.95	
Part III: Extreme Position Totals						
22 or more	5	10	8	7	9	6
18 or less	7	11	13	5	14	4
df	1		1		1	
Chi^2	.109		1.261		1.224	
P	.70		.30		.30	

Tables 19 and 20. The reversers did not differ significantly in elapsed time from non-reversers to first responses. Hypothesis 13 is rejected.

Hypothesis 14 is that low-achieving Ss will deviate more from the mean elapsed time for response delay to first

TABLE 19

A COMPARISON OF FIRST RESPONSE TIME OF REVERSERS AND NON-REVERSERS AND OF HIGH, MEDIUM, AND LOW ACHIEVERS

	Total	Conflict	Family Non-Family	Boy-Girl	Authority
	By Reversers and Non-Reversers				
	4.0+ 3.1-	4.0+ 3.4-	4.0+ 3.3-	4.0+ 3.0-	4.0+ 3.6-*
Rev	8 7	9 6	8 10	8 9	8 11
Non	6 8	7 10	6 12	9 10	7 12
df	1	1	1	1	1
Chi^2	.318	1.130	.468	.0003	.110
P	.50	.30	.50	.98	.70
	4.1+ 3.5-	3.7+ 3.4-	3.6+ 3.3-	3.3+ 3.0-	3.8+ 3.4-*
Rev	8 10	13 6	10 10	8 6	9 9
Non	6 12	8 10	8 12	9 8	8 11
df	1	1	1	1	1
Chi^2	.467	2.165	.404	.0807	.203
P	.50	.10	.50	.80	.70
	By High, Medium, and Low Achievers				
	4.0+ 3.1-	4.0+ 3.4-	4.0+ 3.3-	4.0+ 3.0-	*
H-M	9 12	11 13	9 17	12 14	9 16
L	5 3	5 3	5 5	5 5	6 7
df	1	1	1	1	1
Chi^2	.895	.666	.719	.0004	.373
P	.30	.50	.50	.98	.50
	4.1+ 3.5-	3.7+ 3.4-	3.6+ 3.3-	3.3+ 3.0-	3.8+ 3.4-*
H-M	9 16	11 13	10 17	12 12	10 15
L	5 6	10 3	8 5	5 2	7 5
df	1	1	1	1	1
Chi^2	.287	3.399	2.128	1.004	1.097
P	.70	.05	.20	.30	.30
	4.0+ 3.1-	3.7+ 3.4-	3.8+ 3.6-	3.3+ 3.0-	3.8+ 3.4-*
H	1 6	3 6	2 9	6 5	2 9
L	5 3	10 3	8 5	5 2	7 5
df	1	1	1	1	1
Chi^2	2.941	4.1801	4.608	.513	3.884
P	.10	.05	.05	.50	.05

*Seconds

TABLE 20

A COMPARISON OF FIRST RESPONSE TIMES WITH VARIOUS OSPE SCORE COMBINATIONS

OSPE Level	4.0+	3.2-	3.7+	3.4-	3.7+	3.5-*
87654	11	12	14	14	14	15
321	3	4	4	5	4	7
df	1		1		1	
Chi^2	.053		.084		.457	
P	.80		.80		.50	
8765	10	12	12	14	12	15
4321	4	4	6	5	6	7
df	1		1		1	
Chi^2	.048		.218		.0103	
P	.80		.70		.80	

*Seconds

response than high-achieving Ss. The results for the total responses are not supported by this hypothesis. However, in three of the four Picture Card Series, i.e., conflict, family--non-family and authority groups, this hypothesis is statistically supported. Hypothesis 14 is sustained; low-achieving Ss deviated more from the mean expected time for response delay to first response than high-achieving Ss.

Hypothesis 15 is that reversers will deviate more from mean elapsed time for response delay to conflict response than non-reversers.

Tables 21 and 22 present the data relating to the elapsed time per card until the "conflict" picture response

TABLE 21

COMPARISON OF CONFLICT RESPONSE TIME OF REVERSERS AND NON-REVERSERS AND HIGH, MEDIUM, AND LOW ACHIEVERS

	Total	Conflict	Family Non-Family	Boy-Girl	Authority
By Reversers and Non-Reversers					
	22+ 16-	24+ 16.7-	24+ 17-	23+ 21-	20+ 16-
Rev	8 8	7 7	8 9	8 12	10 8
Non	7 9	4 12	6 9	5 12	7 11
df	1	1	1	1	1
Chi^2	.125	2.009	.161	.452	1.025
P	.70	.20	.70	.50	.30
	20+ 16.7-	20+ 16.7-	21+ 17-	22.9+ 20-	
Rev	9 9	10 7	10 9	8 11	
Non	8 10	7 12	9 9	7 9	
df	1	1	1	1	
Chi^2	.111	1.739	.0256	.0310	
P	.70	.20	.90	.90	
By High, Medium, and Low Achievers					
	22+ 16-	24+ 16.7-	24+ 17-	23+ 21-	20+ 16-
H-M	8 14	6 15	7 13	7 17	10 15
L	7 3	5 4	7 5	6 7	7 4
df	1	1	1	1	1
Chi^2	3.123	1.975	1.659	1.067	1.712
P	.10	.20	.20	.30	.20
	20+ 16.7-	20+ 16.7-	21+ 17-	22.9+ 20-	
H-M	9 15	9 15	12 13	9 14	
L	8 4	8 4	7 5	6 6	
df	1	1	1	1	
Chi^2	2.730	2.730	.346	.380	
P	.10	.10	.50	.50	
	20+ 16.7-	20+ 16.7-	21+ 17-	22.9+ 20-	20+ 16-
M	4 10	4 10	8 9	4 11	6 8
L	8 4	8 4	7 5	6 6	7 4
df	1	1	1	1	1
Chi^2	3.773	3.773	.358	1.556	1.065
P	.05	.05	.50	.20	.30
	20+ 16.7-	20+ 16.7-	21+ 17-	22.9+ 20-	20+ 16-
H	5 5	5 5	4 4	5 3	4 7
L	8 4	8 4	7 5	6 6	7 4
df	1	1	1	1	1
Chi^2	.626	.626	.134	.303	1.636
P	.50	.50	.70	.50	.20

TABLE 22

COMPARISON OF RESPONSE TIME TO CONFLICT PICTURES AND OSPE SCORE-LEVEL COMBINATIONS

	OSPE Score-Level Combinations							
	876	54321	8765	4321	87654	321	876	321
20 or more	5	11	10	6	11	5	5	5
16 or less	7	11	13	5	14	4	7	4
df	1		1		1		1	
Chi^2	.186		.365		.354		.039	
P	.70		.50		.50		.90	

was given. This will be called the "conflict response time."

The data revealed no significant differences in comparison of conflict response time of reversers and non-reversers; therefore, Hypothesis 15 is rejected.

Hypothesis 16 is that low-achieving subjects will deviate more from mean elapsed time for response delay to conflict response than high-achieving subjects. The results as shown in Table 21 do not support this hypothesis. However, the low-achieving Ss deviate significantly more from the mean elapsed time for response delay to conflict than medium-achieving Ss. However, Hypothesis 16 is rejected.

Hypothesis 17 is that Ss with low OSPE scores will deviate more from the mean elapsed time for response delay to conflict response than Ss with high OSPE scores.

Table 22 shows no statistically significant differences in comparisons of elapse times for response delay to conflict picture for various OSPE score-level combinations. Therefore, Hypothesis 17 is rejected.

Hypothesis 18 is that difference in achievement level will correspond more closely with elapsed response time for response delay to conflict response than difference in OSPE score. Using Tables 21 and 22 to compare high-medium achieving Ss with low-achieving Ss; and comparing delay responses for high-medium OSPE compared to low OSPE; and using the same response delay periods of the high-achieving Ss compared to the low-achieving Ss, there were no statistically significant differences.

Comparing the same length of time for response delay for subjects with high OSPE scores and subjects with low OSPE scores did not yield statistically significant results. In all the comparisons of elapsed response time for response delay to conflict response between achievement levels and OSPE levels, no statistically significant results occurred. Therefore, Hypothesis 18 is rejected.

CHAPTER IV

CONCLUSIONS

The gathering of the data for this research presented many difficulties. The actual administration of the Digit Symbol test itself was not time-consuming, but arranging to get into 43 sections of English II during the second semester necessitated that the administration be spread out over a long period of time. By the time a sufficient number of both reversers and non-reversers had been obtained, the semester was nearing its close. The administration of the remaining test data had to be done individually and required a long period of time from each student. It was necessary to complete the administration of the remaining tests before the end of the semester because of the highly selective factors of drop-out that would have been introduced had the study been continued into the summer session or into the first semester of the following year.

This study represents an attempt to determine some of the relationships between grade-point average and certain specified variables. Using first semester grade-point averages for a group of students who were still in school the

second semester in itself introduced some bias, since certainly many individuals with low grade-point average either dropped out of school or were dropped from school. Had the data for the study not been completed during the semester during which the testing was begun, even greater biases would have been introduced.

The selection of subjects for the final study is not the selection that was initially planned and contains biases which must be taken into account in the examination of all tables in the Result section and in considering the hypotheses which were either sustained or rejected.

The Digit Symbol Subtest of the Wechsler-Bellevue Adult Intelligence Scale was administered to 258 students in 43 sections of English II. There were 207 students that did not reverse the mirror image N on the Digit Symbol Subtest and 51 students who did reverse the mirror image N. The OSPE scores and grade-point averages for the first semester for these 258 students were obtained from the University College. Table 23 reveals the breakdown of the total 258 subjects according to OSPE scores and grade-point averages. In the random sample 51 students were found that reversed and 207 students that did not reverse. A study of this set of tables must be made in order to understand the biases existing in the subjects selected for the final study.

In the final study it was necessary to include those subjects who would agree, with examinations approaching, to

TABLE 23

SUBJECTS ACCORDING TO OSPE SCORES AND GPA

OSPE	Total	GPA	Non-Rev	GPA	Non-Rev	GPA	Rev	GPA	Rev	GPA
0	1	2.00	1	2.00	1	2.00	0	---	0	---
9	1	1.93	1	1.93	1	1.93	0	---	0	---
8	40	2.82	32	2.78	30	2.75	8	2.97	3	2.74
7	23	2.57	21	2.64	20	2.63	2	1.85	0	---
6	32	2.52	24	2.66	19	2.68	8	2.12	5	2.49
5	42	2.44	37	2.47	27	2.41	5	2.25	4	2.52
4	23	2.18	18	2.16	16	2.19	5	2.25	5	2.25
3	38	1.99	25	2.17	25	2.17	13	1.51	6	1.70
2	36	1.89	27	2.00	27	2.00	9	1.57	6	1.72
1	22	1.61	21	1.65	21	1.65	1	.91	0	---
Total	258		207		187		51		31	
GPA		2.28		2.34		2.32		1.99		2.19

take the time to take the remaining tests. Table 24 shows the distribution of subjects in the study.

Table 25 shows the differences between the reversers and non-reversers according to OSPE scores. The Chi-square shows that there was a difference between the non-reversers and reversers according to OSPE score at a level that was statistically significant, using 5 or more and 3 or less as

TABLE 24

DISTRIBUTION OF SUBJECTS IN THE STUDY

Non-Reversers in Study			Reversers in Study		
OSPE	Total	GPA	OSPE	Total	GPA
0	0	----	0	0	----
9	0	----	9	0	----
8	2	3.13	8	3	3.34
7	1	2.80	7	2	1.85
6	5	2.59	6	3	1.50
5	10	2.64	5	1	1.20
4	2	1.92	4	0	----
3	0	----	3	7	1.35
2	0	----	2	3	1.28
1	0	----	1	1	.91
	20	2.61		20	1.69

TABLE 25

COMPARISON OF REVERSERS AND NON-REVERSERS BY OSPE SCORES

OSPE	Reversers	Non-reversers	df	Chi^2	P
5+	9	18	1	9.15	0.01
3-	11	2			

a breaking point on the OSPE scores. The non-reversers had high OSPE scores; the reversers had low OSPE scores. The fact that there was this difference between the two groups of subjects must be taken into account in all the findings in the study.

In each hypothesis in the study there were variables which were not controlled. In all hypotheses testing reversing and non-reversing, GPA and OSPE were not controlled. In all hypotheses testing GPA, OSPE and reversing were not controlled. In all hypotheses testing OSPE, GPA and reversing were not controlled.

Hypothesis 1 tested reversers and non-reversers on displacement on the Picture Card Series but it must be noted that the OSPE and GPA variables were not controlled.

Hypothesis 2 tested low-achieving subjects and high- and medium-achieving subjects on displacement. The OSPE and reversing and non-reversing were uncontrolled variables.

Hypothesis 3 tested the low OSPE scores with displacement; GPA, reversing and non-reversing were the uncontrolled variables.

Hypothesis 4 tested displacement between (1) reversers and non-reversers, OSPE and GPA variables uncontrolled, (2) displacement between OSPE scores, GPA and reversing and non-reversing were uncontrolled (3) displacement according to achievement (GPA); OSPE and reversing and non-reversing were uncontrolled.

Hypothesis 5 tested displacement on the Picture Card subtests: (1) Differences in displacement of reversers and non-reversers with OSPE and GPA uncontrolled; (2) differences in GPA with OSPE and reversing and non-reversing uncontrolled; (3) differences in OSPE scores with GPA and reversing and non-reversing uncontrolled.

Hypothesis 6 tested reversers and non-reversers on negative displacement with the OSPE and GPA variables uncontrolled.

Hypothesis 7 tested low-achieving subjects and high- and medium-achieving subjects on positive displacement with the OSPE; reversing and non-reversing variables were uncontrolled.

Hypothesis 8 tested the OSPE scores with negative displacement with GPA and reversing; non-reversing variables were uncontrolled.

Hypothesis 9 tested the correspondence of subjects' achievement and OSPE scores on displacement, with reversing and non-reversing variables uncontrolled.

Hypothesis 10 tested reversers and non-reversers on extreme position responses with GPA and OSPE variables uncontrolled.

Hypothesis 11 tested achieving with extreme position responses leaving OSPE and reversing and non-reversing uncontrolled.

Hypothesis 12 compared low-achieving subjects with Ss with high OSPE scores on extreme position responses leaving the variables of reversing and non-reversing uncontrolled.

Hypothesis 13 tested reversers for the mean elapsed time for response, leaving the OSPE and GPA variables uncontrolled.

Hypothesis 14 tested reversers and non-reversers to the conflict response, leaving OSPE and GPA variables uncontrolled.

Hypothesis 15 tested low-achieving Ss and high-achieving Ss for the mean elapsed time for the first response leaving OSPE and reversing and non-reversing variables uncontrolled.

Hypothesis 16 tested low-achieving Ss and high-achieving Ss for elapsed time to conflict response with OSPE and reversing and non-reversing as uncontrolled variables.

Hypothesis 17 tested Ss with low OSPE scores and high OSPE scores for time to first response with GPA and reversing and non-reversing as uncontrolled variables.

Hypothesis 18 tested Ss with low OSPE scores and high OSPE scores to time of conflict response, leaving GPA and reversing and non-reversing as uncontrolled variables.

A Picture Card Series Test was designed to study the relationship between response delay patterns and these three classifications: reversers and non-reversers, achievement,

and OSPE. This test was composed of 47 picture cards divided into four subtests or areas. Each picture card contained five randomly placed pictures presenting a situation that posed a "problem" situation.

The subjects' displacement totals, extreme displacement, and elapsed time to first response and to conflict response were recorded.

1. There were no statistical differences in displacement on the Picture Card Series by reverser subjects and non-reversers. However, there was a consistent trend for the reversers to displace.

The selection of the subjects could have affected this result. The forty subjects were evenly divided as reversers and non-reversers, but were not matched for achievement level. There were 3 high achievers and 11 low achievers among the reversers and 8 high achievers and 2 low achievers among the non-reversers. The similarity of pattern between reversers and low achievers perhaps occurred because so many of the reversers were low achievers.

2. High- and medium-achieving subjects combined showed a tendency to displace more often than low-achieving subjects.

3. Differences in displacement totals for OSPE score differences were not statistically significant.

4. There were no statistical differences in response to the four subtests of the Picture Card Series in the

family--non-family, conflict, and authority subtests.

5. The subjects displayed the same displacement patterns for each of the subtests as they did for the Picture Card Series Test when considered as a whole.

6. No pattern of positive or negative displacement was shown for reverser and non-reverser subjects.

7. While not statistically significant, there was a tendency for high-medium achievers to displace more positively than low achievers.

8. There was no statistical difference in displacement of high- and medium-achieving subjects and low-achieving subjects.

9. Reversers and low achievers showed a tendency to have more extreme position responses.

10. Subjects of medium OSPE scores showed a tendency toward more positive than negative displacements.

11. There were no statistically significant differences in responses of subjects with low and high OSPE scores in extreme positive responses.

12. The reversers did not have statistically significant more deviations from first response than non-reversers.

13. The low-achieving subjects showed a statistically significant difference in delay response to the conflict, family--non-family, and authority subtests of the Picture Card Series than the high- or high- and medium-

achieving subjects combined.

14. There was no statistically significant difference in conflict response time of reversers and non-reversers.

15. There was no statistically significant difference in low-achieving subjects and high-achieving subjects for response delay to conflict response.

16. There was no statistically significant difference in subjects with low OSPE scores and subjects with high OSPE scores to response delay to conflict response.

17. There was no evidence to show more relationship between achievement level and response delay than between OSPE score and response delay.

In conclusion, the findings in this study might be divided into three categories: (1) an investigation of the relationship of response delay pattern to OSPE scores, and academic achievement. The data showed that the response delay pattern of the Ss to the Picture Card Series showed no relationship between response delay and OSPE scores. Twenty-seven out of 40 subjects had grade-point averages that had correspondence to their OSPE scores.

Second, the relationship of the response delay patterns of reverser and non-reverser subjects and to achievement. Certain trends developed as shown in the data. The reversers consistently tended to displace. However, these trends were not statistically significant. Moreover, while the forty subjects were evenly divided into reversers and

non-reversers, they were not matched as far as achievement level was concerned. There were many more high achievers among the non-reversers than among the reversers (8 to 3) and more low achievers among the reversers than among the non-reversers (11 to 2). These findings are further contaminated by the fact that the subjects were not matched according to OSPE. There were more high OSPE scores among non-reversers (17 to 9) than among reversers. There were more low OSPE scores among reversers (11 to 2) than non-reversers.

Thus, the reversers, over half of whom were low achievers, could be expected to follow the pattern of the low achievers when contrasted to the non-reversers, nine-tenths of whom were high and medium achievers. Nine-tenths of the reverser subjects had low OSPE scores as contrasted to the non-reversers, over half of whom had high OSPE scores.

The analysis of the "ins" and "outs" (Ss with similar OSPE scores and achievement levels) revealed very little statistical significance. The "ins" were comprised of 5 high-achieving reversers, 3 high-achieving non-reversers; 2 medium-achieving reversers and 10 medium-achieving non-reversers; and 9 low-achieving reversers.

The "outs" were comprised of 5 high-achieving non-reversers; 2 low-achieving reversers; and 2 low-achieving non-reversers. Because of the large number of low-achieving reversers who had low OSPE scores also, comparisons were of little value for purposes of comparing "ins" with "outs" in

terms of response delay differences.

Third, the relationship between subjects' achievement and response delay patterns. The high- and medium-achieving subjects tended to respond in a pattern consistent with that assumed to represent the optimum response pattern in both length of time and response position. The modal time was assumed to be the optimum time for response to a stimulus and that deviation from this optimum could be measured as shorter or longer.

The subject responded to the whole structure of a stimulus and not to its component parts. Thus the subjects in this study responded to the picture cards as a whole and not to the individual pictures on the card. It is, therefore, meaningful that the high achievers showed a consistent tendency to respond to the picture cards nearer the mode of all position responses (the mean for high achievers was 3.0; medium, 2.9; and low achievers, 3.2) with fewer fast or slow responses and responded to the conflict picture with positive displacement and a shorter time on the average than the low-achievers who took more time to the first response and to the conflict picture response, and displaced negatively with more first and last position responses to the conflict picture. The conflict picture seemed to affect the low achievers in the direction of disorganizing those subjects' response delay patterns, causing them to respond earlier or later than the optimum time.

These tendencies were more pronounced in the picture cards related to conflict, and family--non-family areas. The subjects seemed to respond to the boy-girl subtest with greater disorganization of response delay than on the other three subtests, which could possibly be indicative of greater threat of problems in the area of boy-girl situations. The conflict area (composed of three subtests) and the family--non-family area (three subtests) were responded to with a high degree of consistency.

This study does not prove that low achievers find themselves in that category as a consequence of their inability to organize stimuli for optimum response delay; but it does establish that a significant relationship does exist between early or late response and the subject's status as a low achiever.

The Picture Card Series was predicated upon the assumption that the stimulus of the picture cards would cause a reaction to the card as a whole, but that the conflict picture, introducing among otherwise essentially neutral or non-threatening pictures a threat or problem, would cause reaction in those subjects with problems or threats in the area of the conflict picture. If the person were a high achiever he would presumably have a response delay pattern that would permit him sufficient time to integrate properly the problem and react appropriately. The low achiever presumably would react inappropriately for adaptive behavior.

If the subject did not have problems in the area, he would react as if the conflict picture presented no threat. The low achiever was presumed to have more problems and a greater likelihood of poorly adaptive responses.

The data do not support this contention except in an imputative fashion. The low-achieving subjects did react as if they had more problems or threatening situations. This result appeared to be in the area of family living. The low-achieving subjects responded nearer to the mode on the pictures of normal family living, and either hurried or delayed their responses to the one of the five pictures dealing either with disturbances in the family or with non-family situations.

The results of this study have implications that there well may be a close relationship to the response delay pattern of a student and his academic achievement. The fact that the hypotheses were not sustained may be traceable to the selectivity of the sample rather than any lack of sensitivity of the Picture Card Series Test.

Definitive answer to the question raised in this study and on a proper testing of its hypotheses formulated could be done in the following research pattern. The principles involved would be: control for the variables of reversing, GPA and OSPE, and equating the subjects on these variables by:

1. Controlling OSPE and reversing would necessitate either equal numbers of reversers and non-reversers in each decile or as they exist in each decile in the O. U. population of students enrolled in English II.

2. Controlling OSPE and GPA would necessitate either equal numbers of subjects according to GPA in each decile or as they exist in each decile in the O. U. population of students enrolled in English II.

3. Controlling GPA and reversing would necessitate either equal numbers of reversers and non-reversers in each level or as they exist in each level in the O. U. population of students enrolled in English II.

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