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ACHIEVEMENT, REFLECTION-IMPULSIVITY AND
RESIDENCE IN PRIORITY AREAS.

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THE RELATIONSHIPS OF THE INTERNAL-EXTERNAL LOCUS OF
CONTROL DIMENSION TO SCHOLASTIC ACHIEVEMENT,
REFLECTION-IMPULSIVITY AND RESIDENCE
IN PRIORITY AREAS

DISSERTATION
Presented in Partial Fulfillment of the Requirements for
the Degree Doctor of Philosophy in the Graduate
School of The Ohio State University

by

Walter John Lesiak, Jr., B.S., M.A.

The Ohio State University
1970

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Special feelings are reserved for my wife, Judi, who was always there when needed.
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CHAPTER I
INTRODUCTION

Introduction to the Problem

The concept of reinforcement assumes that individuals or groups are more likely to repeat a behavior or acquire new behavior if it is positively reinforced and to discard a behavior if it is negatively reinforced. However, it has been found that an important variable is the degree to which an individual perceives the reinforcement as being contingent upon his behavior. As expressed by Rotter, "the effect of a reinforcement following some behavior on the part of a human subject is not a simple stamping-in process but depends upon whether or not the person perceives a causal relationship between his own behavior and the reward." (1966, p. 1)

Social learning theory (Rotter, 1954, 1966) provides the general theoretical background for this concept of the nature and effects of reinforcement. In social learning theory, the potential for any behavior to occur in a particular situation is a function of both the value of the reinforcement and the expectancy that a given behavior will be successful for a given situation or class of situations. Thus, although having a goal, a person may believe that he does not have behavior
available which will permit him to be effective in obtaining the goal. Whether reinforcements are attributed to personal or outside forces is determined by an individual's history of reinforcement. Expectancies then generalize from specific situations to a series of situations which are perceived as related or similar. Thus, in Rotter's Theory, the control construct is considered a generalized expectancy, operating across a large number of situations.

The above theoretical framework has resulted in a construct referred to as internal-external locus of control. The purpose of the present study is to further investigate this construct in relation to school age children.

According to the locus of control construct, individuals can be distributed along a continuum according to the degree to which they accept personal responsibility for outcomes. An "internal" individual would consider reinforcements, both desirable and/or undesirable, as being a consequence of his own efforts or skills. That is, reinforcements are the result of his own instrumental behaviors. The "external" individual would conversely perceive outcomes as being unrelated to his own behaviors and as a result of chance, fate or forces over which he has no control.

Early investigations of the control of reinforcement dimension (locus of control) varied situational task structures,
thereby, inducing a specific expectancy of high or low control. Such studies resulted in an unusually consistent set of findings. Two of the major findings related to learning were: (1) in situations categorized as chance determined, subjects are less likely to generalize success or failure expectancies from one task to another. Also, the subjects are less likely to raise expectancies for future reinforcement as high following success, or to lower expectancies as much following failure (Phares, 1957, 1962); (2) The usual superiority of partial reinforcement for resistance to extinction was not found under skill conditions. When a situation is perceived as skill determined, 100% reinforcement takes longer to extinguish than does the 50% reinforcement, while the 50% is more resistant to extinction only under chance conditions (James and Rotter, 1958; Holden and Rotter, 1962; Rotter, Liverant and Crowne, 1961). Evidence was thus provided that learning under skill conditions was different from learning under chance conditions and it was suggested that typical laws of learning alone may not be sufficient in predicting learning and performance.

As indicated, the locus of control construct originated in social learning theory as part of investigations wherein expectancy learning was influenced by the categorization of a situation as skill or chance. It was then thought that a questionnaire approach to the construct could measure a per-
sonality disposition to categorize events in one way or the other. Phares (1955) developed the first scale, a "chance versus self-determinism" scale. The most recent adult measure is the Internal-External Control Scale (Rotter, Seeman, and Liverant, 1962). It is a twenty-nine item forced choice measure offering alternatives between internal-and-external-control interpretations of various events. Generally, these control scales have predicted individual differences among subjects in the same direction as the skill versus chance instructions. Currently, three locus of control measures exist for children. They are: Locus of Control Scale (Bialer, 1961); The Intellectual Achievement Response Questionnaire (Crandall, Katkovsky, and Crandall, 1964); and The Children's Picture Test of Internal-External Control (Battle and Rotter, 1963).

Developmentally, young children tend to view their experiences as being externally controlled. However, as development proceeds the child begins to note that he is able to influence the outcome of events by his own actions. Bialer (1961) has demonstrated that the locus of control variable shift from external to internal was strongly related to mental age with the effects of chronological age partialled out. He describes it as a shift in conceptualization of locus of control from external to internal. With it evolves the ability to categorize events in terms of success or failure. Success becomes a goal
attainment under conditions where the individual attributes outcomes to his own effectiveness and failure is non-attainment under conditions where the individual attributes outcomes to his own lack of effectiveness.

A possible implication for education can be drawn from the above findings. Younger children may learn more from experience with immediate goal attainment and success, while older children who have developed the success-failure orientation could profit from competition, failure, and frustration in moderate doses.

In terms of learning and school achievement, it seems a logical extension of the control concept to suggest that children who feel internally oriented would show more overt striving for achievement than those who felt they had little control over their environment. It is assumed that children with stronger beliefs in reinforcement contingencies would show greater initiative and effort in intellectual tasks. Such behaviors would, therefore, result in the acquisition of more facts, concepts and skills which would be reflected in measures of academic competence, grades and achievement scores. Some evidence in support of this proposition has been gathered over the years.

One of the earliest studies on this issue found that first, second, and third grade boys with strong internal feelings spent more time in intellectual free-play activities, exhibited more intense striving in those activities, and had
higher reading achievement scores than boys with weak control feelings. These findings were not found for girls (Crandall, Katkovsky and Preston, 1962). Crandall and McGhee (1968), in two recent studies using elementary and high school subjects, found that belief in internal control was more consistently predictive of school grades than achievement scores. Also, it was found that prediction of girls' performance was consistent from beliefs in their own instrumental behavior for success and for failures. Boys' achievement scores were more consistently related to beliefs in responsibility for failure.

Seeman (1963), and Seeman and Evans (1962) have reported differential learning in field settings between groups with high and low internal belief systems. Both hospitalized tuberculosis patients and reformatory inmates characterized by feelings of external control had less objective knowledge about their respective conditions and surroundings. Further studies investigating achievement related factors and learning are reported in Chapter II. It appears that knowledge of an individual's locus of control score allows some prediction to materials relevant to the subject's goal strivings. This prediction, however, has not been consistent for both sexes or at various age levels. Inconsistencies have been found when grades and achievement tests are used as the criteria and when different measures of the locus of control have been used. Theoretically, it has
been predicted that internal control orientations would be associated with greater achievement motivation and higher achievement scores. To date, the evidence is inconsistent.

Several studies have focused on the relationship between race, ethnicity, socioeconomic status and the locus of control. The results have suggested that groups whose social position is one of minimal power, either as a result of class or ethnicity, tend to score higher in the external control dimension. Within the ethnic groupings, cultural status interacts with ethnicity to produce the highest expectancy of external control. Some confirmation of this expectancy has been found. Battle and Rotter (1963) found on a projective measure of internal-external control that lower-class Negroes were significantly more externally oriented than lower-class whites or middle-class Negroes and whites. Of interest was the finding that lower class Negroes with the higher intelligence scores expressed the most external attitudes. Graves and Jessor (1961) felt that "ethnicity" was an important source of variance when it was found that whites were least externally oriented compared to Spanish-Americans and Indians. Indians were the most external in attitudes. Davis and Lesiak (1967), using the Bialer scale and children from grades three, five, six, and eight, found: (1) disadvantaged children had a lower belief in internal control than advantaged children with the effects of intelligence partialled out; (2) Negro children had a lower belief in internal control than white children.
Two master's theses (Lender, 1968; Litzinger, 1968), using the Bialer scale and socioeconomic status judged by fathers' occupations, did not find lower status to be associated with higher feelings of external control. Using the Intellectual Academic Response measure of locus of control, Crandall, et al. (1965) felt that only a small proportion of the variance was accounted for by social class. However, the IAR scale is a specific measure of control and evaluates only school-associated activities.

It is of interest to note that many of the current explanations for reduced learning and lack of achievement among the population referred to as "disadvantaged" appear similar to the concepts expressed in the locus of control orientation. As described by one author, "many of the children show a marked lack of involvement with, attention to, and concentration on the content of their academic experiences. Few tasks commit them to deep involvement" (Gordon, 1968, p. 386). Deutsch (1968) describes a similar attitude when he suggests that lower-class children tend to ignore difficult problems with a "so what" attitude. Lefcourt expressed his view thusly, "...the apathy and what is often described as lower-class lack of motivation to achieve may be explained as a result of the disbelief that effort pays off..." (1966, p. 212)

Generally, it would appear that within the locus of control framework, the above authors have suggested that lower-
class children or "disadvantaged" children might exhibit a lower expectancy of self responsibility or internal control. They have suggested that such children may see little purpose in educational procedures and acquisition of knowledge since whether or not they acquire these skills may be perceived as having a negligible effect on a life which is considered to be controlled by forces outside themselves.

Further investigations as to the accuracy of the above explanations must struggle with the major classification decision required to classify each child as "advantaged" or "disadvantaged." The meaning of "disadvantaged" has been previously a matter of judgment and opinion and would seem to vary with the urban area, races or nationalities considered, general economy of the area, etc. An alternative procedure in the investigation of the locus of control variable and cultural factors may have its basis in ecological psychology (Barker, 1960, 1965). Within this framework, the focus is on the environment and how situations in toto influence behavior. It might be of interest to classify the environments or areas of residence along a continuum from those which suggest low power to control events to those with strong power to control events. The question then could be raised "How would residence in an area characterized by low power versus high power to control events be related to individual beliefs in self-responsibility?"
One other area of research seems logically related to the locus of control dimension. This is the current research on cognitive style, more specifically, the work of Jerome Kagan on the reflection-impulsivity dimension. Studies on cognitive style have come out of the investigation of modes of perception. The term cognitive style refers to "stable individual preferences in the mode of perceptual organization and conceptual categorization of the individual's external environment." (Gardner, 1959). The emphasis thus is on the way an individual tends to process information and solve problems. Kagan has investigated a particular attribute of the style dimension called cognitive tempo. The reflection-impulsivity disposition describes cognitive tempo. Kagan defines this disposition as "...the tendency to make an impulsive selection of a solution as opposed to the tendency to reflect over alternative solution possibilities, in problems with high response uncertainty." (Kagan, 1965b, p. 609).

From the research on the reflection-impulsivity dimension and the locus of control orientation, the hypothesis could be generated that children with feelings of limited personal control (external) would be somewhat more impulsive in problem solution considering their belief that effort may not "pay off." It also seems logical to investigate this relationship in that the reflection-impulsivity dimension seems to parallel that of the locus of control construct. Both are considered generalized expectancies which operate
across various situations and both seem related to age, social class and ethnic variables (Hock, 1967; Litzinger, 1968).

**Statement of Problem**

The purpose of the present study is to investigate more fully the locus of control dimension. Previous research studies have generally found reduced feelings of internal orientation among groups whose social position was one of minimal power either because of social class or race. The present study, in contrast to previous orientations, investigates relatively intact geographical areas (school attendance districts) in relation to the control dimension. It is suggested that schools can be classified along a dimension suggesting a deprivation index called priority status. Priority status is based on the fact that schools serving the highest percentage of deprived children customarily receive additional funds and services for the education of the children. The criteria used to define and determine the percentage of deprived children in an area are family income, education of parents and number of families receiving welfare assistance. Thus, the higher the percentage of deprived children in a school, the higher the priority to receive federal funds and special school services.

The establishment of priority status classifications for schools rests on two assumptions which frequently are made by
school districts. These are: (1) schools serve a relatively homogeneous population, the neighborhood school concept; (2) there are generally more families within an area that meet deprivation standards than are recorded. Based on the above rationale and assumptions it was predicted that children attending the highest priority schools might express more reduced feelings of internal control than children attending the lowest priority schools. Phrased as a question, "would children residing in an area characterized by less power to control the events which influence their lives (lower social strata, lower education levels, less money, etc.) differ in feelings of locus of control from children residing in areas characterized by stronger power to control events?"

The study further investigates the relationship between two measures of control orientation and measures of achievement, reading and arithmetic. Children with stronger feelings of control might be expected to show greater effort in intellectual tasks and situations than those who feel a lack of personal control. Internal feelings of control would, therefore, be positively related to higher achievement. Possibly, the internal orientation represents a motivating propensity which accounts for some of the individual differences noted in learning and achievement behavior. Although previous studies have been suggestive of this hypothesis, consistent findings have not been found across age levels, between sexes and for various control measures.
The final purpose of the study is to investigate the possible relationship between the locus of control dimension and Kagan's concept of reflection-impulsivity, a variable in cognitive tempo. It was reasoned that children perceiving outcomes as not directly contingent on their own skills and efforts (external control) might respond in an impulsive manner on tasks involving response uncertainty. Also, it seemed that the body of literature on locus of control and cognitive style revealed points in common between these constructs. Both were generalized expectancies which operated across various tasks and situations, both were related to age, and both were influenced by environmental factors such as social class and race.

At the time of conceptualization and during the period of data collection stage (1967-68), no studies had investigated the relationship between locus of control and response style. However, since that time, two master's theses have considered this issue. Lender (1968) found internal attitudes were not related to reflective attitudes. Newman (1968) found internal attitudes were associated with field-independent behavior. While the present investigation involves elements of the above studies, it is felt that further study is needed on the relationship between locus of control and cognitive tempo.
Definition of Terms


Reflection-Impulsivity Disposition: A continuum describing the tendency of individuals to make an impulsive selection of a solution, as opposed to the tendency to reflect over alternative solution possibilities, in problems with high response uncertainty (Kagan, 1965 b, p. 609).

Reflective: A classification of individuals who have the tendency to reflect over alternative solutions, characterized by long decision times and low error scores on the Matching Familiar Figures Test (MFF) (Kagan, 1964).

Impulsive: A classification of individuals who have the tendency to give the first hypothesis that occurs to them without sufficient reflection to the possibilities of answers, characterized by short response times and high error scores on the MFF scale (Kagan, 1964).

Internal-External Control: A personality variable which refers to the individual's generalized expectancy concerning the locus
of control of his reinforcement, both positive and negative (Rotter, 1966; Lefcourt, 1966). This variable was measured by the Children's Locus of Control and Intellectual Academic Response scales.

**Internally Controlled**: A personality variable suggesting individuals who tend to perceive reinforcements and outcomes as a result of their own efforts, capacities, or skills.

**Externally Controlled**: A personality variable suggesting individuals who perceive reinforcements as coming unpredictably as a result of luck, chance, fate, or the power of others.

**High Priority**: A category of schools with a high percentage of children from economically deprived homes.

**Low Priority**: A category of schools with a low percentage of children from economically deprived homes.

**Statement of Hypotheses**

The major hypotheses of this study include:

1. There is a significant difference in the performance of the high priority and low priority groups on the Children's Locus of Control Scale (CLC), with the high priority group tending to feel more externally oriented.
2. There is a significant difference in the performance of the high priority and low priority groups on the Intellectual Academic Response scale (IAR), with the high priority group tending to express more external feelings of control. External feelings will be noted on the IAR (total), I (+), I (-) scores.

3. There is a significant relationship between belief in internal control, as measured by CLC and IAR scores, and achievement test scores. The stronger the belief in internal control, the higher the achievement scores, with the effects of intelligence partialled out.

4. There is a significant relationship between the internal-external dimension and the reflection-impulsivity disposition. Internality will be positively related to the reflection disposition.

The data collected to answer the major hypotheses will also provide information on the following secondary questions. What is the relationship between the two most frequently used measures of children's locus of control (CLC and IAR)? Are these scales able to adequately differentiate between high and low internal children as early as the third grade? Are sex
differences related to locus of control scores? What is the relationship between the CLC and IAR measures and intelligence scores?

Overview and Summary

Chapter II reviews the literature on the major constructs and the instruments incorporated in the study. Chapter III will present procedures and the methods used in analyzing the data. Chapter IV will present the analysis of the data and Chapter V the conclusions drawn and suggestions based on them. The concluding pages will present suggestions for further research.

The present study investigated: (1) the locus of control construct as a useful variable in understanding the nature of the learning process, perceived feelings of internal control would be related to higher achievement in reading and arithmetic; (2) the group differences on locus of control measures of children coming from areas characterized by high priority and low priority status, children from high priority areas might express stronger feelings of limited personal control; (3) the relationship between the generalized expectancy of internal-external control and the reflection-impulsivity disposition. It was anticipated that externality would be related to impulsivity.
CHAPTER II
REVIEW OF THE LITERATURE

Locus of Control

A review of the literature on the internal-external locus of control construct indicates that this dimension has been investigated as both a situational variable and a personality variable. The former variable refers to qualities of a situation that arouse specific internal or external expectancies while the latter refers to a generalized expectancy concerning the locus of control of reinforcements. In this and subsequent chapters, individuals with strong feelings of external control are referred to as internals or ILC, while those with internal beliefs are referred to as externals or ELC.

There are currently in use four major instruments to measure the internal-external control dimension. Three are designed for children and one for adults. Such measures have been used to investigate group differences (race, sex, social class) on this dimension, as well as behavioral correlates including: acquisition and extinction in learning tasks, social action taking, conformity, risk taking, strategy preferences, etc. Studies representative of the control dimension as a situational and personality variable will be cited in the following sections.
Lasko (1952) was the first to draw attention to the possible implications of the internal-external control variables. He indicated that although learning under partial reinforcement is more resistant to extinction than learning under continuous reinforcement, these results might not be found in a study designed so that the subject would feel that he had direct control over his reinforcement. A series of studies have consistently revealed that under skill conditions the usual superiority of partial reinforcement for resistance to extinction did not obtain (James and Rotter, 1958; Holden and Rotter, 1962; Rotter, Liverant, Crowne, 1961). The 50% reinforcement group was found to be more resistant to extinction than the 100% group only under chance conditions. Under skill conditions the 100% reinforcement schedule led to less rapid extinction than the 50% reinforcement schedule.

Numerous authors (Holden, 1962; Marlowe, 1962; Phares, 1962; Scodel and Liverant, 1960) have studied verbal expectancies in skill and chance situations. In every case it has been found that the same reinforcements produce smaller changes in expectancy and more unusual shifts within chance or external situations. Liverant and Scodel (1960), in studying decision-making activities under conditions of risk, concluded that internally oriented Ss attempt to control chance-dominated situations by a cautious and planned selection of probabilities,
while externally oriented Ss made choices according to "hunches", not previous outcomes. This is consistent with the earlier work of Phares (1957), who found that categorizing a situation as skill led individuals to use results of past performance in formulating expectancies for future performance, whereas when categorized as a chance situation past performance does not provide a basis for generalization to future trials. Evidence seems to indicate that learning potential is mediated in part by the internal or external character of the situation and that typical nomothetic laws of learning alone are not sufficient in predicting learning and performance.

Miller (1961) in a serial learning task with success, failure, and neutral learning climates found that in a success climate the locus of control variable does not appear to influence rate of performance. However, under the failure and neutral climates the external child's performance decreased while the internal child's performance was unaffected.

James (1957) hypothesized that the extent to which people generally perceive situations as being either internally or externally controlled is a measurable personality characteristic which can be predictive of an individual's reaction in specific situations. He revised and enlarged Phares' original scale of chance orientation and was able to predict differen-
tially behavior within groups given skill or chance instructions.

Simmons (1959), in a subsequent study, attempted to determine what the James-Phares Scale of Internal-External Control (J-P) measured by correlating scores from several instruments with the J-P Scale. The results indicated that externally controlled males tended to be more defensive in the face of failure, whereas externally oriented females tended to be more disorganized, less able to plan or set goals. This study reconfirmed earlier results of James and Phares concerning the relationship between maladjustment and the control orientation. A curvilinear relationship exists with individuals expressing extreme ILC scores and extreme ELC scores appearing less adjusted.

Certain studies have investigated personality variables that are related to the control orientation. Odell (1959) and Crowne and Liverant (1963) found that conformers as a group were more externally oriented. The latter authors also suggested that individuals with high external feelings were less confident in decisions than low external individuals. Gore (1962) found ELC Ss easily biased while ILC Ss were less responsive to experimental bias in both overt and subtle bias situations. Gore and Rotter (1963) found that subjects with high internal control orientations committed themselves to
personal and social action taking behavior to a greater degree than externally oriented subjects.

Because of the implication, the locus of control dimension had for the differential prediction of behavior, attempts were made to construct scales to measure it. The first attempt by Phares consisted of a questionnaire designed to measure both ends of the dimension; however, only the external items proved to have predictive validity. A revision of this scale was developed by James and is referred to as the James-Phares Scale. The current adult form is an extension of the scale revised by James. It is a twenty-nine item, forced choice test developed by Rotter, Seeman, and Liverant (1958). The authors indicated a split half reliability coefficient of .90. An odd-even method resulted in a correlation of .96. An item analysis and a factor analysis demonstrated internal consistency and a general factor loading. An inference of a single dimension, internal versus external control thus seemed warranted.

Three measures of internal-external control for children have been devised. The earliest constructed was the Children's Locus of Control Scale (CLC), developed by Bialer (1961). It is derived from the James-Phares Internal-External Scale (1957). It is a twenty-three item questionnaire which is administered orally to young children and they answer "yes" or "no." With
older children they read the items and circle either "yes" or "no." Both "yes" and "no" responses imply internal control and the final score places a child on a continuum. The higher the score, the more the child perceives himself as controlling reinforcements and is, therefore, considered internal in orientation.

The Intellectual Achievement Responsibility Scale (IAR) was developed by Crandall, Katkovsky and Preston (1962, 1965) to measure beliefs in internal versus external reinforcement responsibility. However, it is limited in scope in that it assesses beliefs exclusively in intellectual-academic achievement situations rather than broad motivational and behavioral areas. It restricts the source of external control to persons who most often come in face-to-face contact with the child, i.e., parents, peers, teachers. Unlike the CLC scale, there is a subtest score which assesses beliefs in internal responsibility for success experiences and a score for failure experiences. This scale has thirty-four forced-choice items. Seventeen items describe positive events and seventeen items describe negative events. Each item poses one internal and one external alternative as the reason for the occurrence of the event given in the item stem. An example includes:

If you solve a puzzle quickly is it.

- a. because it wasn't a very hard puzzle or
- b. because you worked on it carefully?
Older children read and check each of the alternative statements, while with younger children, the stems and alternatives are read orally and the child either responds verbally or by checking his choice of response.

A third test of children's feelings of personal control was developed by Battle and Rotter (1963). It is called The Children's Picture Test of Internal-External Control. This is a projective measure and the child responds to a statement by one character in a cartoon in a way he believes the other character would respond. There are six situations presented to the child. This scale was found to correlate significantly (.42) with the Bialer questionnaire.

In the following sections, data obtained from the three children's tests will be reviewed. Particular emphasis will be given to the variables of intelligence, race, socioeconomic status, and learning in relation to the internal-external control dimension.

Age, Intelligence Factors

Bialer (1961) investigated the developmental aspects of the locus of control construct by using repetition choice and a delay of gratification situation with normal and retarded children. He found that with age there was a tendency for both groups to become more internal. However, he found that
when mental age was partialled out, this relationship was minimized ($r = .02$). With chronological age partialled out, however, mental age and locus of control were strongly related ($r = .47$). It was concluded that with increasing age there is a significant tendency toward internal control. However, mental age appeared to be the more meaningful variable rather than chronological age.

Litzinger (1968) in a study of developmental changes in the locus of control dimension in grades two, four and six, found a significant increase in internal feelings between the second and fourth grade but not afterward. She found IQ scores and CLC scores not related. In a multiple regression technique age and sex of the subjects were found to be of major influence, while IQ and socioeconomic status were of negligible influence. Older Ss and females expressed the highest feelings of internal control. Lender (1968), using third and fifth grade students, found age not significantly related to CLC scores. The relationship between intelligence and CLC approached but did not reach significance.

Crandall, et al. (1965), in the normative study for the IAR scale, found no significant change in internality, using the total score, from the third to the fifth grade, or from the sixth to the twelfth grade for either or both of the sexes. However, marked differences were noted between sexes in sub-scale scores. Boys generally showed a gradual growth
in the assumption of self-credit, I (+) scores, from third to tenth grade. Girls did not show a significant increase in I (+) scores but significantly increased their internality for negative events I (-) scores. It was concluded that by sixth grade girls have assumed a level of responsibility for negative events which is slightly greater than that boys achieve in twelfth grade. This is consistent with Litzinger's study which suggested a sex by age interaction. Within the same study, Crandall, et al. found intelligence to be "moderately" related to the IAR scores ($r = .26$). They concluded that when the effects of social class and intelligence are considered, "intelligence is more often the stronger of the two predictors of internality" (p. 105).

Davis and Lesiak (1967), using the CLC scale in grades three, five, six and eight, found that generally a belief in internal control increased with age. Using the IAR scale, a systematic increase in total scores was found from grade three through grade eight. The relationship between intelligence and both the CLC ($r = .19$) and the IAR scores ($r = .17$) was significant at the $p < .01$ level.

In summary, it would appear that feelings of internal control increase with chronological age. However, of equal, if not more importance, is the frequent finding that intelligence is moderately related to internality. Various authors (Lefcourt,
1966; Crandall, 1965) have explained the relationship between intelligence and locus of control by the greater ability of the more intelligent child to see the causal relationship between rewards and punishments he receives and his own instrumental behavior.

Ethnic and Socioeconomic Factors

Several studies have successfully predicted greater feelings of external control among groups whose social position is one of minimal power, either by class or race. Battle and Rotter (1963), using the variables of social class and race, found lower-class Negroes significantly more externally oriented than middle-class Negroes or whites. Along the class dimension, middle class individuals were more internally oriented than middle class whites with lower intelligence. This finding was interpreted as a defensive reaction to perceived reduced choices in cultural and material rewards.

Davis and Lesiak (1967) found: (1) culturally disadvantaged children scored significantly lower on the CLC scale than advantaged children; (2) Negro children scored significantly lower than white children. When race and cultural status were combined, it was found that at all age levels the advantaged white children expressed a significantly higher belief in internal control than the disadvantaged Negro.
Lefcourt and Ladwig (1965, 1966), using prison inmates, successfully predicted higher external control expectancies among Negro than white inmates. This difference was noted on scales measuring feelings of personal control, powerlessness and normlessness. It was suggested that because of racial segregation and discrimination, Negroes feel that their own efforts will lead to few reinforcements unless adventitious circumstances make it happen.

Strodtbeck (1958), using the concept of "mastery," which also stresses effectance beliefs, found Jewish middle- and upper-class subjects to have more belief in mastery than lower-class Italians. Social class was considered the major variable in this investigation. Graves (1961), studying ethnic differences in a tri-ethnic community, found whites most internal, followed by Spanish-Americans and Indians most external in control attitudes. The expected relationship between low socioeconomic status and feelings of external locus of control was not found in studies by Lender (1968) and Litzinger (1968).

Two studies on the relationship between internal control and personal commitment found that Negroes who see themselves as determiners of their own fate, committed themselves to social and action-taking behavior. (Gore and Rotter, 1963; Strickland, 1965)

While the locus of control dimension, as measured by the Bialer and the Battle projective technique, has been found to
relate to social class and ethnicity, this has not been true with the IAR scale. Crandall (1965) found that social class accounted for only a very small proportion of the variance in IAR scores. This finding is not unexpected considering the intention of the scale. The CLC and Battle scales measure general social experience while the IAR scale is directly related to school-associated activities. It is possible that teachers and parents tend to encourage an internal orientation toward academic efforts with statements that stress personal control, such as, "If you study hard, you will pass the test."

In summary, the majority of studies have consistently suggested that social class and race are important variables in understanding the internal-external dimension. Disadvantaged groups and Negroes tend to score higher in the external control direction. When the factors of race and social class are combined, individuals from lower class status and of the Negro race tend to have the highest expectancy of external control. Explanations generally emphasize that persons from lower social strata are by reason of their vocations, lack of education, and poor financial status in positions of less power to control the events which influence their lives.

Achievement and Learning Factors

Recent studies have investigated the predictive utility of locus of control scores in relation to achievement and
academic competence on the assumption that those at the internal end of the scale would show overt striving for achievement and learn more than those who felt they had little control over their environment.

Crandall, et al. (1962) found internality was positively related to time spent and striving in intellectual free-play activities. Internality was also related to higher reading achievement. However, this finding existed only for boys and not girls. Cellura (1963) found a direct relationship between the SRA Achievement Test, with intelligence partialled out, and IAR scores in lower socioeconomic status boys. Once again this did not hold true for girls. Franklin (1963) noted a positive and significant relationship between feelings of internality and the amount of time spent doing homework in high school students.

Differential learning effects were noted in two field settings using the internal-external dimension. Seeman (1963) found internal patients in a tuberculosis hospital to have more objective knowledge about their illness and to be considered better patients by the staff. Seeman and Evans (1962) noted similar results among a prison population with internal subjects learning more about parole.

Chance (1965) found the internal orientation positively related to reading, arithmetic, and spelling achievement for
both sexes. Coleman, et al. (1966), using a white and nonwhite sample of children in grades six, nine, and twelve, reported that more of the variance of nonwhite achievement test scores was accounted for by the locus of control variable than the other variables of school, teacher, familial attitudes. The locus of control variable was judged the second most predictive variable for white students.

Davis and Lesiak (1967), utilizing first order partial correlations, holding intelligence scores constant, found CLC scores positively related to arithmetic, reading, and language scores on the California Achievement Test for sixth grade Ss. This relationship was not found for the third or fifth grade Ss. At the eighth grade level, arithmetic and reading scores were significant but not language scores.

Crandall, et al. (1965) demonstrated that for both males and females feelings of internality on the IAR scale were positively related to higher report card grades. Both the I (+) and I (-) scores were predictive of grade averages. On the Iowa Achievement Test results were in the direction of high internal Ss, of both sexes having higher test scores. While I (+) and I (-) subscores predicted achievement for the girls, only the I (-) score was predictive for the boys. That is, boys' beliefs in responsibility for failures I (-) were more often associated with achievement test scores than their
beliefs relative to success experiences. A subsequent paper by Crandall and McGhee (1968) extended and replicated the 1965 research. They concluded that children who are highly internal on either I (+), I (-) subscores or the total test score I (total) attain higher academic performance in grades and achievement. However, sex differences were noted. They state, "a boy's belief that he is responsible for his own academic-intellectual failures may constitute a greater incentive to academic effort than a similar orientation with respect to his successes" (p. 99).

These studies suggest that the locus of control construct allows predictions in terms of learning and achievement-related variables. However, there have been differential findings among boys and girls and between grades assigned in school and standardized achievement tests. The need for further investigation of this relationship is clearly evident.

Summary

Studies have suggested that individuals not only differentiate learning situations on a continuum of internal-external control, but they differ in a generalized expectancy in how they regard the same situation. These differences in viewing the behavior-reinforcement contingencies have been measured in adults and children and seem predictive of behavior in a variety of circumstances. The success of various techniques,
forced-choice, true-false, projective devices, in measuring the control dimension provide support for the construct validity of this dimension. Further evidence of the construct validity has come from predicted differences in the behavior of individuals placed along the continuum and from correlations with other behavioral variables.

Studies cited in this chapter suggest that when individuals perceive a situation as one in which they do not control the outcomes or reinforcements, they are less likely to: (1) raise expectancies for future outcomes as high following successes; (2) lower expectancies following failure; (3) generalize expectancies from one task to another similar task. As stated by Lefcourt (1966), "...research in human learning should be understood or interpreted in light of the position on a continuum of internal to external control that the task or procedure will be perceived by the subjects" (p. 25).

Studies relating the internal-external dimension to behavioral and demographic variables have been the basis of much current research. Subjects with strong external beliefs were found to be more conforming, less confident in decisions, and less prone to social action behavior. Intelligence, age, and socioeconomic factors were found to be related to the control dimension. In terms of school-related activities, internal orientations were predictive of achievement and grades; however, such predictions were not consistent for both sexes or
across age levels.

The Reflection-Impulsivity Dimension

Kagan and associates have directed recent studies toward the investigation of reflection-impulsivity, an aspect of cognitive style. Cognitive style refers to stable individual differences in how an individual perceives and organizes his environment. When perceiving, an individual's cognition determines selecting, sorting and organizing information according to principles which are influenced by motivational and personality factors. While Witkin has discussed cognitive style in terms of field-dependent and field-independent behavior, Kagan has recently emphasized cognitive tempo or the speed at which individuals typically process information and solve problems. Cognitive tempo has been labeled the reflection-impulsivity disposition and refers to "...the tendency to make an impulsive selection of a solution, as opposed to the tendency to reflect over alternative solution possibilities, in problems with high response uncertainty..." (Kagan, 1965b, p. 609).

Kagan initially assessed reflection versus impulsivity through the use of the Hidden Figures Test (HFT) and the Design Recall Test (DRT). Both instruments are scored on the time to the first response and number of incorrect responses. The HFT includes a figure card on which there is a picture of
a familiar object and a hidden figure card in which the object is embedded. The subject is asked to find the hidden figures. On the DRT, a geometric design is presented to the subject for five seconds, removed for fifteen seconds and then presented along with eight to ten similar stimuli. The subject is asked to recognize the design which is identical to the standard.

The most recent instrument developed to measure this disposition is the Matching Familiar Figures Test (MFF). The MFF differs from the DRT in that the stimuli are familiar objects rather than geometric designs and it does not contain a memory factor. In the DRT, the subject had to retain the image of the standard for fifteen seconds prior to responding to the variants, while in the MFF, the standard and variants are presented simultaneously.

Early research studies sought to establish the temporal stability, inter-task generality and intra-individual stability of the reflection-impulsivity dimension. In one study (Kagan, et al., 1964), it was found that both recognition errors and response time scores were highly stable across two administrations of the DRT separated by a period of nine weeks. One year later the same children were administered the MFF and scores were compared with the earlier DRT scores. The correlations were significant and suggested that this dimension has short term and long range stability.
A developmental trend was evidenced by the findings that a linear decrease in errors and a linear increase in response times were found on tests measuring the reflection-impulsivity disposition (Kagan, 1966). With age, there is an increase in response time and a decrease in errors on both the DRT and MFF scales. Yando (1966), did not find a significant relationship between the reflection-impulsivity dimension and age of Ss. It is possible that, although following a developmental trend, cognitive tempo stabilizes prior to adulthood.

Kagan (1965) assessed the generality of a tendency toward fast or slow response times on a perceptual matching test and a tachistoscopic recognition task. He found that response times to descriptions of the tachistoscopic scenes were positively associated with response times on the matching tests. It was suggested that individual differences in speed of decision making was a pervasive characteristic that could influence the performance of an individual in a variety of test situations.

More recent studies have focused on the relation of the reflection-impulsivity disposition to a variety of variables. Kagan, et al. (1966), in exploring the relationship between conceptual impulsivity and inductive reasoning, hypothesized that impulsive children would make more errors than reflective children, of similar ability, on inductive reasoning problems. It was reasoned that impulsive children
would be more apt to select an answer that was not carefully evaluated because they would be minimally concerned about mistakes and would not inhibit potentially incorrect hypotheses. The findings confirmed the hypothesis. Impulsive children did make more errors in inductive reasoning problems. Observations made during the study also confirmed that impulsive children do not seem apprehensive about mistakes. The possibility of being wrong does not seem to elicit as much concern in impulsive children as it does with reflective children. Kagan felt that an implication for teachers of subjects which require inferences from the children (arithmetic, science, social studies) is that it might be profitable to train children in reflective behavior.

An investigation of the reflection-impulsivity disposition in relation to errors on a serial learning task was conducted with third grade children (Kagan, 1966). This study further tested the possibility that in response to a suggestion of probable task failure, the reflective child would exhibit greater deterioration in quality of performance. The children, matched on sex and verbal ability, were assigned the serial learning task under the conditions of threat, rejection, or control. Reflective children in the threat condition showed the largest increase in intrusion errors and the largest decrease in recall. However, under control conditions, the reflective Ss had the smallest increase of intrusion errors.
Since learning to read might be considered a discrimination problem with high response uncertainty, a study was designed to investigate the relation between a tendency to make fast decisions and the quality of reading performance. Kagan (1965b) evaluated 130 children on visual matching problems and reading recognition tests at the end of the first and second grades. The results indicated that children classified as impulsive were found to commit more reading errors when tested one year later. An implication of this study is that teachers in remedial programs and kindergarten prereading programs might want to include specific training in reflection.

Two studies have investigated cultural factors in relation to the impulsivity-reflectivity dimension. Schwebel (1967) sought to explain lower-class differences in language ability by their greater tendency toward impulsivity. He concluded that lower-class children were handicapped by inadequately developed vocabularies and a tendency toward impulsivity. The middle class children paused before responding with grammatically correct and well planned answers.

Hock (1967) investigated cultural factors in relation to this disposition. She hypothesized that (1) disadvantaged children would be more impulsive than advantaged children; (2) there would be significant differences between these groups on game-type directions and the established directions
of Kagan. The first hypothesis was confirmed. In response to the second hypothesis, it was found that the disadvantaged performed more impulsively under game-type directions using the composite score on the MFF. She suggested that the reduction in structure of the game-like directions might be an explanation for this finding.

In previously mentioned studies it had been suggested that children might be trained to be more reflective. Two investigations have considered the modifiability of the reflection-impulsivity dimension. Kagan (1966a) found the only important effect of training was to lengthen the response times on the MFF. The effect of having a child identify with a trainer seemed to give the girls a slight advantage, but had no significant effect on boys.

Yando (1966) hypothesized that it was possible to modify a child's disposition by placing him with teachers of a specific disposition. She concluded that reflective and impulsive teachers have a differential effect on the modification of dispositions. Reflective teachers are more effective in modifying children's dispositions than are impulsive teachers. Although reflective teachers affect change only toward reflectivity, impulsive teachers affect change toward both impulsivity and reflectivity.
Cognitive tempo was suggested by Kagan as an important variable of cognitive style. The reflection-impulsivity disposition considers the speed at which individuals characteristically process information and solve problems. Research has established the temporal stability, inter-task generality and intra-individual stability of this dimension. Developmentally there is a decrease in errors and an increase in response time with age (Kagan, 1966). This disposition has been investigated in relation to inductive reasoning (Kagan, et al., 1966), serial learning task (Kagan, 1966) and reading (Kagan, 1965b). Two studies have suggested that culturally disadvantaged children are more impulsive than advantaged children (Schwebel, 1967; Hock, 1967). Thus far, only a few studies have explored the possibility of modifying a child's disposition by placing him with an adult of a specific disposition (Kagan, 1966a; Yando, 1966). These results are promising but emphasize the need for continued research in this area.

Significance of the Present Study

Research has shown the locus of control construct to be related to numerous demographic and behavioral variables. The present study attempts to extend the previous findings to primary grade children and to investigate hypotheses that may have educational relevance. Of particular interest in this
study is the relationship between internal feelings of control and residence in areas characterized as high or low priority. Intact geographical areas are compared in terms of producing differential responses on the control dimension. The rationale for using priority areas rather than specifically designated individuals was derived from ecological psychology. The emphasis is thus on the social or ecological environment in explaining behavior on the assumption that situations in toto influence behavior.

The significance of such an investigation rests on current educational practices. Presently school districts characterize schools rather than individual students along dimensions suggesting a degree of deprivation. Educational plans are frequently based on such classifications. The most current example would be "inner city" schools wherein additional funds and services are provided. Special provisions are frequently made in the instructional process, such as additional use of aids, use of language laboratories, placement in day care centers, visual motor training, etc. The existence of a relationship between priority status and feelings of control would provide additional and somewhat different information upon which to make educational decisions. Rather than indicating deficits of children attending priority schools, such data would indicate a generalized expectancy
or orientation toward life. Perhaps to be more effective in the educational process schools would need to consider the modifiability of this orientation.

The significance of studying the relationship between locus of control and achievement is related to the concept of individual differences. Feelings of internal control might represent a motivating propensity which may help to explain differences in learning and achievement behavior. Thus, within the classroom, if a child perceives reinforcement as contingent upon his own behavior, then the occurrence of an outcome would either strengthen or weaken the potential for similar behavior in a similar situation. However, if the outcome is not perceived as contingent on personal behavior, then the preceding behavior may not be strengthened or weakened.

If it can be demonstrated that children with stronger feelings of external control do not learn or achieve as well in school as those with strong internal feelings of control, then the apparent lack of motivation to achieve may stem from their conviction that effort may not pay off. Similar reasoning suggested that a relationship might exist between cognitive tempo and locus of control. Impulsivity in problem solutions might represent feelings that further deliberation and thought on a problem are not related to success. Thus, within the classroom, it would be important to consider the degree of personal control expectancies for making differential predictions of learning.
In summary, the major significance of the present study is to suggest the utility of considering the locus of control construct in relation to the educational process. Learning and problem-solving behavior in the classroom might be related to feelings of internal locus of control. If this is confirmed, then consideration might be given to the problem of teaching children to respond in more internal and reflective orientations.
CHAPTER III
PROCEDURES

The purpose of the present study was to investigate the relationships between children's feelings of personal control, residence in low power or high power areas, and scholastic achievement. The relationship between the personal control dimension and the cognitive tempo concept of reflection-impulsivity was also considered. Four instruments were administered to 120 third grade children which measured the locus of control variable, academic achievement and reflection-impulsivity disposition.

Description of Sample

The participants in this study were third grade white children enrolled in the South Western City School District (Ohio) during the school year 1967-68. This district has approximately 15,000 children and is located ten miles southwest of the city of Columbus. The district has eighteen elementary schools, three junior-high schools, and three high schools. The total district is heterogeneous in composition with a number of extremely small schools, under 200 children, serving low socioeconomic populations, and a number of large schools (1,000+ in size) serving children from primarily middle class homes.
Since priority status was a major variable under consideration in this study, a list of all schools within the district was obtained from the Superintendent's office which designated schools as qualifying for services under Title I, Elementary and Secondary Education Act. This list was compiled and published in June of 1967 and indicated the percentage of deprived children within a school attendance area. Factors involved in determining the percentage of deprived children within a school area included: median income under $4,700, formal education of parents, number of families receiving Aid to Dependent Children.

Under existing guidelines, the larger the percentage of deprived children in a school, the higher would be the priority to receive funds and services under Title I. From this list, the four elementary schools with the highest percentage of disadvantaged children and the three schools with the lowest percentage were selected as participating schools. These were operationally defined as high priority and low priority schools in this study. An unequal number of high and low priority schools was needed to balance out the potential number of students. The final student populations were approximately 2500 from the low priority schools and 2200 from the high priority schools. Respectively, the third grade populations had 370 students compared to 325 students.

Third grade students in the seven schools were considered potential subjects. The third grade was selected in that
the instruments used as measures of the major variables have not been customarily used below this grade level. Previous research indicated that children could be placed along a dimension of low internality to high internality by this grade level (Crandall, et al., 1965). Also, there was available a recent group measure of intelligence.

It was established prior to the study that a total of 120 children were to be selected from the high and low priority schools, sixty from the high priority and sixty from the low priority, with an equal number of males and females. The number of children selected from each school was based on the proportional representation principle. The larger the number of potential Ss in a school the larger the sample drawn.

In selecting the Ss from each school, a random sample was drawn. The third grade children in each school were arbitrarily numbered and a table of random numbers was consulted to determine the specific children selected from the school. Negro children were not included in the pool of subjects since race was not a variable under consideration. The schools, percentage of disadvantaged children and number drawn as a sample from each school are listed in Table 1. As indicated in Chapter I, the percentage of deprived children within the high priority area was considered a minimal estimate by the local administrators.
TABLE 1
NUMBER OF CHILDREN SELECTED FROM PARTICIPATING HIGH AND LOW PRIORITY SCHOOLS

<table>
<thead>
<tr>
<th>School Priority</th>
<th>% of Deprived</th>
<th>Number of Third Grade Students</th>
<th>Total Sample</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Priority</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>School 1</td>
<td>42.3</td>
<td>60</td>
<td>11</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>School 2</td>
<td>34.1</td>
<td>110</td>
<td>20</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>School 3</td>
<td>33.5</td>
<td>60</td>
<td>11</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>School 4</td>
<td>29.7</td>
<td>95</td>
<td>18</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>Low Priority</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>School 5</td>
<td>6.7</td>
<td>130</td>
<td>22</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td>School 6</td>
<td>5.9</td>
<td>120</td>
<td>19</td>
<td>10</td>
<td>9</td>
</tr>
<tr>
<td>School 7</td>
<td>4.7</td>
<td>120</td>
<td>19</td>
<td>9</td>
<td>10</td>
</tr>
</tbody>
</table>

Instrumentation

The instruments of Children's Locus of Control Scale (CLC), (Bialer, 1961), and Intellectual Academic Response Questionnaire (IAR), (Crandall, Katkovsky, Crandall, 1965) were chosen to measure the internal-external dimension. Achievement in reading and arithmetic was measured by the Wide Range Achievement Test (Jastak, 1946). The reflection-impulsivity disposition was measured by the Matching Familiar Figures Test (MFF), (Kagan, 1964).

The following two scales were administered to measure the children's feelings of external-internal control.

(1) Children's Locus of Control Scale (CLC) -- This scale was developed by Bialer (1961) and is essentially
derived from the James-Phares Internal-External (I-E) Scale for Adults. The CLC scale is a twenty-three item "yes" or "no" questionnaire in which the child attributes the locus of control to himself or to others. It is a general measure of the personal control dimension and contains items describing reinforcements in a number of motivational and behavioral areas such as affiliation, dominance, achievement and dependency. Sample items include "When someone is nice to you, is it because you did the right things?", "Do you really believe a kid can be whatever he wants to be?" As it is developed, both the "yes" and "no" responses can imply the feelings of internal control. This scale was scored in terms of internal control so that the higher the score, the stronger the belief in internal personal control. The total score is interpreted as measuring the extent to which a child characteristically construes both positive and negative event outcomes as being consequential of his own actions rather than due to the whims and/or manipulations of fate, chance or other people. A copy of this scale is found in Appendix A.

(2) Intellectual Achievement Responsibility Questionnaire (IAR) (Crandall, Katkovsky, and Crandall, 1965) -- The IAR is a thirty-four item, forced-choice instrument which is similar to the CLC scale in that it attempts to measure beliefs in
internal versus external reinforcement responsibility. Each item has two alternatives, one stating that the event was caused by the child and another stating that the event occurred because of the behavior of someone else in the child's immediate environment.

Although generally measuring feelings of internal-external disposition, this scale differs in several respects from the CLC scale. First, it assesses beliefs exclusively in intellectual or academic situations. Secondly, it limits the source of external control to those persons with whom the child has face-to-face contact, such as parents, teachers and peers rather than general sources of luck, fate, chance. Thirdly, this scale has an equal number of positive and negative events. In addition to the total I (internal or self-) responsibility score, separate subscores can be obtained for beliefs in internal responsibility for successes (I+ score) and for failures (I- score). To maintain consistency, this scale was also scored for feelings of internal control. A copy is available in Appendix B.

The following scales provided data on levels of achievement in reading and arithmetic and data on the reflection-impulsivity disposition.

(3) Wide Range Achievement Test (Jastak, Bijou, Jastak, 1946, 1965). This test measures achievement in spelling,
reading and arithmetic. The level of achievement in each area ranges from preschool to college level. Although the scores can be interpreted in terms of percentile and standard scores, most frequently they are reported in terms of grade level. In this study, only the reading and arithmetic sections were presented. The 1946 version of this scale was used rather than the 1965 form in that the earlier form permits the child to work more items in order to obtain a specified grade level. In the reading section, the child proceeds until he makes ten consecutive failures. In arithmetic, he works at his own pace and attempts items until he feels he is no longer able to compute them. However, a thirty minute time limit is imposed. 

(4) Reflection-Impulsivity Dimension — The children's reflective-impulsive disposition was assessed by administering the Matching Familiar Figures Test (MFF). This is the most recently developed test by Kagan and has been employed in many of the more recent studies investigating this disposition. In this particular test, the child is simultaneously shown a single picture of a familiar object (the standard) and six similar variants, only one of which is identical to the standard. The child is asked to select the one variant that is identical to the standard. There are fourteen items, two practice and twelve test items. The variables scored
are response time to the half second for the first selection and the total number of errors committed across the twelve items. On each item the subject is limited to a maximum of six errors.

The final scores on this scale are the mean response time (RT) to the child's first answer, and the total number of errors (E) committed on the entire test. Kagan defines the impulsive child as one who exhibits a fast response time and makes many errors. The reflective child is one who has a long response time and makes few errors.

**Procedure for Data Collection**

This study involved 120 white children from the third grade in seven elementary schools. Four of the schools were designated as high priority (high percentage of economically deprived children) and three as low priority (low percentage of deprived children). These children were in attendance in the third grade during the school year 1967-1968. All children were evaluated during the last two weeks of March and the first week of April, 1968. The California Test of Mental Maturity was administered to these children in the fall of 1967 and provided verbal, performance and full intelligence scores.

Three school psychologists completed the evaluation of these children. Prior to actual test administration, each
examiner became proficient with each of the instruments mentioned in the previous section. A number of children were selected from non-participating schools and each examiner field-tested the materials prior to the March evaluation. A formal procedure was established by the investigator which included a statement of introduction that was read to the child and an order in which to present the instruments. The sequential order of testing was introduction, MFF, Wide Range Achievement Test, CLC and IAR Scale.

The selected children were tested individually and in groups of three in their own school. The teachers were advised ahead of time that certain members of the third grade would be involved in a study but the names were not disclosed until the day of the examination. Children were individually called from their rooms, given the general introduction and presented with the MFF and Wide Range materials. Following this phase, they were informed that later in the day they would return in small groups to complete some other materials. The procedure will be discussed in detail following the order of presentation.

Introduction

The examiner introduced himself or herself to the child as Mr. or Mrs. ________ and attempted to establish rapport. During this period the examiner would read the following statement:
I am interested in finding out what kind of materials third graders like to do best. I have picked about twenty boys and girls from the third grade and will ask them to do some of the things you are going to do. These are not tests but rather I want to find out what kids in the third grade think about things. Some children in your class may have already tried these and when you are through I will probably get someone else. This doesn't take very long and when we are done here, you can go back to your class. Later on today or tomorrow I will call you to come back with two other children and then we will do some more materials.

After establishing rapport and the introduction was presented, testing was begun with the following sequence of tests:

**Reflection-Impulsivity Disposition**

The MFF test was placed in a hard back, three-ring notebook which was opened before the subject. The picture of the standard was on the top page and the pictures of the six familiar alternatives were on the bottom page. The pages were at right angles to one another so that the standard and the alternatives could be viewed simultaneously. Two practice items were presented to the subjects along with the following directions:

I am going to show you a picture of something you know and then some pictures that look like it. You will have to point to the picture on this bottom page (point) that is just like the one on this top page (point). Let's do some for practice.

Now we are going to do some that are a little bit harder. You will see a picture on this top and six pictures on the bottom. Find the one that is just like the one on the top and point to it.
If the response was correct, the examiner praised the child; if wrong, the examiner stated, "No, that is not the right one. Find the one that is just like this one (point)." Response time to the half second for the first answer and number of errors through six were recorded for each item. The stopwatch and record sheet were concealed so that the subjects would be relatively unaware of the scoring factors. Personal comments from the examiners indicated few instances wherein the Ss seemed concerned with the recording procedures.

Achievement Tests

The Wide Range Reading Test was given first followed by the Arithmetic test. The ceiling on the reading test is reached when the child makes ten consecutive errors. On the arithmetic test the child is permitted to work at his own pace until he feels he is unable to work further problems. Thirty minutes is the maximum time limit. Both reading and arithmetic scores were interpreted in terms of grade level achievement.

Following the MFF and Wide Range Testing, the child was returned to the classroom. After the Ss within a building had been evaluated on the individually administered items, they were called back in groups of three or four, with four being the maximum number.
Locus of Control Dimension

When these children were present and widely spaced in the testing room, the CLC and IAR tests were administered.

The CLC was verbally read to the children with the following directions:

This is not a test. I am just trying to find out how kids your age think about certain things. On the next page there are some questions to see how you feel about these things. There are no right or wrong answers to these questions. Some kids answer "yes" and some answer "no." When I read the question, if you think the answer should be yes or mostly yes, circle "yes." If you think the answer should be no, or mostly no, circle "no." Remember, different children give different answers and there are no right or wrong answers. Just circle "yes" or "no," depending on how you think the question should be answered. If you want me to repeat a question, just raise your hand. Do you understand? All right, listen carefully and circle "yes" or "no."*

Following the collection of the CLC scale, the IAR scale was distributed and the following directions were given:

This is not a test. We are interested in finding out what kids your age think about certain things. On the next three pages you will see thirty-four questions, each question having one of two possible answers. You are simply to choose which one of the two answers best describes what happens to you or how you feel. Of course, there are no right or wrong answers to these questions. Different children give different answers.

Just pick the one answer for each question that best fits the way you feel about what happens to you. Put a check mark (or an X) in the space in front of your choice. When I read the question remember to choose only one answer for each ques-

*Personal communication with I. Bialer Nov. 18, 1966 indicated that children are permitted to circle the test if it is read to them.
tion. If you want me to repeat a question, just raise your hand."

No difficulties were encountered by the three examiners in using a small group for the administration of the CLC and IAR. Each question was identified by number and then read slowly and clearly to insure that the children understood the item and recorded their responses accurately. No instance was reported of children randomly marking responses.

The total testing time for each child was approximately one hour, one half hour for the individual section and one half hour for the group administration. All testing was completed within two days for each child. The total sample was evaluated by the three examiners in a three week period.

Treatment of Data

Each subject elicited fifteen pieces of data. Demographic data includes chronological age, sex, priority school status, and intelligence (verbal, performance, full). The data gathered through test procedures included CLC, IAR, MFF, and achievement scores.

The two measures of the internal-external dimension were the CLC and IAR scales. They can be scored from either the internal or external orientation. In this study both were

*Personal communication with Virginia Crandall Oct., 1966 indicated that reading the item and alternatives was appropriate for third grade children.
scored for internal orientation. A higher score on each scale thus indicates a stronger feeling of internal or personal control.

The CLC scale results in a single score. The IAR scale results in three scores. The I (total) score is the number of items, involving both positive and negative consequences, that were attributed to personal control or in the internal direction. Since the thirty-four item test is divided equally in situations involving positive and negative consequences, two subscale scores are available. The I (+) score indicates the strength of internal disposition for positive or success consequences, while I (-) is the internal disposition for unfavorable or negative consequences. The three scores were separately utilized in this study.

The scores on the MFF scale are the response time (RT) to the child's first answer, and the total number of errors (E) committed on the entire twelve item test. Kagan defines the impulsive child as one who exhibits a fast response time and makes many errors. The reflective child is one who has a long response time and makes few errors. Each of the 120 subjects received a response time score, an error score and a composite score. The composite score is a derived score of both RT and E scores and was utilized to place reflection-impulsivity on a continuum. The RT and E scores were con-
verted to standard scores and the negative sign of the error score was changed. Both scores were added and a constant of ten was added to the total. A high composite score indicates a reflective child (high RT and low E score), while a low score represents the impulsive child (low RT and high E score).

The basic statistical procedures utilized in the analysis of the data were the analysis of variance, analysis of covariance and the Pearson product-moment correlation procedure. The analysis of variance provided data on the source of locus of control score variance. Priority status, sex and the interaction of the two were evaluated in relation to perceived feelings of control. A comparison of means between the various groups followed the analysis of variance. Significance was established when \( p < .05 \) although \( p < .10 \) was accepted as evidence of a trend.

Locus of control scores were divided by a median split procedure into high and low internal scores. These scores were then compared by an analysis of covariance procedure to achievement scores. Intelligence was the covariant. First order partial correlations were computed to establish the relationship between internality and reflectivity. Factor analysis of the intercorrelation matrix were used to determine the number and nature of the underlying variables among the 15 measures.
This chapter presents the results of the statistical treatment of the data and relates the findings to the hypotheses of the study. The major aims of the present study were threefold: (1) to investigate the relationship between residence in high or low priority areas and perceived reinforcement responsibility; (2) to investigate whether locus of control scores are related to measures of achievement; (3) to examine the relationship between feelings of personal control and cognitive tempo. These objectives are stated in the form of four experimental hypotheses.

**Relationship Between Locus of Control and Priority Status**

This section discusses the relationship between priority status and scores on the CLC and IAR scales. It is suggested in the two following hypotheses that children coming from high priority areas will manifest stronger feelings of external control than children from low priority areas.

**Hypothesis 1:** There is a significant difference in the performance of the high and low priority groups on the CLC scale, with the high priority groups tending to feel more
externally oriented.

Each child was administered two scales to measure the internal-external locus of control orientation. The CLC scale is a general measure of the personal control belief system while the IAR scale measures the belief system in relation to school associated activities. In each case, the scales were scored for internal control. The larger the mean score, the stronger the internal orientation or perception of personal control.

TABLE 2
ANALYSIS OF VARIANCE OF CHILDREN'S LOCUS OF CONTROL SCORES (CLC)

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>Sums of Squares</th>
<th>Mean Squares</th>
<th>F</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Priority</td>
<td>1</td>
<td>12.03</td>
<td>12.03</td>
<td>1.53</td>
<td>N.S.</td>
</tr>
<tr>
<td>Sex</td>
<td>1</td>
<td>1.20</td>
<td>1.20</td>
<td>.15</td>
<td>N.S.</td>
</tr>
<tr>
<td>Priority X Sex</td>
<td>1</td>
<td>0.53</td>
<td>0.53</td>
<td>0.06</td>
<td>N.S.</td>
</tr>
<tr>
<td>Within</td>
<td>116</td>
<td>908.19</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>119</td>
<td>921.96</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2 shows the results of the analysis of variance technique using priority status, sex and the interaction effects on CLC scores. The variance attributed to the factors of priority status, sex, and the interaction of the two did not reach
the level of significance established for the study. However, the mean scores of low priority children on the CLC scale appear larger than high priority children. (Table 24, Appendix D). Comparisons between pairs of means are consistent with analysis of variance and indicate that the differences between priority groups did not reach the .05 level of significance. Not all pairs of means were computed but the pairs with the largest mean differences were first selected and examined by an F test using the within-group variance estimate. If the largest mean difference attained statistical significance, then all cell and marginal means were compared. If the largest mean difference was not significant, however, other paired comparisons were not computed.

Reference to Table 3 indicates the coefficient of correlation between priority status and CLC scores was .11 and not significant. An r of .16 is needed for significance at the .05 level. The correlation between sex and CLC, r = .03, was also not significant.

Considering the results of the analysis of variance and comparison of pairs of means test, the first hypothesis is not supported. Children from high priority areas do not exhibit significantly stronger feelings of external control than children from low priority areas.
<table>
<thead>
<tr>
<th>V P Full MFF MFF MFF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prior</td>
</tr>
<tr>
<td>-------</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>4</td>
</tr>
<tr>
<td>5</td>
</tr>
<tr>
<td>6</td>
</tr>
<tr>
<td>7</td>
</tr>
<tr>
<td>8</td>
</tr>
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<td>9</td>
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<td>10</td>
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<tr>
<td>11</td>
</tr>
<tr>
<td>12</td>
</tr>
<tr>
<td>13</td>
</tr>
</tbody>
</table>

a p < .05
b p < .01
Hypothesis 2: There is a significant difference in the performance of the high and low priority groups on the IAR scale, with the high priority group demonstrating stronger feelings of external orientation.

The procedure used in evaluating this hypothesis is similar to that in the first hypothesis. Pertinent data was obtained from analysis of variance, comparison of pairs of means and correlational procedures.

The Intellectual Academic Response (IAR) scale results in three separate subtest scores. I (+) indicates acceptance of responsibility for positive or success outcomes and I (-) represents acceptance of negative outcomes or failure experiences. I (total) is the overall self or internal responsibility score for both positive and negative outcomes. Each subtest was scored for internality. The higher the score, the more internal or less external is the perceived control of reinforcements.

The correlation between I (+) and I (-) scores was small but definite, $r = .33$, $p < .01$ (Table 3). Thus, it appears that while these subtests measure internal control orientations, they involve sufficiently diverse perceptions to warrant considering each score separately.

The analysis of variance of I (+) scores by priority and sex (Table 4) indicates that neither variable individually
or in interaction accounts for a statistically significant amount of the score variance. The variable of sex approached but was not significant at the .10 level or trend level.

Multiple mean comparisons indicate that generally low priority students have higher mean internal control scores than high priority students. However, these differences do not reach a statistical level of significance (Table 25, Appendix D). As a total group, girls had a mean score of 13.13 compared to 12.33 for boys, suggesting that girls exhibited stronger internal feelings for positive outcomes. The F ratio ($F = 3.047$) is significant at the .10 level, indicative of a trend. Further investigation of mean comparisons

<table>
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<tr>
<th>Source</th>
<th>df</th>
<th>Sums of Squares</th>
<th>Mean Squares</th>
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<tr>
<td>Priority</td>
<td>1</td>
<td>2.69</td>
<td>2.69</td>
<td>.38</td>
<td>N.S.</td>
</tr>
<tr>
<td>Sex</td>
<td>1</td>
<td>19.19</td>
<td>19.19</td>
<td>2.72</td>
<td>N.S.</td>
</tr>
<tr>
<td>Priority X Sex</td>
<td>1</td>
<td>4.03</td>
<td>4.03</td>
<td>.57</td>
<td>N.S.</td>
</tr>
<tr>
<td>Within</td>
<td>116</td>
<td>815.52</td>
<td>7.03</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>119</td>
<td>841.46</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
suggests that the differences in sexes is due primarily to the discrepancy in mean scores between males and females in the high priority area. The difference \((F = 2.746)\) approached but was not significant at the trend level which required an \(F\) score of 2.750.

**TABLE 5**

**ANALYSIS OF VARIANCE OF INTELLECTUAL ACADEMIC RESPONSE SCORES I (-)**

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>Sums of Squares</th>
<th>Mean Square</th>
<th>(F)</th>
<th>(P)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Priority</td>
<td>1</td>
<td>1.00</td>
<td>1.00</td>
<td>.09</td>
<td>N.S.</td>
</tr>
<tr>
<td>Sex</td>
<td>1</td>
<td>37.40</td>
<td>37.40</td>
<td>3.41</td>
<td>.10</td>
</tr>
<tr>
<td>Priority X Sex</td>
<td>1</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td>N.S.</td>
</tr>
<tr>
<td>Within</td>
<td>116</td>
<td>1269.35</td>
<td>10.94</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>119</td>
<td>1307.78</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The analysis of variance of I (-) scores (Table 5) is similar to the results for the I (+) subtest previously discussed. The variance attributed to priority status and the sex X priority interaction was not significant. The variable of sex, however, did account for variance significant at the trend level. Table 26 in Appendix D indicates the mean female score (11.09) is significantly different than the male mean
score (9.98) at the .10 level. Thus, girls demonstrated somewhat stronger feelings of personal control over negative or failure outcomes than boys.

**TABLE 6**

ANALYSIS OF VARIANCE OF INTELLECTUAL ACADEMIC RESPONSE SCORES I (TOTAL)

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>Sums of Squares</th>
<th>Mean Square</th>
<th>F</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Priority</td>
<td>1</td>
<td>.40</td>
<td>.40</td>
<td>.01</td>
<td>N.S.</td>
</tr>
<tr>
<td>Sex</td>
<td>1</td>
<td>110.20</td>
<td>110.20</td>
<td>4.65</td>
<td>.05</td>
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<tr>
<td>Priority</td>
<td>1</td>
<td>4.40</td>
<td>4.40</td>
<td>.18</td>
<td>N.S.</td>
</tr>
<tr>
<td>X Sex</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Within</td>
<td>116</td>
<td>2746.88</td>
<td>23.68</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>119</td>
<td>2861.90</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The IAR (total) score demonstrates perceived feelings of internality for both success and failure outcomes. The analysis of variance table (Table 6) indicates that the sex variable accounts for a statistically significant amount of score variance (F = 4.654, p < .05). The variance attributed to priority status and the interaction effects did not reach a minimal level of significance.

Reference to Table 27 (Appendix D), a comparison of pairs of means between the sexes, indicates that within the
high priority group and total group, girls expressed stronger feelings of internality on the I (total) scale than males. Within the high priority area the difference was significant at the .10 level ($F = 2.438$) and significant at the .05 level ($F = 5.197$) when priority status was disregarded. Differences were not found between the sexes within the low priority areas.

Correlational data concerning priority and sex variables are consistent with the analysis of variance and mean differences approach (Table 3). Priority status related $r = .06$ with I (+), $r = .03$ with I (-) and $r = .01$ with I (total). The coefficients of correlation between sex and the I (+), I (-), I (total) scores were respectively .15, .16, .19. Only the last relationship, sex and I (total), is significant at the .05 level.

The evidence is consistent from analysis of variance, mean comparison data and correlation coefficients that there does not appear to be a significant difference between priority groups in feelings of internal orientation on the IAR scale. Hypothesis 2 is thus not supported.

There was some evidence, although not consistent, that female subjects tend to express stronger feelings of internality than male subjects. Although results indicated that sex was not a significant source of variance on the CLC scale, it accounted for a significant amount of score variance on the I (total) scale. On the I (-) scale, significance was at
the trend level. An F test following the analysis of variance found differences between sexes acceptable at the trend level on the I (+) and I (-) scales and at the .05 level for the I (total) scale. Consistently, female subjects expressed higher feelings of internality on the IAR subscales than male subjects. There were no significant sex differences between priority areas or within priority areas with one exception. Only within the high priority area on the I (total) scale did females exceed males at the .10 level of significance. Thus, it would appear that males and females did not differ significantly between priority areas although there is evidence that as a total group females generally indicated more internal feelings of control than males.

TABLE 7
CORRELATIONS BETWEEN LOCUS OF CONTROL AND INTELLIGENCE SCORES

<table>
<thead>
<tr>
<th></th>
<th>Verbal IQ</th>
<th>Performance IQ</th>
<th>Full IQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>I (+)</td>
<td>.37&lt;sup&gt;a&lt;/sup&gt;</td>
<td>.36&lt;sup&gt;a&lt;/sup&gt;</td>
<td>.40&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>I (-)</td>
<td>.26&lt;sup&gt;a&lt;/sup&gt;</td>
<td>.24&lt;sup&gt;a&lt;/sup&gt;</td>
<td>.27&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>I (total)</td>
<td>.38&lt;sup&gt;a&lt;/sup&gt;</td>
<td>.36&lt;sup&gt;a&lt;/sup&gt;</td>
<td>.40&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>CLC</td>
<td>.12</td>
<td>.09</td>
<td>.11</td>
</tr>
</tbody>
</table>

<sup>a</sup> p < .01
Prior to a discussion of the remaining hypotheses, data are presented on the relationship between feelings of personal control and intelligence. Previous studies have indicated that intelligence is positively related to perceived internal control. Correlations presented in Table 7 indicate a definite but small positive relationship between the IAR scale and intelligence scores. Although all coefficients are significant at the .01 level, the I (-) score does not appear as strongly related to intelligence as the I (+) and I (total) scores. The CLC scale relates positively but minimally with the various intelligence measures. Generally, the difference in relationship between intelligence and IAR and CLC is consistent with the intent of the two scales. The IAR is a more restricted measure of the internal-external control dimension, limited to experiences in intellectual achievement situations, whereas the CLC presents items describing reinforcements in general motivational and behavioral areas.

**Relationship Between Locus of Control and Achievement**

The next hypothesis investigates the relationship between feelings of personal control and scholastic achievement.

**Hypothesis 3:** There is a significant relationship between feelings of internal control and achievement test scores.
The stronger the belief in internal control, the higher the achievement scores, with the effects of intelligence partialled out.

Data bearing on this hypothesis are provided through the analysis of covariance and correlational technique. Previous data indicated that a positive relationship exists between feelings of perceived control and intelligence, especially for the IAR scale. Brighter children tend to perceive more of a causal relationship between their own behavior and outcomes. The covariance statistical procedure was, therefore, used to control or adjust for the effects of intelligence in investigating the relationship between locus of control scores and scholastic achievement scores.

Each measure of locus of control was divided into a high and low internal group by a median-split procedure. Scores above the median were considered high internal scores and those below it were labeled low internal scores. The median score on the CLC scale for the total group was 12.64, with 12.6 and 12.7 respectively for males and females. The median scores for the I (+) scale were, in the same order, 13.14, 12.5, 13.7. For the I (-) scale they were 10.83, 9.8, 11.6 and 23.72, 22.3, 25.1 for the I (total) scale.
Results of the analysis of covariance procedure using CLC scores and achievement scores are presented in Tables 8 and 9. The variable of high or low internal control did not account for a significant amount of reading or arithmetic score variance.
The factor of sex and the interaction of sex and high-low internality were not significant as a source of score variance.

TABLE 10
ADJUSTED MEAN ACHIEVEMENT SCORES FOR HIGH AND LOW INTERNAL CHILDREN

<table>
<thead>
<tr>
<th></th>
<th>Reading</th>
<th></th>
<th>Arithmetic</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
<td>Total</td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>CLC High</td>
<td>3.98</td>
<td>3.91</td>
<td>3.94</td>
<td>3.73</td>
<td>3.73</td>
</tr>
<tr>
<td>Low</td>
<td>3.58</td>
<td>3.86</td>
<td>3.72</td>
<td>3.70</td>
<td>3.56</td>
</tr>
<tr>
<td>I (+) High</td>
<td>3.94</td>
<td>4.13</td>
<td>4.05</td>
<td>3.64</td>
<td>3.71</td>
</tr>
<tr>
<td>Low</td>
<td>3.67</td>
<td>3.63</td>
<td>3.66</td>
<td>3.76</td>
<td>3.58</td>
</tr>
<tr>
<td>I (-) High</td>
<td>4.07</td>
<td>3.96</td>
<td>4.01</td>
<td>3.74</td>
<td>3.68</td>
</tr>
<tr>
<td>Low</td>
<td>3.53</td>
<td>3.79</td>
<td>3.65</td>
<td>3.69</td>
<td>3.61</td>
</tr>
<tr>
<td>I (total) High</td>
<td>3.96</td>
<td>4.02</td>
<td>3.99</td>
<td>3.62</td>
<td>3.69</td>
</tr>
<tr>
<td>Low</td>
<td>3.67</td>
<td>3.66</td>
<td>3.67</td>
<td>3.78</td>
<td>3.56</td>
</tr>
</tbody>
</table>

Mean achievement scores for high and low internal groups with the variable of intelligence partialled out are found in Table 10. For both reading and arithmetic scores, the high internal group on the CLC scale demonstrated a higher grade placement level of achievement than the low internal group. However, as indicated, these differences did not reach an acceptable level of significance.
TABLE 11
ANALYSIS OF COVARIANCE (SEX, I(+)) OF READING SCORES

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>Sums of Squares</th>
<th>Mean Square</th>
<th>F</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>I (+)</td>
<td>1</td>
<td>381.61</td>
<td>381.61</td>
<td>4.26</td>
<td>.05</td>
</tr>
<tr>
<td>Sex</td>
<td>1</td>
<td>10.95</td>
<td>10.95</td>
<td>.12</td>
<td>N.S.</td>
</tr>
<tr>
<td>Sex X I (+)</td>
<td>1</td>
<td>39.87</td>
<td>39.87</td>
<td>.45</td>
<td>N.S.</td>
</tr>
<tr>
<td>Within</td>
<td>115</td>
<td>10327.00</td>
<td>89.80</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

TABLE 12
ANALYSIS OF COVARIANCE (SEX, I (+)) OF ARITHMETIC SCORES

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>Sums of Squares</th>
<th>Mean Square</th>
<th>F</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>I (+)</td>
<td>1</td>
<td>.14</td>
<td>.14</td>
<td>.01</td>
<td>N.S.</td>
</tr>
<tr>
<td>Sex</td>
<td>1</td>
<td>14.11</td>
<td>14.11</td>
<td>.58</td>
<td>N.S.</td>
</tr>
<tr>
<td>Sex X I (+)</td>
<td>1</td>
<td>47.95</td>
<td>47.95</td>
<td>1.99</td>
<td>N.S.</td>
</tr>
<tr>
<td>Within</td>
<td>115</td>
<td>2762.88</td>
<td>24.03</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Findings in Tables 11 and 12 indicate that the variable of high-low internal scores on the I (+) scale accounted for a significant (.05) source of reading achievement variance but not arithmetic achievement. As a group, students above the median or those who assumed more responsibility for positive
outcomes scored at a higher level in reading achievement than the group below the median. The high internal group had a mean reading grade level of 4.05 compared to 3.65 for those below the median. The variables of sex and interaction effects of sex and median score did not reach an acceptable level of significance.

TABLE 13

ANALYSIS OF COVARIANCE (SEX, I (-)) OF READING SCORES

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>Sums of Squares</th>
<th>Mean Square</th>
<th>F</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>I (-)</td>
<td>1</td>
<td>356.11</td>
<td>356.11</td>
<td>3.99</td>
<td>.05</td>
</tr>
<tr>
<td>Sex</td>
<td>1</td>
<td>11.34</td>
<td>11.34</td>
<td>.13</td>
<td>N.S.</td>
</tr>
<tr>
<td>Sex X I (-)</td>
<td>1</td>
<td>105.21</td>
<td>105.21</td>
<td>.28</td>
<td>N.S.</td>
</tr>
<tr>
<td>Within</td>
<td>115</td>
<td>10268.46</td>
<td>89.29</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

TABLE 14

ANALYSIS OF COVARIANCE (SEX, I (-)) OF ARITHMETIC SCORES

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>Sums of Squares</th>
<th>Mean Square</th>
<th>F</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>I (-)</td>
<td>1</td>
<td>6.59</td>
<td>6.59</td>
<td>.27</td>
<td>N.S.</td>
</tr>
<tr>
<td>Sex</td>
<td>1</td>
<td>16.23</td>
<td>16.23</td>
<td>.67</td>
<td>N.S.</td>
</tr>
<tr>
<td>Sex X I (-)</td>
<td>1</td>
<td>.61</td>
<td>.61</td>
<td>.88</td>
<td>N.S.</td>
</tr>
<tr>
<td>Within</td>
<td>115</td>
<td>2801.40</td>
<td>24.36</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Tables 13 and 14 provide data and findings that are quite similar to the findings for the I (+) scale. Students above the median in feelings of personal control for negative outcomes demonstrate higher reading achievement scores than those below the median. Specifically, the high internal group had a mean reading grade level of 4.01 compared to 3.65 for the low internal group. As indicated, the mean achievement scores and F ratio for the I (+) and I (-) scales are quite similar. Again it was found that high or low internality was not predictive of arithmetic scores. The variable of sex and interaction effects were not significant.

**TABLE 15**

**ANALYSIS OF COVARIANCE (SEX, I (TOTAL)) OF READING SCORES**

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>Sums of Squares</th>
<th>Mean Square</th>
<th>F</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>I (total)</td>
<td>1</td>
<td>283.48</td>
<td>283.48</td>
<td>3.13</td>
<td>.10</td>
</tr>
<tr>
<td>Sex</td>
<td>1</td>
<td>1.88</td>
<td>1.88</td>
<td></td>
<td>.02 N.S.</td>
</tr>
<tr>
<td>Sex X I (total)</td>
<td>1</td>
<td>3.29</td>
<td>3.29</td>
<td>.04</td>
<td>N.S.</td>
</tr>
<tr>
<td>Within</td>
<td>115</td>
<td>10502.95</td>
<td>91.33</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### TABLE 16
ANALYSIS OF COVARIANCE (SEX, I (TOTAL)) OF ARITHMETIC SCORES

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>Sums of Squares</th>
<th>Mean Square</th>
<th>F</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>I (total)</td>
<td>1</td>
<td>2.99</td>
<td>2.99</td>
<td>.13</td>
<td>N.S.</td>
</tr>
<tr>
<td>Sex</td>
<td>1</td>
<td>11.41</td>
<td>11.41</td>
<td>.48</td>
<td>N.S.</td>
</tr>
<tr>
<td>Sex X I (total)</td>
<td>1</td>
<td>60.26</td>
<td>60.26</td>
<td>2.52</td>
<td>N.S.</td>
</tr>
<tr>
<td>Within</td>
<td>115</td>
<td>2749.65</td>
<td>23.98</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Considering the results found on the I (+) and I (-) scales, the findings in Tables 15 and 16 are not unexpected. Children with stronger feelings of internal control achieved at a higher level than those with weaker internal control feelings. The high-low split as a source of variance, however, was only acceptable at the .10 or trend level of significance for reading achievement. No significant difference was found for arithmetic achievement. The reading achievement means for the high and low internal groups were 3.99 and 3.67 respectively.
TABLE 17
FIRST-ORDER PARTIAL CORRELATIONS FOR LOCUS OF CONTROL SCORES AND ACHIEVEMENT SCORES

<table>
<thead>
<tr>
<th></th>
<th>Reading</th>
<th>Arithmetic</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLC</td>
<td>.14</td>
<td>.09</td>
</tr>
<tr>
<td>I (+)</td>
<td>.25 b</td>
<td>.07</td>
</tr>
<tr>
<td>I (-)</td>
<td>.21 a</td>
<td>.09</td>
</tr>
<tr>
<td>I (total)</td>
<td>.26 b</td>
<td>.04</td>
</tr>
</tbody>
</table>

a p < .05
b p < .01

References to the first-order partial correlation matrix (Table 17) presents findings consistent with the previous results. When intelligence was partialled out, CLC scores were not significantly related to reading (r = .14) or arithmetic scores (r = .09). Each subscale of the IAR measure, however, was positively related to reading achievement scores. The coefficients of correlation between the I (+), I (-) and I (total) scores with reading scores were respectively .25, .21, .26. I (+) and I (total) were significant at the .01 level of confidence. I (-) was significant at the .05 level. The relationships between the IAR scales and arithmetic achievement were not statistically significant.
In summary, scores above the median on the I (+), I (-) and I (total) scales, labeled high internality, were consistently related to achievement in reading but not arithmetic. CLC scores were not predictive of reading or arithmetic achievement. Analysis of covariance revealed that the I (+) and I (-) scores accounted for a significant amount of reading score variance. Both were significant at the .05 level while the I (total) scale accounted for variance at the trend or .10 level. Sex was not found to be a significant source of achievement score variance. Significance was not reached for the interaction of sex and internality for all locus of control scales.

These findings are interpreted as partial support of hypothesis three. Children with stronger feelings of internality do tend to score higher on standardized achievement tests. This, however, is true only for the IAR scale, not the CLC scale, and only for reading achievement.

**Relationship Between Locus of Control and the Reflection-Impulsivity Dimension**

This section discusses the relationship between the CLC and IAR scale to the MFF scale. It is suggested that children with strong internal feelings of control will respond in a more reflective fashion than children with weaker feelings of internality.
Hypothesis 4: There is a significant relationship between the internal-external locus of control dimension and the reflection-impulsivity dimension. Internality is positively related to the reflection disposition.

Consistent with previous procedures, the locus of control scales were scored for internality. The higher the score, the stronger the feelings of internal or personal control. The scores on the MFF scale are the mean response time (RT) to the child's first answer and the total number of errors (E) committed on the test. As defined by Kagan, the impulsive child exhibits a fast response time and makes many errors, while the reflective child has a long response time and makes fewer errors. Previous studies investigating this dimension have established a composite score which is used to place reflection-impulsivity on a continuum (Yando, 1966; Lender, 1968). The composite score is a derived score of both response time and error score. A high composite score indicates a reflective child (high RT and low E score) while a low composite score represents the impulsive child (low RT and high E score). According to the fourth hypothesis, a positive relationship is proposed between the various locus of control scales and the MFF (composite) score.

Prior to discussing this hypothesis, data are available which reflect on Kagan's basic concept that a short response
time is associated with increased errors. A correlation coefficient of -.45, significant at the .01 level, was found between reaction time and error score, suggesting that short reaction time is associated with an increase in error score. The present data are thus consistent with previous research findings.

**TABLE 18**

**PEARSON PRODUCT-MOMENT CORRELATIONS BETWEEN LOCUS OF CONTROL SCALES AND MFF SCORES**

<table>
<thead>
<tr>
<th></th>
<th>CLC</th>
<th>I (+)</th>
<th>I (-)</th>
<th>I (total)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MFF (RT)</td>
<td>.08</td>
<td>.09</td>
<td>.19 a</td>
<td>.18 a</td>
</tr>
<tr>
<td>MFF (E)</td>
<td>-.07</td>
<td>-.38 b</td>
<td>-.20 a</td>
<td>-.34 b</td>
</tr>
<tr>
<td>MFF (Composite)</td>
<td>.06</td>
<td>.19 a</td>
<td>.21 a</td>
<td>.25 b</td>
</tr>
</tbody>
</table>

a \( p < .05 \)

b \( p < .01 \)

Coefficients of correlations in Table 18 indicate that the subtests of the IAR scale were significantly related to the MFF composite score. I (+) and I (-) scores were correlated with the MFF composite score at the .05 level, while I (total) was at the .01 level of significance. Although the coefficients attained the accepted level of significance, the proportion of variance explained is relatively small. CLC scores were not significantly related to the composite scores.
These results would appear to suggest that stronger feelings of internality, especially in intellectual or academic situations, are associated with a more reflective method of problem solution. However, previous findings have indicated that intelligence is significantly related to both perceived feelings of internal control and to a tendency to respond in a reflective manner. Intelligence was found to correlate at the .01 level with I (+), I (-), I (total) and MFF composite scores. The implication is that the locus of control scores and MFF composite score may correlate with each other because both are correlated with intelligence. A first-order partial correlation was used with the above data to obtain a measure of correlation with the effect of intelligence removed.

TABLE 19

FIRST-ORDER PARTIAL CORRELATIONS FOR LOCUS OF CONTROL SCORES AND MFF COMPOSITE SCORES

<table>
<thead>
<tr>
<th></th>
<th>CLC</th>
<th>I (+)</th>
<th>I (-)</th>
<th>I (total)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MFF (Composite)</td>
<td>.03</td>
<td>.08</td>
<td>.15</td>
<td>.15</td>
</tr>
</tbody>
</table>

The results of the partial correlation are found in Table 19. Consistently it was found that the coefficients of correlation between internal scores and the reflection orientation
did not reach significance. Using a variance interpretation, the percentage of association between CLC and MFF composite scores resulting from the effect of intelligence was 75 per cent. For the I (+) and MFF scale the percentage was .72 while the percentage was .125 and .47 respectively for I (-) and I (total) scores.

The findings would, therefore, suggest that when the effects of intelligence are removed from the association between internality and reflection, the correlations do not attain significance. Hypothesis 4 is thus not supported.

**TABLE 20**

**ANALYSIS OF VARIANCE OF MFF COMPOSITE SCORES**

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>Sums of Squares</th>
<th>Mean Squares</th>
<th>F</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Priority</td>
<td>1</td>
<td>10.07</td>
<td>10.07</td>
<td>1.55</td>
<td>N.S.</td>
</tr>
<tr>
<td>Sex</td>
<td>1</td>
<td>10.25</td>
<td>10.25</td>
<td>1.58</td>
<td>N.S.</td>
</tr>
<tr>
<td>Priority X Sex</td>
<td>1</td>
<td>12.95</td>
<td>12.95</td>
<td>1.99</td>
<td>N.S.</td>
</tr>
<tr>
<td>Within</td>
<td>116</td>
<td>751.92</td>
<td>6.48</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>119</td>
<td>785.21</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Although not pertinent to the stated hypotheses, additional data was available on the reflection-impulsivity disposition as measured by the MFF composite score. The analysis of variance
technique in Table 20 indicates that the variables of priority, sex and their interaction, did not account for a significant amount of composite score variance. A significant difference was not found between high and low priority groups when composite mean scores were compared (Table 28, Appendix D). A comparison of pairs of means, however, does indicate a trend with females tending to be somewhat more reflective than males in the low priority area. The F ratio was significant at the .10 level.

In summary, it was found that although internality and reflectivity appeared to be highly related, the variable of intelligence markedly influenced this association. From 25 to 75 per cent of the association between various locus of control scores and reflection was due to the effect of intelligence. When the factor of intelligence was controlled, a significant correlation was not found between internality and reflectivity. Residence in the high priority or low priority area was not significantly related to the reflection-impulsivity disposition.

Additional Findings

To investigate underlying factors among the fifteen measures the factor analysis technique was applied to the correlation matrix. Three separate analyses were made of the data. Table 21 presents the factor loadings and communalities found
using the FACANA program. The FACANA program extracts factors by the centroid method and uses a varimax rotation. Table 22 represents the findings obtained by using a modified program. This program uses the principal factor and minres method of extraction and varimax rotation. A hierarchial method is also available for use in the rotation. The final factor analysis, identified as BMD, is found in Table 23. Factors are extracted by the principal factors method and rotated by the varimax solution.

In each solution, six factors were extracted and rotated. In the three separate solutions five factors were consistently identified. These factors are identified by roman numerals and are consistent for all solutions. Factor I had the highest loadings on intelligence and achievement variables. Although there were differences among the solutions with respect to the weight of the loadings, a factor of scholastic aptitude, achievement and intelligence was suggested.

Components of the MFF dimension had the highest loadings on Factor II. In each solution, RT, E, and composite scores attained the highest loadings and suggest the presence of a cognitive tempo or reflection-impulsivity variable. Factor III on two of the three solutions had highest loadings on the internal orientation for negative consequences and total self responsibility scores. A factor of internal responsibility
for negative outcomes seems probable considering the high loading on the I (-) and negligible loading on the I (+) scale. The reverse of this is found in Factor IV where I (+) and I (total) received highest loadings. Factor IV thus seems to measure acceptance of responsibility for positive outcomes. In only the BMD solution (Table 23) was responsibility for negative and positive outcomes extracted on the same factor. An implication can perhaps be drawn that the I (+) and I (-) scales measure sufficiently different orientations to warrant considering them independently as well as jointly.

Factor V has highest loadings on priority status, verbal intelligence and reading achievement. This appears to suggest a verbal factor in combination with socioeconomic status. No consistency was found for Factor VI among the solutions.
TABLE 21

ROTTED FACTOR MATRIX (FACANA)

<table>
<thead>
<tr>
<th>Variable</th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
<th>V</th>
<th>VI</th>
<th>h²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Priority</td>
<td>.028</td>
<td>.080</td>
<td>-.042</td>
<td>.034</td>
<td>.398</td>
<td>.033</td>
<td>.170</td>
</tr>
<tr>
<td>Age</td>
<td>-.160</td>
<td>-.037</td>
<td>-.073</td>
<td>.005</td>
<td>-.060</td>
<td>.509</td>
<td>.272</td>
</tr>
<tr>
<td>Sex</td>
<td>.072</td>
<td>.072</td>
<td>.188</td>
<td>.084</td>
<td>.139</td>
<td>-.119</td>
<td>.086</td>
</tr>
<tr>
<td>Verbal IQ</td>
<td>.782</td>
<td>.003</td>
<td>.226</td>
<td>.050</td>
<td>.484</td>
<td>-.171</td>
<td>.929</td>
</tr>
<tr>
<td>Perf. IQ</td>
<td>.886</td>
<td>.196</td>
<td>.089</td>
<td>.165</td>
<td>-.049</td>
<td>-.188</td>
<td>.896</td>
</tr>
<tr>
<td>Full IQ</td>
<td>.911</td>
<td>.117</td>
<td>.166</td>
<td>.118</td>
<td>.218</td>
<td>-.196</td>
<td>.971</td>
</tr>
<tr>
<td>CLC</td>
<td>.100</td>
<td>.042</td>
<td>.134</td>
<td>.019</td>
<td>.131</td>
<td>.297</td>
<td>.136</td>
</tr>
<tr>
<td>IAR (+)</td>
<td>.236</td>
<td>.078</td>
<td>.331</td>
<td>.779</td>
<td>.148</td>
<td>.017</td>
<td>.800</td>
</tr>
<tr>
<td>IAR (-)</td>
<td>.151</td>
<td>.122</td>
<td>.913</td>
<td>.056</td>
<td>-.081</td>
<td>.085</td>
<td>.888</td>
</tr>
<tr>
<td>IAR (total)</td>
<td>.225</td>
<td>.123</td>
<td>.791</td>
<td>.501</td>
<td>.026</td>
<td>.064</td>
<td>.947</td>
</tr>
<tr>
<td>MFF (RT)</td>
<td>.024</td>
<td>.938</td>
<td>.115</td>
<td>-.069</td>
<td>.077</td>
<td>.037</td>
<td>.906</td>
</tr>
<tr>
<td>MFF (E)</td>
<td>-.365</td>
<td>-.550</td>
<td>-.067</td>
<td>-.259</td>
<td>-.132</td>
<td>.082</td>
<td>.531</td>
</tr>
<tr>
<td>MFF (Comp.)</td>
<td>.167</td>
<td>.972</td>
<td>.069</td>
<td>.081</td>
<td>.095</td>
<td>.025</td>
<td>.994</td>
</tr>
<tr>
<td>Reading</td>
<td>.603</td>
<td>.018</td>
<td>.295</td>
<td>.141</td>
<td>.505</td>
<td>.189</td>
<td>.762</td>
</tr>
<tr>
<td>Arith.</td>
<td>.713</td>
<td>.143</td>
<td>.079</td>
<td>.039</td>
<td>-.080</td>
<td>.245</td>
<td>.603</td>
</tr>
</tbody>
</table>
**TABLE 22**

**ROTATED FACTOR MATRIX (WHERRY)**

<table>
<thead>
<tr>
<th>Variable</th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
<th>V</th>
<th>VI</th>
<th>$h^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Priority</td>
<td>-.016</td>
<td>.069</td>
<td>-.034</td>
<td>.037</td>
<td>.376</td>
<td>.059</td>
<td>.152</td>
</tr>
<tr>
<td>Age</td>
<td>.026</td>
<td>.026</td>
<td>-.057</td>
<td>-.046</td>
<td>-.055</td>
<td>-.332</td>
<td>.120</td>
</tr>
<tr>
<td>Sex</td>
<td>.033</td>
<td>.045</td>
<td>.156</td>
<td>.107</td>
<td>.128</td>
<td>.093</td>
<td>.064</td>
</tr>
<tr>
<td>Verbal IQ</td>
<td>.469</td>
<td>-.142</td>
<td>.187</td>
<td>.216</td>
<td>.517</td>
<td>.641</td>
<td>.999</td>
</tr>
<tr>
<td>Perf. IQ</td>
<td>.444</td>
<td>.065</td>
<td>.100</td>
<td>.351</td>
<td>-.039</td>
<td>.713</td>
<td>.845</td>
</tr>
<tr>
<td>Full IQ</td>
<td>.508</td>
<td>-.026</td>
<td>.139</td>
<td>.334</td>
<td>.156</td>
<td>.766</td>
<td>1.000</td>
</tr>
<tr>
<td>CLC</td>
<td>.121</td>
<td>.042</td>
<td>.125</td>
<td>.060</td>
<td>.132</td>
<td>-.040</td>
<td>.055</td>
</tr>
<tr>
<td>IAR (+)</td>
<td>.117</td>
<td>.060</td>
<td>.241</td>
<td>.906</td>
<td>.185</td>
<td>-.024</td>
<td>.931</td>
</tr>
<tr>
<td>IAR (-)</td>
<td>.227</td>
<td>.080</td>
<td>.965</td>
<td>.103</td>
<td>-.022</td>
<td>-.007</td>
<td>1.000</td>
</tr>
<tr>
<td>IAR (total)</td>
<td>.207</td>
<td>.094</td>
<td>.768</td>
<td>.598</td>
<td>.030</td>
<td>-.015</td>
<td>1.000</td>
</tr>
<tr>
<td>MFF (RT)</td>
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Summary

Data presented in this chapter indicate that as a group children coming from areas characterized as either high or low priority do not differ significantly in feelings of personal control or outcome responsibility. Analysis of variance techniques indicated that priority status did not account for a significant amount of score variance on all locus of control scales. In the correlation matrix priority status was not significantly related to the locus of control measures. Some evidence was, however, noted that the sex of the subject may be related to perceived feelings of internality. Analysis of variance indicated that sex accounted for score variance on the I (-) and I (total) scales. It was at the trend level (.10) for the I (-) scale and at the .05 level for the I (total) scale. Sex was not a pertinent source of variance on the CLC or I (+) scales.

A comparison of pairs of means between the sexes indicated that on I (+) and I (-) scales girls had higher mean internality scores than boys. This was accepted at the trend level. Girls demonstrated stronger feelings of internality at the .05 level, on the I (total) scale. The evidence, although not consistent, suggests that girls exhibit stronger feelings of internality, especially in academic or intellectual situations, than boys.
Locus of control measures varied in their relationship with intelligence from \( r = .11 \) to \( r = .40 \). The CLC scale correlated lowest while the IAR scale related highest. This was not unexpected considering that the CLC scale measures a broad, general orientation while the IAR measures primarily intellectual-academic behavior. It would appear that brighter children tend to perceive more of a causal relationship between their own behavior and outcomes. However, intelligence and internality do not relate so highly that it might be assumed that internal responses are simply another measure of intellectual behavior per se.

Data on the relationship between internality and achievement scores was inconsistent. It had been suggested that internality would be predictive of higher achievement levels for both reading and arithmetic with the effects of intelligence controlled. Analysis of covariance tables indicated that on the I (+), I (-), and I (total) scales, high internal feelings accounted for significant source variance. This was true, however, only for reading achievement and not arithmetic achievement. It was concluded that children above the median on the IAR scale generally had higher mean reading achievement scores with the variable of intelligence controlled.

The positive relationship predicted between internality and reflectivity was not supported by the data. When the
variable of intelligence was removed from the correlations between locus of control and the MFF scores by first-order partial correlations, the coefficients were no longer significant. Thus, it would appear that strong feelings of internality are not predictive of a reflective orientation in problem solutions. It was further found that children from the two priority areas did not vary significantly in the reflection-impulsivity dimension.

Factor analyses of the correlations between the 15 variables extracted six factors. Two of the factors focused on intelligence and achievement, two measured feelings of positive and negative internal control, one was the reflection-impulsivity disposition, and one emphasized verbal ability and socioeconomic factors.

In summary, it was found that feelings of internality are somewhat predictive of differential achievement. However, different instruments vary in their predictive value and internality appears only predictive of reading but not arithmetic achievement. Children from high priority areas did not express reduced feelings of internality compared to children in high priority areas. Consistently, although generally at a trend level, it was found that girls perceived stronger feelings of internal control than boys. This occurred for total groups and was not more prevalent within the high or
low priority group. Evidence was presented that children with stronger feelings of internal control do not correspondingly respond in a more reflective fashion on a task involving response uncertainty.
CHAPTER V
DISCUSSION AND CONCLUSIONS

The present study investigated the relationship between residence in areas characterized by two opposing socioeconomic backgrounds on the one hand and feelings of internal control and responsibility for outcomes on the other. It was further hypothesized that the internal-external construct would be positively related to academic achievement. Children with stronger feelings of internality would demonstrate a higher level of achievement than a group with weaker feelings of internal control. In addition to the behavioral correlate of achievement, it was predicted that internal attitudes would be associated with a reflective approach to problem solution.

The sample was made up of 120 third grade children of which 60 were drawn from high priority and 60 from low priority schools. There were an equal number of males and females. Subjects were randomly selected and a proportional representation of children was drawn from each school within a priority classification. Each child was administered four instruments. The Children's Locus of Control Scale and the Intellectual Academic Response Questionnaire measured feelings of personal control and outcome responsibility. The Wide
Range Achievement Test provided reading and arithmetic scores. Cognitive tempo, along the reflection-impulsivity dimension, was measured by the Matching Familiar Figures Test. In all, 15 items of information were available on each subject. The data were treated by analysis of variance and analysis of covariance techniques to determine the effects of the major variables on score variance. Pearson product-moment and first-order partial correlations provided data on the relationships between the variables. Factor analyses using the principal components and centroid extraction method provided data on underlying factors in the correlation matrix.

Conclusions

It was found that children residing in areas designated as either low or high priority status did not differ significantly in feelings of internal control or outcome responsibility. The hypotheses were not supported that children from low socioeconomic areas (high priority) would express stronger feelings of external control on the CLC and IAR scales than children from high socioeconomic areas (low priority). Some evidence was available, however, that males and females differ in feelings of internal control with girls expressing stronger internal feelings. This was not consistent, however, for all measures of internal-external control.
Data suggested that perceived internal control was predictive of higher scholastic achievement dependent on locus of control and achievement measures. Internal control, as measured by the I (+), I (-) and I (total) scales, was related to higher reading achievement scores but not to higher arithmetic scores. The acceptance of internal outcome responsibility on the CLC scale was not predictive of higher achievement in reading or arithmetic.

The relationship between the locus of control construct and reflection-impulsivity dimension was not supported by the data. It initially appeared that perceived internal control was positively and significantly associated with a reflective disposition in problem solution. However, the magnitude of the relationship decreased markedly when the variable of intelligence was extracted from both variables.

Specific conclusions regarding the hypotheses and major variables in the study are as follows:

1. Priority status was not a major source of variance in explaining scores on the measures of locus of control, CLC, I (+), I (-) and I (total). Analysis of variance and correlational procedures did not confirm that children from high priority areas expressed stronger feelings of external control compared to children from low priority areas. Therefore, residence in an area with a low socioeconomic status does not appear to be related to feelings of outcome responsibility.
2. Female subjects tend to express stronger feelings of internal control than male subjects. On three of the four scales measuring control attitudes, females expressed stronger internal feelings than male subjects. The evidence was consistent from the analysis of variance and comparison of means that on the I (-) and I (total) scales females were more internally oriented than males. The difference was significant at the trend level for the I (-) scores and at the .05 level for I (total) scores. The difference between means for males and females on the I (+) scale was at the trend level ($p < .10$) but was not significant by the analysis of variance method. Consistently, sex was not a major factor on the CLC scale. It can be concluded from these findings that sex is a minimally significant factor in relation to the locus of control construct. It has greatest impact on the I (-) and I (total) scales but yet is significant only between the trend and .05 level.

3. The CLC and IAR scales are essentially different measures of the locus of control construct. The highest correlation between the scales was .17, suggesting that less than four percent of the variance of the CLC scale is predictable from the variance of the IAR scale. When the factor of intelligence is partialled out, the correlation is reduced to .14.
4. Brighter children tend to express stronger feelings of internal control in school associated situations, but not necessarily in general social situations. Intelligence was consistently related to IAR scores (.01) but not related to CLC scores.

5. Partial confirmation was obtained for the hypothesis that children with stronger internal control attitudes would achieve at a higher level than students with weaker internal control attitudes. On the IAR scale children with scores above the median, labeled high internals, had higher achievement in reading but not arithmetic than low internal children. This was not found on the CLC measure of control to either reading or arithmetic achievement. It was concluded that knowledge of the degree of personal outcome responsibility may be necessary for making differential predictions of achievement, especially in reading achievement. The I (+) and I (-) measures of internality were most positively related to reading achievement followed by I (total) scores.

6. Sex was not a significant factor in the relationship between internal control attitudes and achievement. Strong internal orientations were associated with higher reading achievement for both sexes.
7. It was found that response time was significantly related to error score on the MFF \( r = -0.45, p < 0.01 \). A short response time is associated with an increase in error score.

8. Internal attitudes were not significantly related to reflective dispositions, as measured by The Matching Familiar Figures Test. Thus, knowledge of a person's locus of control orientation and/or reflection-impulsivity orientation would not permit a prediction that the person would respond in a certain way on the other variable.

9. The variables of priority status, sex, and the interaction of the two were not significant sources of score variance on the reflection-impulsivity disposition. Children from high priority areas were not significantly more impulsive than children from low priority areas.

10. Intelligence was found to be significantly related to the reflection-impulsivity dimension. Brighter children responded in a more reflective fashion on problems with high response uncertainty.

11. Factor analyses of the correlation matrix of pertinent variables extracted five consistent factors. The
factors were: (1) intelligence and achievement; (2) reflection-impulsivity disposition; (3) internal responsibility for negative outcomes; (4) internal responsibility for positive outcomes; (5) verbal skill and socioeconomic status.

**Discussion**

The findings that children from high priority areas did not exhibit reduced feelings of internal control appears inconsistent with previous findings. As indicated, it has generally been found that a minimal power position is associated with higher feelings of external control. However, the results of this study and previous works are not truly comparable when the factor of subject selection is considered. Previous designs have categorized each subject as socially, culturally advantaged or disadvantaged on the basis of such indices as Hollingshead's Two Factor Index of Social Position, Warner's Classification of Father's Occupation or a combination of factors such as economic, cultural-physical provisions and parental interest and involvement with children. In contrast, this study sought only to classify the school attended as either high or low priority status. Priority status was based on the percentage of deprived families in attendance. Children were drawn randomly from the schools and no attempt was made to classify them individually as deprived or non-deprived.
This study was an extension of previous findings and was designed to investigate the feasibility of generalizing an expectancy of internal-external control attitudes to students based on the overall deprivation rating of a school. It was suggested that by a process yet unidentified the circumstances and environment surrounding a high priority school would result in reduced feelings of personal control. The findings did not support this prediction. However, it may be possible that if schools were selected in different localities with a higher percentage of deprived children constituting the student body, the prediction might be obtained. Although the highest priority schools were selected in the district, on the average only 36 percent of students were considered deprived. Perhaps the basic assumptions that the priority areas served a relatively homogeneous population and that the recorded percentage of deprivation was a minimal estimate were also erroneous.

The finding that sex was a pertinent variable on the internal-external dimensions is not without precedent for the IAR scale. Crandall's validation study of the IAR found that for third grade subjects, girls tended to exceed males in perceived internal control on the I (+) and I (total) scale while boys exceeded girls on the I (-) subtest. The differences approached significance. In the present study, it was accepted as a trend that girls exceeded boys on both the
(+ and I (-) scales. The I (-) finding was not consistent
with Crandall. Girls, however, exceeded males at the .05
level on I (total) scores.

Since age and intelligence have been found to be posi­
tively related to internal attitudes on the IAR scale, a t
test was computed between mean chronological ages and in­
telligence scores for the groups. Although males were
slightly older and less intelligent, the differences were
not significant. The implication, at least from the study,
is that at the third grade level girls express slightly stronger
internal attitudes than boys on the IAR scale.

Possible explanations for the sex differences are based
on principles of development and possibly in the nature of
the teacher-student interaction. Since girls generally mature
earlier than boys and since the locus of control construct
has been considered a developmental conceptualization process,
the differences in internal orientations may be a product of
earlier maturation. Also, it is logical to suggest that many
teachers attempt to encourage an internal orientation toward
academic efforts with such statements as "you can pass the
test if you study hard," or "you can do the work if you keep
working on it." In addition to verbal reinforcement, teachers
reward by better grades students who persist in their work.
In the primary grades, it would appear that girls generally
persist on tasks and receive better grades than boys.
The combination of verbal and grade reinforcement may also help account for the slightly higher mean IAR scores for girls.

The relationship between sex and CLC scores is not clarified by the results of this study. No differences were found between males and females in internal control attitudes. In contrast, Lender (1968) found males more internal while Litzinger (1968) found females more internal. Davis and Lesiak (1967) found no sex differences. Clearly there is a need for further study of this issue.

Perhaps one of the most educationally relevant findings in this study is the confirmation, in part, that a student's locus of control score may be related to his level of scholastic achievement. It was found on the I (+) and I (-) scales that high internal subjects, of both sexes, had higher reading achievement scores than low internal subjects. The I (+) and I (-) scales were significant at the .05 level while I (total) narrowly missed this level and was significant at the trend level. The failure of the high internal scores to predict arithmetic achievement seems partially explained by factors existent in the measuring instrument. Reference to Table 29 in Appendix E indicates that the standard deviation for arithmetic scores was approximately one half grade level. This is approximately one half the size of the standard deviation for reading scores. Inspection of test protocols revealed that the majority of subjects worked approximately the same
number and types of problems but did not proceed above a certain level. The result was a relatively constricted range of scores which precluded differential prediction of achievement. Possibly if a test with a higher ceiling level was used, the results would be comparable to those found for reading scores.

Compared to previous findings by Crandall, et al. (1965, 1968), the results of the present investigation are similar. Children who are more highly internal on either IAR subscore or total test score consistently attain higher academic performance, either in terms of report card grades or achievement test results. It was not found, however, in this study that a boy's belief in self-responsibility for failure was more associated with achievement test scores than beliefs relative to success experiences. I (+) and I (-) scores were most strongly related to reading achievement, followed by I (total) scores.

These findings add some support to the conceptualization of Crandall which suggests that the locus of control concept may represent a motivating propensity which helps account for individual differences noted in achievement behavior. Knowledge of the orientation and strength of personal control expectancies would seem important considerations for the educator in making differential predictions of learning. If the internal child displays greater effort, initiative and
persistence in school and this is indirectly reflected in the
degree to which knowledge has been acquired (achievement), then
consideration needs to be given to the modifiability of outcome'
expectancies toward the internal orientation.

The predicted relationship between internal attitudes and
reflection in problem solution was not supported by the data.
Thus, knowledge of the locus of control score as not predictive
of behavior on the reflection-impulsivity dimension. Lender
(1968) also found that CLC and MFF scores were not related and
proposed the explanation that an internal attitude may be pre­
dictive of impulsive behavior in one situation and reflective
behavior in another. In a high response uncertainty problematic
situation the internal subject may respond at varying tempos
as dictated by his attitude, while the external subject may
respond in a stereotyped manner as soon as he had selected a
response. At present, an alternative explanation is suggested
for this finding.

It would appear of critical importance to investigate
whether the nature of the task and the basic directions of the
MFF measure suggest a skill or chance orientation. If it is a
skill orientation then it would be expected that high internal
Ss would take longer in selecting and evaluating the response.
Such behavior would be consistent with previously mentioned
research on learning expectancy, risk task, etc. However,
it is conceivable that under a chance orientation the high internal Ss would respond with quicker response times and less effort since as chance situation it would be beyond their personal control. Hock (1968) in her study on the reflection-impulsivity dimension suggested that under "gamelike" directions disadvantaged children responded in a more impulsive fashion. Possibly "gamelike" directions suggested a chance orientation. To summarize, it appears of consequence to suggest that only under skill conditions would high internal Ss express a more reflective orientation than low internal Ss. Data could be obtained on this issue by constructing skill versus chance directions for the MFF and noting differential behavior between high external and high internal Ss. Such a recommendation is made as an implication for further research.

The fact that priority status was not a major source of variance on the MFF scale is not unexpected. Although previous studies have suggested that culturally disadvantaged children are more impulsive than advantaged (Hock, 1967; Schwebel, 1967), the present study did not identify specific children as disadvantaged. Intelligence was, however, related to the reflection-impulsivity dimension. Brighter children responded in a reflective orientation.

The results of the factor analyses were consistent in the extraction of five underlying factors in the correlation
matrix. Of particular interest were the factors dealing with internal-external control and the reflection-impulsivity dimension. Reflection-impulsivity was extracted as a single factor with RT, E, and Composite scores indicating highest loadings. In terms of locus of control, however, I (+) and I (total) were extracted as one factor while I (-) and I (total) were the other. This suggests that the two orientations, outcome responsibility for success and for failure, should be considered separately. Apparently using only the I (total) score would tend to hide significant differences within the children.

Summary

The present study has investigated the locus of control variable in relation to a number of demographic and behavioral variables. Of primary importance was the possible relationship between the locus of control dimension and learning, specifically school achievement. It seemed logical to suggest that a child who felt that success or failure was a consequence of his own behavior may demonstrate greater effort and persistence in intellectual tasks than a child who felt that he had little or no control over outcomes. Internal control attitudes, therefore, would be predictive of measures of academic competence, such as achievement scores. The locus of control variable could then be considered a pertinent
variable in accounting for individual differences in learning and achievement.

Previous research had suggested that culturally and socially disadvantaged groups expressed stronger external feelings of control. The relationship between residence in an area characterized by low socioeconomic status and locus of control was investigated. Battle and Rotter (1963) felt that persons from the lower social strata were by reason of their vocations, lack of education and little money, in positions of less power to control the events which influence their lives. They consequently expressed limited feelings of internal control. It was felt that children raised in limited power surroundings might also tend to exhibit a lower expectancy of self responsibility or control.

The relationship between locus of control and the reflection-impulsivity disposition was investigated in that both are generalized expectancies which operate across various situations and have been related to age, social class, intelligence, and ethnic variables.

In summary, of the four major hypotheses, three were not supported. Residence in an area characterized as high priority status was not related to perceived feelings of control or to the reflection-impulsivity disposition. However, intelligence was positively related to both dimensions. The more intelligent subjects not only assumed more reinforcement
responsibility but also tended to handle response uncertainty situations in a reflective manner. Internality was not related to reflectivity when the variable of intelligence was controlled. Higher achievement scores in reading were related to higher feelings of internal control on the IAR scale but not the CLC scale. Subjects of both sexes who expressed strong feelings of outcome responsibilities generally read at a higher level than children with reduced internal control feelings. This finding did not hold true for arithmetic scores. Also, on the IAR scale, it was found that even at the third grade level girls expressed small but significantly stronger feelings of internal control than males.

Limitations

The sample included a total of 120 children with 30 children in each priority status-sex comparison group. A comparison of distribution and variability of intelligence and age scores among groups suggests that the results are not confounded by differences in intelligence or age. The sample, however, was not representative of a wide range of socioeconomic, racial or cultural differences. Only rural, white, working class, and suburban backgrounds were represented. Also, only the extremes of the socioeconomic continuum in one
school district were considered. Schools with highest percentages of disadvantaged children were compared to schools with the lowest percentage of disadvantaged children. Results should be considered in the context of these sampling limitations.

As is true of most psychological research, measurement limitations are the most crucial. The CLC and IAR scales are relatively new measures of the internal-external construct. The available evidence on the construct validity of the scales has come from predicted differences in the behavior of individuals expressing high and low internal control attitudes. Extensive research has not been achieved on these scales when compared to the adult version of the internal-external scale. With the exception of the basic normative data gathered by Bialer and Crandall, the reliability and discriminant validity of the CLC and IAR scales have not been fully established.

Design limitations consist primarily of lack of follow-up or reliability data on the same sample and the use of three examiners in data collection. While all examiners were trained in the administration of the instruments, subtle individual differences could have existed in presentation and recording of responses. Scoring was accomplished by one examiner and this does not appear to be a confounding factor.

Three of the measures (CLC, IAR, IQ) used in this study were group forms and group tests are generally considered to
be less accurate than psychological instruments that are administered individually. To some extent the sample size tends to counterbalance the error variance. The results should, therefore, be interpreted in the context of group measurement limitations.

**Implications for Further Study**

One of the purposes of this study was to investigate the relationship between how young children view behavior-reinforcement contingencies and their achievement behavior in school. In retrospect, it would appear that motivational factors are only indirectly reflected in achievement scores. Motivation is reflected only in the degree to which the child has acquired previous knowledge. If a belief in self-responsibility constitutes a motivational influence upon achievement performance, then it would appear important to investigate behaviors which are clearer reflections of motivational determinants. Possible measures might include task persistence and task striving. Grades may or may not reflect motivational factors based on their use. If they are assigned on the student's approach behavior such as effort, class participation, completion of extra assignments, etc., then grades may be a good measure of motivational factors. One of the implications for further study then is to investigate the relationship between self-responsibility scores and measures
where motivation clearly accounts for a larger proportion of variance.

The finding that the children expressed internal orientations on the IAR scale above those expected by chance has two possible interpretations and two subsequent implications for further study. First, it could suggest that self-responsibility is a characteristic which develops and is measurable in children as early as the third grade. If this is true, then it would be important to extend the locus of control dimension below the third grade level. At what point in development do children of differing ethnic group membership and culture express self-responsibility attitudes? Would it be possible to differentiate children on this dimension as they enter school? To answer these questions, no doubt, an instrument other than the forced-choice approach would need to be developed to measure this dimension.

A second interpretation of the high mean score on the IAR scale is that there are a number of non-discriminating items on the scale which elicit or "pull" an internal response from most children. If this is accepted, then it would appear that further refinement of the instrument is needed through item and factor analyses. This investigator accepts both interpretations as true. While there are some non-discriminating items, sufficient individual differences in responses have been found to allow predictions to behavioral correlates with
accuracy. Therefore, a refinement of instruments and extension below the third grade seem a beneficial source of study. Also, it would be of interest to further establish the relationship between the various locus of control scales and a measure of social desirability. This would provide further evidence as to the discriminant validity of the scales.

At the present stage of knowledge more work needs to be done to search for the antecedents of external control orientation. Little work has been done in the area of parental attitudes, discipline and socialization practices, although it has been found that the first-born and children from larger families tend to be more internal. From what sources and how do children learn their attitudes of internal versus external responsibility for outcomes?

Generally it would appear that prior to serious consideration of the question of whether attitudes of external control can be modified, further information is needed on the behavioral correlates of this dimension. The various interrelationships among need for approval, expectancies, academic achievement, locus of control and self-esteem, require further exploration. As indicated, other achievement criteria such as grades, persistence, curiosity, occupational preferences and choices should be considered.

A further implication for further study is based on the finding that the locus of control dimension was not related
to the reflection-impulsivity dimension. As mentioned previously, it would be of interest to develop new directions for the MFF scale, one clearly emphasizing a skill condition and one clearly emphasizing a chance condition. It would be predicted that under skill conditions internally oriented Ss would take longer to decide on a matching standard than externally oriented Ss and appear more reflective.

The final implication for investigation rests on the basic assumption that the effects of a reinforcement following a behavior is not a simple stamping-in process but depends on the perception of a causal relationship. Would techniques of "behavior modification" be equally effective with individuals considered high in external control as those judged high in internal orientation?
CIRCLE "YES" OR "NO" FOR EACH QUESTION

Yes  No  1. When somebody gets mad at you, do you usually feel there is nothing you can do about it?
Yes  No  2. Do you really believe a kid can be whatever he wants to be?
Yes  No  3. When people are mean to you, could it be because you did something to make them be mean?
Yes  No  4. Do you usually make up your mind about something without asking someone first?
Yes  No  5. Can you do anything about what is going to happen tomorrow?
Yes  No  6. When people are good to you, is it usually because you did something to make them be good?
Yes  No  7. Can you ever make other people do things you want them to do?
Yes  No  8. Do you ever think that kids your age can change things that are happening in the world?
Yes  No  9. If another child was going to hit you, could you do anything about it?
Yes  No  10. Can a child your age ever have his own way?
Yes  No  11. Is it hard for you to know why some people do certain things?
Yes  No  12. When someone is nice to you, is it because you did the right things?
Yes  No  13. Can you ever try to be friends with another kid even if he doesn't want to?
Yes  No  14. Does it ever help to think about what you will be when you grow up?
Yes  No  15. When someone gets mad at you, can you usually do something to make him your friend again?
<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>16. Can kids your age ever have anything to say about where they are going to live?</td>
<td>Yes</td>
</tr>
<tr>
<td>17. When you get into an argument, is it sometimes your fault?</td>
<td>Yes</td>
</tr>
<tr>
<td>18. When nice things happen to you, is it only good luck?</td>
<td>Yes</td>
</tr>
<tr>
<td>19. Do you often feel you get punished when you don't deserve it?</td>
<td>Yes</td>
</tr>
<tr>
<td>20. Will people usually do things for you if you ask them?</td>
<td>Yes</td>
</tr>
<tr>
<td>21. Do you believe a kid can usually be whatever he wants to be when he grows up?</td>
<td>Yes</td>
</tr>
<tr>
<td>22. When bad things happen to you, is it usually someone else's fault?</td>
<td>Yes</td>
</tr>
<tr>
<td>23. Can you ever know for sure why some people do certain things?</td>
<td>Yes</td>
</tr>
</tbody>
</table>
INTELLECTUAL ACADEMIC RESPONSE SCALE

1. If a teacher passes you to the next grade, would it probably be
   a. because she liked you, or
   b. because of the work you did?

2. When you do well on a test at school is it more likely to be
   a. because you studied for it, or
   b. because the test was especially easy?

3. When you have trouble understanding something in school, is it usually
   a. because the teacher didn't explain it clearly, or
   b. because you didn't listen carefully?

4. When you read a story and can't remember much of it, is it usually
   a. because the story wasn't well written, or
   b. because you weren't interested in the story?

5. Suppose your parents say you are doing well in school. Is this likely to happen
   a. because your school work is good, or
   b. because they are in a good mood?

6. Suppose you did better than usual in a subject at school. Would it probably happen
   a. because you tried harder, or
   b. because someone helped you?

7. When you lose at a game of cards or checkers, does it usually happen
   a. because the other player is good at the game, or
   b. because you don't play well?

8. Suppose a person doesn't think you are very bright or clever.
   a. can you make him change his mind if you try to, or
   b. are there some people who will think you're not very bright no matter what you do?

9. If you solve a puzzle quickly, is it
   a. because it wasn't a very hard puzzle, or
   b. because you worked on it carefully?
10. If a boy or girl tells you that you are dumb, is it more likely that they say that
   a. because they are mad at you, or
   b. because what you did really wasn’t very bright?

11. Suppose you study to become a teacher, scientist, or doctor and you fail. Do you think this would happen
   a. because you didn’t work hard enough, or
   b. because you needed some help, and other people didn’t give it to you?

12. When you learn something quickly in school, is it usually
   a. because you paid close attention, or
   b. because the teacher explained it clearly?

13. If a teacher says to you, “Your work is fine, is it
   a. something teachers usually say to encourage pupils, or
   b. because you did a good job?

14. When you find it hard to work arithmetic or math problems at school is it
   a. because you didn’t study well enough before you tried them, or
   b. because the teacher gave problems that were too hard?

15. When you forget something you heard in class, is it
   a. because the teacher didn’t explain it very well, or
   b. because you didn’t try very hard to remember?

16. Suppose you weren’t sure about the answer to a question your teacher asked you, but your answer turned out to be right. Is it likely to happen
   a. because she wasn’t as particular as usual, or
   b. because you gave the best answer you could think of?

17. When you read a story and remember most of it, is it usually
   a. because you were interested in the story, or
   b. because the story was well written?

18. If your parents tell you you’re acting silly and not thinking clearly, is it more likely to be
   a. because of something you did, or
   b. because they happen to be feeling cranky?

19. When you don’t do well on a test at school, is it
   a. because the test was especially hard, or
   b. because you didn’t study for it?
20. When you win at a game of cards or checkers, does it happen
   a. because you play real well, or
   b. because the other person doesn't play well?

21. If people think you're bright or clever, is it
   a. because they happen to like you, or
   b. because you usually act that way?

22. If a teacher didn't pass you to the next grade, would it probably be
   a. because she "had it in for you," or
   b. because your school work wasn't good enough?

23. Suppose you don't do as well as usual in a subject at school. Would this probably happen
   a. because you weren't as careful as usual, or
   b. because somebody bothered you and kept you from working?

24. If a boy or girl tells you that you are bright, is it usually
   a. because you thought up a good idea, or
   b. because they like you?

25. Suppose you became a famous teacher, scientist, or doctor. Do you think this would happen
   a. because other people helped you when you needed it, or
   b. because you worked very hard?

26. Suppose your parents say you aren't doing well in your school work. Is this likely to happen more
   a. because your work isn't very good, or
   b. because they are feeling cranky?

27. Suppose you are showing a friend how to play a game and he has trouble with it. Would that happen
   a. because he wasn't able to understand how to play, or
   b. because you couldn't explain it well?

28. When you find it easy to work arithmetic or math problems in school, is it usually
   a. because the teacher gave you especially easy problems, or
   b. because you studied your book well before you tried them?
29. When you remember something you heard in class, is it usually
   a. because you tried hard to remember, or
   b. because the teacher explained it well?

30. If you can't work a puzzle, is it more likely to happen
   a. because you are not especially good at working puzzles, or
   b. because the instructions weren't written clearly enough?

31. If your parents tell you that you are bright or clever, is it more likely
   a. because they are feeling good, or
   b. because of something you did?

32. Suppose you are explaining how to play a game to a friend and he learns quickly. Would that happen more often
   a. because you explained it well, or
   b. because he was able to understand it?

33. Suppose you're not sure about the answer to a question your teacher asks you and the answer you give turns out to be wrong. Is it likely to happen
   a. because she was more particular than usual, or
   b. because you answered too quickly?

34. If a teacher says to you, "Try to do better," would it be
   a. because this is something she might say to get pupils to try harder, or
   b. because your work wasn't as good as usual?
A sample item of the Matching Familiar Figures Test, Children's Version

The figures reproduced in this appendix represent two pages from the test. The first page presents the "standard" which is presented to the child. An identical match must then be located by the child from the array of 6 stimuli on the following page.
APPENDIX D
CELL AND MARGINAL MEAN SCORES FOR COMPARISON GROUPS

TABLE 24
COMPARISON OF MEANS FOR SEX AND PRIORITY FACTORS ON THE CLC SCALE

<table>
<thead>
<tr>
<th>Priority</th>
<th>High</th>
<th>P</th>
<th>Low</th>
<th>P</th>
<th>Total</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males</td>
<td>12.83</td>
<td>13.33</td>
<td>N.S.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>13.08</td>
<td>N.S.</td>
</tr>
<tr>
<td>Females</td>
<td>12.90</td>
<td>13.66</td>
<td>13.28</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>12.86</td>
<td>N.S.</td>
<td>13.49</td>
<td>13.18</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

TABLE 25
COMPARISON OF MEANS FOR SEX AND PRIORITY FACTORS ON THE I (+) SCALE

<table>
<thead>
<tr>
<th>Priority</th>
<th>High</th>
<th>P</th>
<th>Low</th>
<th>P</th>
<th>Total</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males</td>
<td>12.00</td>
<td>12.66</td>
<td>N.S.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>12.33</td>
<td>.10</td>
</tr>
<tr>
<td>Females</td>
<td>13.16</td>
<td>13.10</td>
<td>13.13</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Total</td>
<td>12.58</td>
<td>N.S.</td>
<td>12.88</td>
<td>12.73</td>
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<td></td>
</tr>
</tbody>
</table>

TABLE 26
COMPARISON OF MEANS FOR SEX AND PRIORITY FACTORS ON THE I (-) SCALE

<table>
<thead>
<tr>
<th>Priority</th>
<th>High</th>
<th>P</th>
<th>Low</th>
<th>P</th>
<th>Total</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males</td>
<td>10.06</td>
<td>9.90</td>
<td>N.S.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>9.98</td>
<td>.10</td>
</tr>
<tr>
<td>Females</td>
<td>11.20</td>
<td>11.00</td>
<td>11.09</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>10.63</td>
<td>N.S.</td>
<td>10.45</td>
<td>10.54</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
TABLE 27
COMPARISON OF MEANS FOR SEX AND PRIORITY FACTORS ON THE I (TOTAL) SCALE

<table>
<thead>
<tr>
<th>Priority</th>
<th>High</th>
<th>P</th>
<th>Low</th>
<th>P</th>
<th>Total</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males</td>
<td>22.06</td>
<td>.10</td>
<td>22.56</td>
<td>N.S.</td>
<td>22.31</td>
<td>.05</td>
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<tr>
<td>Females</td>
<td>24.36</td>
<td></td>
<td>24.09</td>
<td></td>
<td>24.23</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>23.21</td>
<td>N.S.</td>
<td>23.33</td>
<td></td>
<td>23.27</td>
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</tbody>
</table>

TABLE 28
COMPARISON OF MEANS FOR SEX AND PRIORITY FACTORS ON THE MFF (COMPOSITE) SCORES

<table>
<thead>
<tr>
<th>Priority</th>
<th>High</th>
<th>P</th>
<th>Low</th>
<th>P</th>
<th>Total</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males</td>
<td>9.77</td>
<td>N.S.</td>
<td>9.69</td>
<td>.10</td>
<td>9.73</td>
<td>N.S.</td>
</tr>
<tr>
<td>Females</td>
<td>9.70</td>
<td>10.94</td>
<td></td>
<td></td>
<td>10.32</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>9.73</td>
<td>N.S.</td>
<td>10.31</td>
<td></td>
<td>10.02</td>
<td></td>
</tr>
<tr>
<td>Variable</td>
<td>Males, N = 60</td>
<td>Females, N = 60</td>
<td>Total, N = 120</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-----------------</td>
<td>---------------</td>
<td>-----------------</td>
<td>---------------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mean</td>
<td>S.D.</td>
<td>Mean</td>
<td>S.D.</td>
<td>Mean</td>
<td>S.D.</td>
</tr>
<tr>
<td>C.R.</td>
<td>103.22</td>
<td>4.87</td>
<td>102.45</td>
<td>3.91</td>
<td>102.83</td>
<td>4.42</td>
</tr>
<tr>
<td>Verbal I.Q.</td>
<td>94.27</td>
<td>12.96</td>
<td>99.63</td>
<td>12.86</td>
<td>96.95</td>
<td>13.14</td>
</tr>
<tr>
<td>Performance I.Q.</td>
<td>101.17</td>
<td>15.13</td>
<td>104.20</td>
<td>15.47</td>
<td>102.68</td>
<td>15.30</td>
</tr>
<tr>
<td>Full I.Q.</td>
<td>97.90</td>
<td>12.73</td>
<td>102.13</td>
<td>13.27</td>
<td>100.02</td>
<td>13.12</td>
</tr>
<tr>
<td>C.L.C.</td>
<td>13.08</td>
<td>2.81</td>
<td>13.28</td>
<td>2.77</td>
<td>13.18</td>
<td>2.78</td>
</tr>
<tr>
<td>IAR (+)</td>
<td>12.33</td>
<td>3.83</td>
<td>13.13</td>
<td>2.44</td>
<td>12.73</td>
<td>2.66</td>
</tr>
<tr>
<td>IAR (-)</td>
<td>9.98</td>
<td>3.18</td>
<td>11.10</td>
<td>3.79</td>
<td>10.54</td>
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</tr>
<tr>
<td>IAR (total)</td>
<td>22.32</td>
<td>4.72</td>
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<td>4.94</td>
<td>23.28</td>
<td>4.90</td>
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<td>MFF Reaction Time</td>
<td>14.71</td>
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<td>8.07</td>
<td>15.33</td>
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<td>MFF Error</td>
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<td>5.43</td>
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<td>5.32</td>
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<td>MFF Composite</td>
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<td>10.32</td>
<td>2.29</td>
<td>10.03</td>
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<td>4.03</td>
<td>1.24</td>
<td>3.84</td>
<td>1.30</td>
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<tr>
<td>Arithmetic</td>
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<td>0.59</td>
<td>3.71</td>
<td>0.64</td>
<td>3.68</td>
<td>0.61</td>
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</table>
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