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A COMPARISON OF THE LOCUS OF CONTROL OF CHILDREN
IN THE GIFTED AND AVERAGE RANGES OF INTELLIGENCE

DISSERTATION

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

By
Joan Lynne, B.S., M.A.

* * * * *

The Ohio State University
1979

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Chapter I is a brief introduction to the problem area which is the subject in this dissertation. The importance of the study will first be discussed followed by a statement of the need, the significance of the study and finally the definition of terms used in the study.

Importance of the Study

Leaders today are looking for solutions to many diverse problems. To help themselves intelligently think through some of those problems, leaders need to turn to those people who have demonstrated the necessary intelligence and training in specific areas. At no time in man's history has it been more important to recognize special giftedness in individuals. Although society has recognized those with talents in many areas, such as athletics, music, art and acting, there has not been a consistent effort to recognize those who are talented intellectually. Although there is a resurging interest in giftedness in general, public schools do not consistently recognize and appropriately meet the needs of the gifted.

Using our gifted resources wisely could help bring more tenable solutions to some of the major world problems such as the Arab-Israeli conflict, over-population, hunger, and struggles for power. Nationally, the United States is faced with serious concerns such as energy problems,
increasing crime, and inflation. At a time when there is a need for more intelligent leadership, the public is showing concern with education, as shown in the Gallup Poll, Proposition 13, the press for competency testing, concern for declining test scores, and tax levy failures (Gallup, 1978).

There appears to be a need world-wide, nationally, and locally for gifted humanitarian leaders to help all people use their potentials to the fullest. Using gifted talent wisely involves the recognition of the importance of individual differences and the unique contributions that can be made by many when these individual differences are recognized and developed.

According to Wallach (1962), recent years have witnessed a tremendous growth in the interest of individual differences in cognitive processes. Individual differences can be viewed in many ways. Holtzman (1965) chooses to discuss three dimensions of individual differences, namely intelligence, cognitive styles, and personality. Wallach (1962) discusses cognitive styles as bridges between intelligence and personality. These three dimensions of individual differences will be briefly discussed.

Intelligence refers to a construct which produces a psychometrically determined score and is best construed as the potential for academic ability. According to Whimbey (1975), intelligence should not be understood as a unitary dimension, but rather as a multidimensional construct. Most psychologists agree that intelligence is "what an intelligence test measures," but this definition is circular and really does not describe intelligence. Lewis Terman (1925) defines intelligence
as "the ability to do abstract thinking." Whimbey (1975) states that:

Intelligence is the skill that assists in the learning (the mental reconstruction) of relations that are not perceived immediately, but require active analysis. Thus, while IQ tests do not measure overall innate learning potential, they do reflect a broad and useful acquired learning ability. (p. 79)

In discussing personality, Hall and Lindzey (1970) recognize the difficulty in defining it accurately because "personality is defined by the particular empirical concepts which are a part of the theory of personality employed by the observer. In other definitions, personality is equated to the unique or individual aspects of behavior."

For the purpose of this study, individual differences will be examined most closely as they are reflected in cognitive styles. Broverman (1960) defines cognitive styles as "relationships between abilities within individuals." He describes them as "second-order individual differences" as opposed to first-order individual differences which are based on normative differences between individuals. Holtzman (1965), in discussing cognitive styles states:

The way in which an individual organizes an amorphous perceptual field, the manner in which he deploys his attention in scanning a stimulus, the extent to which he is analytical rather than global in his approach to categorizing familiar objects, and the degree to which he can overcome conflicting perceptual cues in coping with a specific problem are just a few of the ways in which variation in cognitive style can be expressed. Different cognitive styles can be thought of as stable individual differences in mode of perceptual organization and conceptual categorization of the external environment. (pp. 320-321)

Cognitive styles refer to the way individuals process information, while ability refers to the individual's measured strengths as he
performs tasks. For example, given a task of assembling a puzzle, a child's cognitive style, such as impulsivity, can influence how well he arranges the puzzle pieces, or his ability to assemble the puzzle.

Examples of cognitive styles include fixed dependence-independence (Witkin, 1962), reflection-impulsivity (Kagan, 1965), leveling-sharpening (Gardner, 1959), automatization-non-automatization (Broverman, 1966), and locus of control (Rotter, 1965). Examples of abilities, as measured on many tests of general ability include general reasoning, auditory memory, concept formation, perceptual organization, and speed of mental operations.

Within the broad area of cognitive styles, this study will investigate one specific style—locus of control. Locus of control refers to "the degree to which persons believe that they, rather than someone or something else control and are responsible for the events which occur in their lives" (Katkovsky, Crandall, & Good, 1967). People who believe that they have some control over what happens in their lives are said to possess an "Internal Locus of Control," or are referred to as "Internals." Those people who feel that the events and outcomes in their lives are determined by factors outside of themselves are said to possess an "External Locus of Control," or are referred to as "Externals." Care should be taken to understand that the I-E Construct must be seen as a continuum rather than as a dichotomous concept. A person would rarely be entirely internal or external, but rather would be more internal than external or more external than internal. Although persons could be compared according to internal test scores, no across test formula or
method has been derived to use in describing someone's degree of internality. Literature merely refers to a person as "more internal" or "more external."

The I-E Construct has its origin in Rotter's Social Learning Theory, which stresses the "interaction of the individual and his meaningful environment" (Rotter, 1954). In his theory, Rotter also emphasized learned social behavior, stable, consistent behavior over time, the purposefulness of behavior and states that "the occurrence of a behavior of a person is determined not only by the nature or importance of goals or reinforcements but also by the person's anticipation or expectancy that these goals will occur" (Rotter, 1954).

The locus of control concept is based upon social learning theory and its views that behavior is learned in part by the reinforcements received as a result of the behavior. The concept of reinforcement is central to the locus of control construct. Social learning theory views behavior as being learned as a result of previous reinforcement following behavior. Thus, an individual builds expectations for future reinforcements based on reinforcement history. With this in mind, a person is more internal when he learns and adapts his behavior to fit these anticipated reinforcements. An example of internal behavior in a child would occur when he studies hard for a test because he knows that his grades have been higher in the past when he studied for tests. He feels that he has a large amount of control over his environment.

In addition to the increased interest in individual differences and locus of control, there is a present increase in the interest in
the area of giftedness. This study will examine the concept of locus of control as it applies to children of gifted and average intelligence.

Statement of the Need

Lewis Terman (1925), in his Genetic Studies of Genius, was the first to provide research showing the superior multidimensional traits of the gifted. Previously, misconceptions concerning gifted children, widely believed before Terman's research, and believed by many still today, stemmed from the writings of early men, such as Lombrosa (1895) and Nisbet (1895), who attempted to link genius with insanity. Although there is evidence that children scoring in the highest ranges of intelligence (over 180) do exhibit adjustment problems not found prevalent among those in the average range of intelligence (Hollingworth, 1926), it is now known that gifted children, in general, are better adjusted than children in other intelligence ranges. According to Berelson and Steiner (1964), Terman's study contradicts the former myths that gifted children are developmentally slow in other areas. In this study, the gifted children were shown to remain superior in health, physique, personality, character traits, academic skills, and subsequent success. Maladjustment, instability, and psychosis occurred less frequently than in the general population.

Lightfoot (1951) was one of the earliest researchers to study the personality differences between the gifted and the non-gifted. Synthesizing her overall findings in terms of Murray's "needs," she found that bright children were more outgoing, sociable, independent, curious, and creative, whereas the non-gifted children were more withdrawn, dependent, and highly self-protective.
Other research which documents the exceptionality of gifted children in areas other than intelligence include Jerecky's (1959) findings that gifted adolescents are more socially gifted, Torrence's (1960) work with creativity, Getzels-Jackson's (1962) research dealing with the high moral courage found in gifted children, and Lucito's (1964) finding that gifted children were significantly less conforming to their peers than were non-gifted children.

It is apparent from the above research findings that intellectually gifted children do possess other achievement, social, and adjustment characteristics which cluster them together in the top percentage in many diversified areas. These findings indicate a need for extensive research to be done in the field of giftedness so that there can be maximum understanding of how gifted children learn and behave, how they deal with life situations, and what antecedents to behavior are present.

Good research in the area of giftedness has not been substantial in recent years. Terman's early works sparked an interest and initial research in the gifted, but it appears, from the lack of current research, that this interest has not been sustained. Newland (1976) discussed four reasons why, since the 1960's, the gifted have been increasingly considered outside the domain of special education. Because of the current emphasis on the handicapped, these same reasons can be considered contributing to the lack of a substantial body of good research in the gifted area.

1. State legislation for the handicapped has been in effect for a long time and has increased considerably in the last several
years. As a result, the number of children served and the educators prepared to work with the handicapped is large. The same people are not properly equipped to work with the gifted. Administrators have been hesitant to ask for additional funds for the gifted. Although in many places the handicapped and gifted are to be served by the same administration, the administrator prefers that they be separate and consequently, the gifted program is ignored, or slighted.

2. Society responds differently to the handicapped than to the gifted. The handicapped evoke more emotional responses, and therefore are more powerful for promotional purposes. A gifted child does not look different from other children.

3. Handicapped children need special provisions that can be easily recognized, such as braille equipment, ear phones, special learning materials, while the gifted need availability to carefully planned materials and "cognitive nurturance." The tangible items of the handicapped program are easier to understand than the conceptual planning necessary for the gifted.

4. The prevalence in our society of the feeling that "the gifted will learn in spite of what they are taught" helps to keep the gifted program from receiving its fair share of educational programming monies.

All of the above affect the amount of effective programs for the gifted, and in turn, the money available for research in the gifted
domain. Much of the gifted research has looked at what and how children learn, but almost no research has explored the cognitive styles of the gifted.

The author of this paper cites the following four reasons for the importance of studying the cognitive styles of the gifted.

1. Through the knowledge of what cognitive styles are most frequently associated with the gifted, it is possible that one additional facet would be available that could eventually fit into a comprehensive identification process of the gifted.

2. As teachers and other educators become more aware of the learning styles of the gifted, planning and programming for the gifted could incorporate these findings. Curriculum materials and the manner of instruction could both reflect these learning styles. This, of course, opens a new area of research--that of studying the effects of applying what we know about cognitive functioning to the instructional process.

3. The area of the gifted underachiever is one of interest to many. Perhaps by having identified cognitive styles generally associated with the gifted, it would be possible to attempt to change the cognitive style behavior of these underachievers and therefore help them to achieve closer to their potential. This is only in the stage of possibility, but certainly it opens more research possibilities since much attention is being given to the effects of attempting to change the direction or degree of locus of control.
4. A natural question arising from adequate cognitive functioning research with the gifted would be, "Do children function differently in cognitive styles because they are gifted, or are they gifted, at least partly, because of their styles of cognitive functioning?". With increased research in the area of cognitive styles, perhaps this question can be answered.

The following reasons can be cited as influencing the large amount of current locus of control research, and therefore, can be considered as important justifications for this research.

1. According to Robinson and Shaver (1976), the popularity of the locus of control construct is greatly due to its social relevance today. This is shown in the large amount of research that deals with locus of control and social issues of the day, such as alcoholism (Goss & Morosko, 1970) and drug addiction (Beizin & Ross, 1973). At a time when society is demanding relevance of its social, political, educational institutions, it is apparent that social learning theory, and its offspring, the I-E Construct would gain in popularity.

2. The generalizability of the I-E Construct is being widely recognized. Research is relating it to diverse areas, such as achievement (McGhee & Crandall, 1968), parental attitudes (Chance, 1965), hospitalized patient behavior (Seeman & Evans, 1962), depression (Abramowitz, 1969), civil rights activities (Gore & Rotter, 1963), and many others.

3. There is appearing in the research an increasing amount of evidence supporting the desirability of attempting to change
behavior in the direction of internality. As a result, methods are being developed to systematically change behavior in this direction (MacDonald, 1972).

Although some research has shown a relationship between locus of control and mental age (Bialer, 1961), the specific area of giftedness has not been related to locus of control. With this in mind, the following questions will be answered in this research.

1. What is the relationship between locus of control and ability?

2. Is there more variance within the gifted child population than the average intelligence range child population on measures of locus of control?

3. Does the relationship between achievement and locus of control scores confirm previous research (Coleman, 1966)?

In addition to the above three questions, this study, in an exploratory fashion only, will look at the factor structures to see if they are different on locus of control measures for gifted and average.

Despite the amount of literature in the area of cognitive styles, very little research has examined cognitive styles in the gifted. Gifted research, in general, is scarce, and good gifted research is even more scarce. Adding to this the almost non-existent gifted research on cognitive styles, it is not difficult to establish a need for research on the cognitive styles of the gifted, in this instance, the locus of control of gifted children.

Significance of the Study

In a world that is demanding more accountability in the schools, psychology and education must join forces and come to a better
understanding of how children learn and how educators can then use these findings in everyday teaching. It is important and necessary to understand these relationships so that they can be of practical value to educators today.

Coleman in his often referred to "Coleman Report" (Coleman, Hobson, McPartland, Mood, Weinfield, & York, 1966) was one of the first to demonstrate that a feeling of personal control is an important determinant of achievement. His work emphasized the important role that a child's locus of control can play in his academic achievement. Coleman's study, based on a large sample of children, found that their attitudes concerning their control over their lives had a stronger relationship to achievement than factors dealing with the school environment.

Of all the various school variables in the Coleman Report (1966), a sense of control over the environment:

- is more strongly related than any other variable to achievement...achievement or lack of achievement appears closely related to what they believe about their environment, whether they believe the environment will respond to reasonable efforts, or whether they believe it is instead merely random or immovable. (pp. 320-321)

Several additional studies relate I-E with achievement. Brown and Strickland (1972) found a significant correlation between GPA of college seniors and internality for males, but not females. Chance (1965) found a relationship between achievement and the IAR, including reading, math, spelling, and I.Q. In general, the data suggest some relationships between internality and school achievement.

With the above relationship strongly suggested by research, the implications for this study are as follows.
1. Because of the importance of the relationship between achievement and locus of control, and because the relationship between giftedness and locus of control has not been studied, the information gained will be valuable in gaining a more complete picture of gifted children, and how and why they learn. A possible question for future research arising from this study could be "Given children of equal giftedness, is there a significant relationship between their achievement and locus of control as compared to children on another level of giftedness?".

2. Since there is evidence of much research presently being conducted on method of changing locus of control, the information gained from this study could be useful in applying some of this change knowledge in the gifted field. This would mean that the locus of control concept would be an important part of the planning and programming in gifted education.

3. The results of the comparison of three locus of control measures for children could provide some insight into the usefulness of those measures to determine internal locus of control in gifted children. Possibly it could lead additional studies to be undertaken to devise even more accurate locus of control measures.

In summary, although much has been written separately about the gifted, cognitive styles, and the locus of control concept, the relationship between any of these is not clearly delineated. This study
investigates the relationship between locus of control scores and IQ scores of children in the gifted and average ranges of intelligence. Additionally, the three acceptable locus of control measures for children will be compared. Achievement in reading, spelling, and math also will be compared to ability and locus of control for both groups.

Definition of Terms

1. **Gifted**: A child will be considered gifted who scores between 125-145 on an individually administered intelligence test.

2. **Average Intelligence**: A child will be considered of average intelligence who scores between 90-110 on a group administered intelligence test.

3. **Intelligence**: According to Whimbey (1975), it is "the skill that assists in the learning of relations that are not perceived immediately, but require active analysis." It manifests itself in the potential for academic ability.

4. **Cognitive Style**: A cognitive style refers to the way in which a person learns, or processes information. This style can be the basis for predicting how a person will react in different situations.

5. **Locus of Control**: Locus of Control is a cognitive style which is measured by the degree to which persons believe that they, rather than something or someone else, control the events in their lives.

6. **Internal Locus of Control**: Those persons who feel that they have some control over what happens in their lives are considered to have an Internal Locus of Control.
7. **External Locus of Control:** Those people who feel that someone or something outside of themselves controls what happens in their lives are considered to have an External Locus of Control.

8. **Internal +:** An Internal + score indicates the degree to which persons feel that they control the positive events that happen in their lives.

9. **Internal -:** An Internal - score indicates the degree to which persons feel that they control the negative events that happen in their lives.

**Organization**

Chapter I has included an introduction, statement of the problem, statement of the need, implications of the study, definitions of terms, and organization of the dissertation. Chapter II presents a relevant review of the literature pertaining to the study. Chapter III discusses the methodology and statistical treatments used. Chapter IV describes and discusses the results of the study. Chapter V includes the conclusions derived from the study, implications from these conclusions, recommendations for further research and a summary of the study.
CHAPTER II
LITERATURE REVIEW

This chapter will review the literature pertaining to the locus of control construct, especially as it is related to intelligence, achievement, sex, and giftedness. Because of the large volume of literature which has been written about locus of control, it is impossible to review all articles for this chapter. Several literature reviews have been written on the subject (Joe, 1971; Lefcourt, 1976; Minton, 1976; Phares, 1976; Rotter, 1966). This chapter will review only research which is most relevant to the issues being studied.

Learning Theory

The locus of control construct can best be understood through a knowledge of its early conception, which stemmed from social learning theory (Rotter, 1954). In Rotter's theory, a person's values, expectations, and the present situation all are predictors of a person's actions. The place of personal control within social learning theory can be explained by Rotter's formula: \( NP = f (FM + NV) \), i.e., the potentiality of occurrence of a set of behaviors that lead to the satisfaction of some need (need potential) is a function of both the expectancies that these behaviors will lead to these reinforcements (freedom of movement) and the strength or value of these reinforcements (need value). Freedom of movement is the basis for the locus of control concept (Lefcourt, 1976).
Rotter (1954) defined freedom of movement as "the mean expectancy of obtaining positive satisfactions as a result of a set of related behaviors directed toward the accomplishment of a group of functionally related reinforcements. A person's freedom of movement is low if he has a high expectancy of failure or punishment as a result of the behaviors with which he tries to obtain the reinforcements that constitute a particular need" (p. 194).

Within the concept of "freedom of movement" is the construct of "perceived control," which refers to a person's expectancy of what happens to him as being externally or internally controlled. Internal control refers to the perception of events as being a consequence of one's own actions while external control refers to the perception of the causation of events being related to the actions of someone or something outside of himself.

Children who are "internal" perceive that their actions will influence the outcomes of their behavior. In turn, their outcomes or "reinforcement" for their behavior will influence their future behavior. A cycle is then set in which their internality helps them perform in the way in which they will be reinforced in a satisfactory way to them.

In 1954, for the first time, a student of Rotter's, E. Jerry Phares, was engaged in psychotherapy with a patient, who, according to Phares, did not perceive a relationship between his actions and the events that then occurred in his life. The patient saw behavior outcomes as
externally controlled in all instances. From this psychotherapy experience came the early thinking of the locus of control construct (later defined by Rotter in 1966).

In 1957, Phares experimented with the idea that expectancies for success will differ under chance and skill conditions (Phares, 1957). His study, allowing subjects to bet chips, under "chance" or "skill" conditions, provided an indication that knowledge of a subject's perception of control is useful in predicting his behavior. James and Rotter (1958) confirmed these findings.

Before a cognitive style can be useful, it must be shown that it is consistent over time. Witkin, Goodenough, and Karp (1967) reviewed studies with adults which show marked stability for several measures of differentiation. Using drugs, stress, training and electroconvulsive shock, the researchers were unable to change scores on the rod-and-frame test, which measures field dependence. Although when re-tested, the subjects suffered amnesia, and therefore were coming to the testing situation as though for the first time, they showed very little change in their scores, and the test-re-test correlation was high (.88, p.<.01). Other adult studies using various cognitive styles (Bauman, 1951, Kraidman, 1959) show that stability over time was absolute in the sense that not only were test-re-test correlations high, but mean scores were not significantly different. According to Goldstein and Blackman (1978), the reliability for the various measures of cognitive styles seem to be adequate with the exception of cognitive complexity. Reliability
studies are usually interjudge (integrative complexity) or test-re-test over a short period of time because alternative forms are usually not available.

The phenomenon of stability, during growth years is, however, more pertinent to the subject of this paper. According to Witkin (1967), during growth years there appears to be relative stability and test-re-test scores are high. A longitudinal study of field-dependence-independence showed continuity and relatively little change in the cognitive style studied. It should be noted that Witkin chose subjects from stable homes who were living in stable environments.

However, it has been shown that although a person tends to be "internal" or "external" in general, specific situations, such as a life crisis, can temporarily change the degree of internality. Studies have shown that locus of control does remain stable by returning to the original locus of control following the crisis or situation. For example, McArthur (1976) found that students became more external when their status was affected by the draft lottery, but that, if they were not actually drafted, they returned to their original internality. Brecher and Denmark (1972) found students to be temporarily more external immediately following negative feedback on a course exam. Phares (1976) states that "I-E changes that are obtained following brief, highly specific experiences probably are specific to that situation (and will be reflected only on an I-E Scale administered in that context) and are not relevant to a large number of situations" (p. 163). In all of the studies, I-E is shown to return to its original orientation
following a crisis. This consistent return demonstrates the basic stability of the locus of control construct.

**Scales of Measurement**

As is frequently the case in personality research, the greatest period of interest in locus of control came when an assessment scale was designed for its measurement. From his previous studies with chance-skill situations, Phares (1955) developed a short Likert-type scale containing 26 items that attempted to measure internal control by demonstrating that those who chose skill items would expect the reinforcements most associated with skill instructions. The test was not entirely successful, but it did pave the way for later measures in locus of control. Later, the James-Phares Scale (James, 1957) was comprised of 26 items which reflected revisions and improvements from the original Phares Scale.

More systematic scale developments followed in which Rotter, Liverant, and Crowne (1961) and later Rotter, Liverant, and Seeman (1962) developed the Rotter Internal-External Control Scale, often referred to as the I-E Scale, and the one used in most locus of control research involving adults. The Rotter I-E Scale, because of its generalized nature, showed that most measures of locus of control are additive, which means that the items sample I-E feelings over a wide range of situations and attitudes, such as school, social, and job-related. This additive quality, although allowing for more generalizability, does lessen the ability to predict for specific situations. According to
Phares (1972), this additive nature "has resulted in the moderate but rather uniform set of internal consistency estimates reported by Rotter (1966)."

In addition to being considered an additive scale, Rotter's I-E Scale is also considered to be multidimensional rather than unidimensional. This means that a person who is "internal" could attribute his internality to several different components, such as parent guidance or school success. Some early work was done in attempting to factor analyze the I-E Scale (Franklin, 1963), but the small number of items does not lend itself to clear-cut definitive factors that could be used in the construction of subscales.

Mirels (1970) was the first to report on finding two factors in Rotter's scale, one dealing with felt mastery over the course of one's life and the other dealing with individual influence on politics. Others have found similar results (MacDonald & Tsenz, 1971; Reid & Ware, 1973). Schneider and Parsons (1970) came up with five factors in the I-E Scale, namely luck, respect, politics, academics and leadership, and success. Although there is much agreement regarding the multidimensionality of I-E, there is disagreement as to degree. According to the method of factor analysis used and the population studied, investigators have found two, three or five or more factors.

Some additional work has generated other locus of control scales for adults, although none has come into wide use. Locus of control scales have been constructed by Dean (1961), Lessing (1969), Gurin, Gurin, Lao, and Beattie (1969), Powell and Vega (1972), and Nowicki and Duke (1974).
Because of the increased interest in measuring locus of control and the inappropriateness of earlier measures for children, the Intellectual Achievement Responsibility Questionnaire (IAR) was developed by Crandall, Katkovsky, and Crandall (1965). It is probably the most used measure of I-E for children today. Several features are unique with the IAR. It measures locus of control solely in academic-school related situations, and it involves only the children's involvement with significant others--teachers, parents, and students. Also, the IAR yields not only a total internal score, but also subscores of internal for positive situations (I+) and for negative situations (I-). It stands as a fairly reliable predictor of locus of control in children in the school setting.

Bialer (1961) constructed the Children's Locus of Control Scale, which consists of 23 yes-no questions. Nowicki and Strickland (1973) constructed the Nowicki-Strickland Scale for Children (CNS-IE) which can be used with children in grades 3-12. Because the three children's scales cited, the IAR, Bialer, and Nowicki-Strickland, are the only three widely used measures of locus of control for school-age children, and because no study has used all three tests on the same population, they are included in the measures given to the subjects in this research.

I-E and Intelligence

Many studies attempting to relate I-E with intelligence and achievement have produced conflicting results. In general, the studies have not supported a significantly high correlation between I-E and intelligence. At the Fei's Research Institute (Crandall, Katkovsky, & Preston, 1962) the IAR was significantly related to intelligence for boys (r=.52, p<.05),
but not for girls. Crandall et al. (1962) also found significance for
boys and not for girls. Chance found a correlation among third grade
boys and intelligence (r=.34, p<.01).

Rotter (1966) has stated that there is, at best, a low correlation
between intelligence and I-E. Hersch and Scheibe, when including
both boys and girls in the sample, reported only insignificant correla­
tions. Kienlbauch (1967) agreed with this. He did find a correlation
between I-E scores and intelligence in a reformatory population.
Although research reports small, or in some cases moderate, correlations
between I-E and intelligence, Bialer (1961), in studying success-failure
conceptualization in normal and mentally retarded children, found that
I-E tends to become higher with increased age.

A recent study by Mulgram and Mulgram (1976) is the only research
which investigates gifted children and locus of control. The investiga­
tors developed their own locus of control measure. This study included
Israeli gifted and non-gifted children and found that the gifted were
significantly more internal than non-gifted, that sex was not
significant, and that there was no difference between the two groups
on affecting undesirable outcomes. The study in this paper differs
from the Israeli research in that American children are studied, the
groups are designated gifted and average (thus specifying criteria more
closely for each group), established locus of control measures are used,
and comparisons are made among three measures. Because no reliability or
validity data is given on the Mulgram self-constructed scale, it cannot
be determined how these results would correspond to studies using
published norms.
In summary, research indicates only low correlations between I-E and intelligence, with possible exceptions for boys and those in the gifted range. There is a need for this relationship to be more systematically investigated.

I-E and Achievement

Results in the research with the locus of control construct are most consistent in the relationship between I-E and achievement. In general, the achievement scores and grades of internal children are significantly higher than for external children. It appears reasonable that those children who have higher achievement scores would also tend to see a relationship between the efforts they make to achieve and the outcome.

The Coleman Report (1966) was instrumental in focusing attention on the importance that the "child's perceived control of self" plays in his achievement. Above all factors studied, this attitude about his controlling ability is most strongly related to achievement.

Many studies have studied the relationship between the IAR scores and achievement scores. Report card grades and scores on the Iowa Test of Basic Skills were positively related for third, fourth, and fifth grade children. $I+$ predicted scores for third and fourth grade girls, and $I-$ predicted for fifth grade boys. In the sixth, eighth, tenth, and twelfth grades, the total I score was related to report card grades (Crandall, 1965). McGhee and Crandall (1968) and Messer (1972) supported these findings. The Messer study, as have others, found that I-E scores relate more highly to grades than to achievement test scores.
Cleary (1972) found a significant relationship between IAR scores and vocabulary, spelling, and math. Katz (1967), however, did not find any substantial relationship between the IAR and achievement. On the Bialer Scale, Shaw and Uhl (1971) found reading achievement related to I-E in white second graders, but not to black second graders. On the Nowicki-Strickland, internality was significantly related to achievement for the third, fifth through seventh, tenth and twelfth grade males, but not for females.

Several additional studies relate I-E with achievement. Brown and Strickland (1972) found a significant correlation between GPA of college seniors and internality for males, but not for females. Chance (1965) found a relationship between achievement and the IAR, including reading, math and spelling. Roberts (1971) found a significant relationship between internals and reading achievement for males and females, and for math achievement for males only.

In summary, research does generally support the findings of the Coleman Report (1966) in that there is a positive relationship between internal locus of control scores and achievement. The literature is not clear on the role that sex differences play in I-E scores, but more studies indicate that there is a higher relationship between internal males and achievement than for internal females and achievement. Most of the research has used the IAR in relating to achievement.

I-E and Social Behavior

Research has demonstrated that a child becomes more internal not only with age, but also that children in the middle or higher socio-economic status tend to be more internal than those from the lower
socioeconomic status (Davis & Lesiak, 1967; Nowicki, 1971; Nowicki & Strickland, 1973; Stephens, Delys, & Parker, 1971; Strickland, 1971). According to Royer (1975), in the four studies in which the IAR is used to determine I-E, there was no significant difference between middle and lower socioeconomic levels, and no difference between black and white children. This could be due to the situation-specific nature of the IAR, in that it is related to school achievement only. Perhaps children from all levels of advantage feel that they can exert more control in the school environment than in home, work or community settings.

Most of the research supports the theory that white children tend to be more internal than black children. The implication of this is that blacks tend to have less significant power, opportunity, social advantage, and financial power. Battle and Rotter (1963), using the Bialer Scale, found lower class black children to be significantly more external than middle class white children. They found middle class children more internal than lower class children, but that lower class black children with high intelligence were more external than middle class white children with lower intelligence. This may suggest that higher IQ blacks are more realistic about the opportunities which they can control.

Other research has supported the greater degree of internal locus of control in whites. Scott and Phelan (1969) found that, of those on welfare who were unemployable, the whites were significantly more internal than black or Mexican-Americans, but that the Mexican-Americans were still slightly more internal than the blacks. Research by Shaw
and Uhl (1971), and Zytkoskee, Strickland, and Watson (1971) support the findings of Scott and Phelan. Again, only those studies (Katz, 1967; Solomon, Houlihan, & Parelieus, 1969) that used the IAR as the measurement of I-E were unable to find a significant racial difference.

Considering Coleman's important findings that belief of personal control is most highly related to school achievement, it seems that much more research is warranted in the area of black-white I-E scores. Are the scales culturally unbiased? Is the black child's score the same on questions that attempt to measure control in the black community only, as opposed to control in the total community?

Much has been written on the degree of susceptibility to resist manipulation by others. As would be expected, internals tend to trust their own inner resources in social situations and to conform less often to group pressure (Crowne & Liverant, 1963). Their study also showed internals to have a greater level of confidence in their own judgments. Toler (1961) agreed with these findings as his research with moving lights showed that external persons are more susceptible to persuasion by others.

Another interesting aspect of social relatedness to locus of control involves acceptance of information by internals and externals. For example, in a study by James, Woodruff, and Werner (1965), it was shown that following the Surgeon General's Report on the effects of smoking, internals quit smoking more than externals. Phares interpreted this to mean that although internals are less influenced by pressure from others, they more often will accept information which is factually presented and which gives them opportunity for self-analysis. Although
they are more analytic in their acceptance of information, this research shows that internals do not automatically resist change.

Internals demonstrate a larger amount of desire to be involved in social action. Gore and Rotter (1963) demonstrated that internals are more willing to be involved in civil rights activities. While Gore and Rotter only examined statements of wishing to be involved, Strickland (1965) showed that blacks actually involved in civil rights activities had higher internal scores than blacks who were not involved. However, another study (Evans & Alexander, 1970) found externals to be more involved in political action. Much research has been done on this with conflicting results, and no single interpretation can be derived. The world of political concern and action involves too many variables for consistent findings to be found.

In summary, it can be said that internal locus of control tends to be higher with middle class, white children and that internal children are less prone to be affected by group peer pressures, possibly because of a higher level of confidence in their own judgment. Many studies point to greater involvement in social and political actions by internals, but this evidence is not conclusive.

Antecedents of I-E

Perhaps because it is more difficult to research the area of antecedents of locus of control behavior, much more is known of the consequences of locus of control than of the antecedents of it. A difficulty with examining antecedents is that Lefcourt (1972) found that locus of control in children is related more to the child's perception of parental attitudes and behavior than to actual observed behavior. Much
of the research has, therefore, used measures of perceived parental behavior in the research.

One of the first studies to look at possible parental influences on locus of control was by Chance (1965) in which by interviewing mothers, he found that the more internal boys were, the more their mothers expected them to show independence at an early age. This was not found with the girls.

In a study by Katkovsky, Crandall, and Good (1967), it was found that internals had more "babying" from their mothers. Also, highly relating to internality in this study were protectiveness, affectionateness, and parent approval. They found that the five behaviors that were not related to locus of control were restrictiveness of regulations, severity of punishment, clarity of policy of regulations and enforcements, coerciveness of suggestions, and accelerational attempts. From this, it can be suggested that an internal control is reinforced by the degree to which parents are protective, nurturant, approving, and non-rejecting.

Crandall (1973) discussed the nurturance associated with internals as being a protective state during the early years, but that this protectiveness changes to a gradual release by the parents, which allows the child to move toward independence. Davis and Phares (1969) reported that internals found their parents to be more consistent in practice. MacDonald (1971) found this to be true, especially for males.

Chance (1965) found some slight relationship between internality and birth-order, reporting that the first born was more internal.

Crandall, Katkovsky, and Good (1965) found this to be true for grades
six through twelve, but not in grades three through five. However, 
Eiseman and Platt (1968) found first born males to be more external.

The Coleman Report (1966) found that most closely associated with 
parent contributions for positive self-concept and a sense of control 
of the environment was the parents' desire for the child to further 
his education as much as possible. Those parents who value further 
education tend to have children who are more internal.

In summary, although not totally consistent, research indicates 
that a warm nurturant home is more commonly reported by internal 
children. External children were more often associated with less-caring, 
demanding and punitive home environments.

Changes in I-E

Although much research documents periods of locus of control 
consisting over a short period of time, there is evidence of locus of control 
changes following specific situations. Age changes do account 
for the most frequent locus of control fluctuations. Usually internality 
increases with the age of children (Penk, 1979). It appears that it is 
not age itself that influences locus of control, but rather increased 
independence and verbal fluency. According to Crandall, Katkovsky, and 
Good (1965), third graders are relatively external, with internality 
increasing to the eleventh grade, with a reversion to externality in the 
twelfth grade. This is probably due to the increased independence and 
uncertainty at that time of life. Other situations affecting locus of control 
are imprisonment (Kielbuach, 1967), elections (Gorman, 1968) 
and life crises (Smith, 1970).
Since much research reports a positive relationship between internality and success in life, some investigation is now beginning on the possibilities of changing behavior to coincide more closely to an internal locus of control. Reimanis (1971) attempted, through teacher training sessions and subsequent re-training with external students, to modify student behavior in the direction of internality. Although the students then scored higher internally at a post-testing, they did not improve in achievement. The classic deCharms (1972) personal causation study showed that although intensive "internal type" training did not increase achievement, it did prohibit the expected decline in achievement on the population he was working with. Also, these children averaged fewer absences than the control group.

Both deCharms and Reimanis have shown that behavior can be changed to some degree by training in the internality direction in educational settings. Therapy in a clinical setting has also produced some positive changes. Smith (1970), working in a crisis center in a neuropsychiatric hospital, examined the locus of control of clients and found that, as the treatment for the crisis situation progressed, the clients' scores moved significantly from the external to the internal range.

The most often cited research dealing with locus of control change (Nowicki & Barnes, 1971) is a study in which seventh, eighth, and ninth grade predominantly black inner-city boys were enrolled in a structured camping program, administered an I-E scale, and counseled in ways to facilitate their perceiving the results of their actions as being related to their behavior. Campers were more internal at the end of the week-long camp session. Although the findings are provocative, there
are unanswered questions that relate to the stability and behavioral correlates of the locus of control measures. Follow-up investigations on this type of study need to be considered. Do the boys remain more internal after longer periods of time? Do their actions show internal behavior or are they just able to verbally respond with what they have been taught?

In summary, it is apparent that more research is needed before conclusive statements can be made about change techniques in the locus of control of children. It is hoped that research will turn to many of these practical issues that affect locus of control change techniques so that the construct may positively affect education today.

Summary

In summary, although many studies have investigated various dimensions of locus of control, there are areas that still have many unanswered questions. The research concerning the relationship between locus of control and intelligence is not consistent and the possible relationship between locus of control and giftedness has rarely been studied. This dissertation has been designed to investigate this relationship.
CHAPTER III

METHODOLOGY

The present chapter is divided into six sections for organizational purposes. The first section discusses the objective of the study. The second section deals with the four hypotheses and the exploratory question of the study. The third section describes the procedures of the study, including how the samples were selected and the sample characteristics. The fourth section describes the instruments used in this study and how these instruments were administered. The fifth and last section discusses the research methods used in this research.

Objective

The primary objective of this study is to determine the relationship between internal locus of control scores of children in the gifted and average ranges of intelligence. This will be measured on three locus of control instruments to determine variability within these two groups and to relate these locus of control measures to achievement scores in reading, spelling, and math.

Hypotheses

The four research questions that are listed in Chapter I are transformed into four hypotheses for considerations in this study. Following the hypotheses there is one exploratory research question. This issue is in the form of exploratory research only because the
number of subjects (100) and the number of test items (97 in all) are too small to consider factor analytic results as evidence to support an hypothesis. However, with the preliminary explanation that the factor results are being examined in an exploratory fashion only, the results could possibly lead to interesting future studies. The hypotheses and research questions are as follows:

Hypotheses.

1. The internal locus of control scores for gifted elementary school children will be significantly higher than the internal locus of control scores for elementary school children of average ability. Although a strong relationship between intelligence and locus of control has not been established in previous studies, the gifted range of intelligence has not been investigated previously on the scales used in this study. Therefore, this research is hypothesizing that high intelligence is related to locus of control.

2. There will be less variability in locus of control scores for gifted elementary school children than for elementary school children of average ability with respect to each measure of locus of control. No research has examined the variability existing in the locus of control scores for gifted children. Although variability has been examined with average children, the research has not looked at the results from all three measures on the same population.
3. The three locus of control measures will be significantly correlated with each other. This investigation will report the correlations between each of the measures studied with each of the other measures. Previous research has not investigated this relationship with the gifted population.

4. There will be a significant correlation between each locus of control score and each achievement measure. Studies have demonstrated a strong relationship between locus of control and school achievement, but the strength of this relationship has not been examined with children in the gifted range, nor has there been a comparison of the correlations in the scores for gifted and average children.

Research question.

In examining the results of factor analysis, the following two areas will be examined on the Crandall measure in an exploratory manner.

1. Do factors which emerge support previous research?
2. Is the factor structure the same for the gifted as for the average group?

Procedures

The 100 subjects for this study included a group of 50 fourth and fifth grade boys and girls who had been identified as gifted intellectually and 50 fourth and fifth grade boys and girls in the average range of intelligence. All children were students from a large suburban school district. The gifted students, in general, represented each
elementary school in the district, there being two fourth and two fifth
graders from each school. The children of average intelligence were all
from one specific elementary school in the district. This school was
assigned to the researchers involved and could be characterized as
comprized of mostly low middle class white children. All children were
white in the average intelligence sample and all children except two in
the gifted sample were white. Two black children were included in the
gifted sample.

The gifted children all are presently enrolled in the district's
gifted program which meets in groups of approximately 15 students each
afternoon. Each child, therefore, attends regular classes for 4½ days
per week and the gifted class for ½ day per week. Identification of
the gifted is initially undertaken by teacher recommendation (See
Appendix A). The children were nominated for this program on the bases
of achievement, social skills and emotional stability. At the end of
the year, third grade teachers are asked to complete the checklist for
two or three children whom they feel would most benefit from being in
the enrichment class. The school psychologist assigned to that building
reviews these checklists and administers an individual test of
intelligence and achievement tests to those who appear to be best
qualified for the program. In order to qualify for the class, a student
must attain a score of 125 of higher on the Weschler Intelligence Scale
for Children-Revised or the Stanford-Binet Intelligence Scale. This
criterion was adjusted where appropriate to accommodate minority group
students.
To select the 50 children in the average range of intelligence, letters were sent to the parents of all fourth and fifth grade students of the selected representative elementary school. One hundred ninety-six letters were sent in all. The letter requested permission for their children to participate in a research study (See Appendix B). Ninety-six parents responded with permission for their children to participate. To these 96 children, Level 3 of the Short Form Test of Academic Ability, a group test, was administered. Of this group of 96 children, 58 qualified to participate in the research by achieving scores of 90 to 110. Five of these children were absent when additional testing was administered on another date. Of the remaining 53, three were randomly discarded from the group.

In the gifted group of children, there were 27 fourth grade students (16 girls and 11 boys) and 23 fifth grade students (10 girls and 13 boys). In the group of children of average intellectual ability, there were 23 fourth grade children (10 girls and 13 boys) and 27 fifth grade children (11 girls and 16 boys).

Data collection for this project was shared with Joan English, a M.A. degree candidate who included the same population (with several differences due to attendance on specific days) in the data collection for her research entitled, "A Preliminary Investigation of Cognitive Complexity in Gifted and Average Children" (English, 1979). She administered The Adapted Modified Role Repertory Test (Vacc & Vacc, 1973) as a measure of cognitive complexity. The author and Joan English worked together in administering and proctoring the selected tests.
In addition to the Short Form of Academic Ability, all 100 children were given three locus of control measures—The Intellectual Achievement Responsibility Questionnaire (IARQ, Crandall et al., 1965), A Locus of Control Scale for Children (Nowicki & Strickland, 1972), and the Bialer-Cromwell Children's Locus of Control Scale (Bialer, 1960). The three measures were given to children to silently read to themselves as the questions were read orally by the examiner. These measures are described in more detail in the instrumentation section of this chapter.

The 100 children were also given three measures of achievement—Form D-1M of the Gates-MacGinitie Reading Tests, Comprehension Section (Gates-MacGinitie, 1965), as a measure of reading achievement, Spelling Level I from the Wide Range Achievement Test (Jastak, Bijou, & Jastak, 1976) as a measure of spelling achievement, and Arithmetic, Level I of the Wide Range Achievement Test (Jastak, Bijou, & Jastak, 1976) as a measure of arithmetic achievement. The instructions given for each administered test will be discussed in the following section.

Instruments

The following seven instruments were administered to all 100 children. In this section, each instrument will be discussed.

1. Short Form of Academic Aptitude, Level 3, derived from the California Test of Mental Maturity (Sullivan, Clar, & Tiegs, 1970).
   The SFTAA was chosen as a means of identifying children in the average range of intelligence because of its short administration time (38 minutes), reliability of
.89 and construct validity of .87. In comparing results of individual and group test scores, data published by the California Test Bureau (1954) reported that group tests of ability yield lower scores for those at the upper level intellectually, yield higher scores for those below the average range of intelligence, but were comparable for those who scored in the average range of intelligence as compared to scores from individually administered tests. For this reason, identification of the gifted included the already available individual scores and the identification of the average range children was based on a reliable group test of ability. Specific oral instructions as printed in the examiner's manual were followed. Answers were recorded by the children on answer sheets which accompany this test.


The IARQ is designed to measure control and responsibility for intellectual academic successes and failures for children in grades three through twelve. Two short forms have been devised, but, for this research paper, the original form was administered.

The Scale is composed of 34 forced-choice items, followed by one alternative stating the event was caused by the child and another that it was caused by someone else. Half of the items measure acceptance of responsibility for
positive events, and half measure negative events. Therefore, in addition to an I (internal) score, each child receives an I+ (internal success) and an I- (internal failure) score.

Test-re-test reliabilities were established on grades three through five, r=.69 for total I and .66 for I+ and .74 for I- (McGhee & Crandall, 1968). The scores on the IARQ were significantly related to school grades, according to a sample of third through twelfth graders. Correlations with intelligence were moderate, but significant. With the California Test of Mental Maturity for grades 6, 8, 10, and 12, the Lorge-Thorndike for grades 3, 4, and 5, the IARQ correlated .26 for the total I scale for children in grades 3-5 and .16 for children in grades 6, 8, 10, and 12. With the Nowicki-Strickland, correlations for 182 third grade and 161 seventh grade black children were significant. The oral directions and questions are included in the Appendix.


This scale is designed to measure locus of control as defined by Rotter (1966) and measures general expectations for internal versus external locus of control. This scale consists of a 40-item paper-pencil test with yes-no responses. Test-re-test reliability is .63 for the third grade, .66 for the seventh grade and .71 for the tenth grade (six weeks
apart). Significant relationships were found between grade point averages and internal scores on the Nowicki-Strickland for twelfth graders and college students. Also, internal scores were related to achievement test scores for third, fifth, sixth, seventh, tenth, and twelfth grade males, but not for females. With the Bialer-Cromwell Scale (Bialer, 1961), correlations of .41 were found for a sample of 29 children. Correlations with the IARQ for 182 third grade and 171 seventh grade black children were significant. The correlations with I± were significant for both groups (r=.31 and r=.51), but were not significant for I-.

4. Bialer-Cromwell Children's Locus of Control Scale (Bialer, 1961).

This scale measures the extent to which a child characteristically construes events as being contingent upon his own actions. It consists of 23 questions, each requiring a yes-no answer.

A test-re-test reliability coefficient of .84 was obtained over one week for 60 young EMR adults (Gonzali & Bealey, 1968). Bialer-Cromwell scores have been found to correlate significantly with standardized achievement test scores in reading, reading readiness scores, and teacher rating of achievement (Bartel, 1968). Non-significant correlations were found between the IARQ and the Bialer-Cromwell Scale for black fifth grade students (Solomon, 1971). There are
insufficient validity data on the Bialer-Cromwell Scale to be able to satisfactorily evaluate it. It is apparent that no study has looked at all three scales systematically on the same population. Also, no study has compared the gifted range and the average range children on any of the scales.

5. Gates-MacGinitie Reading Tests, Form D, for grades 4 through 6 (Gates & MacGinitie, 1965).
   The reading comprehension section of this test was administered. According to the test manual, reliability ranges from .89 - .94 and validity ranges from .90 - .94.

   A. The WRAT Spelling Test consists of 45 spelling words given orally for the students to spell on the appropriate test blank. The work is pronounced, read in a specific sentence, and then repeated. Reliability for the spelling test ranges from .92 to .98. The validity of the WRAT spelling test when compared with the New Stanford Dictation Test was .93.
   B. The Arithmetic Test, Level I consists of a page of arithmetic problems to compute. The problems become increasingly difficult, and no child attempted to answer all problems. Reliability for the arithmetic test ranges from .85 to .92. The validity of the arithmetic test, when compared with the New Stanford Arithmetic Test is .91.
Research Design

The basic design of this study consists of comparing fourth and fifth grade elementary school children in the gifted range with those in the average range of intelligence, using data from three administered locus of control scales and three group achievement tests. Additionally, a factor analysis will be run in an exploratory manner to examine the difference in factor structure in the gifted and average ranges on the locus of control measures.

The Statistical Package for the Social Sciences (SPSS) was the program used for the statistical analysis of the data derived. To determine the relationship between the internal locus of control scores for the gifted children and the average range children, T-tests were run on the data. A univariate approach, in which a F test, or Pearson's Product-Moment $r$ test, was run for each locus of control measure to determine variability and to yield information on the correlation of each locus of control measure with the other. To determine whether or not there is a significant correlation between each locus of control score and each achievement measure, F tests were run.

Because of the small N (100) in relationship to the total number of test items on the three locus of control measures (97), the factor analysis will be approached in an exploratory manner only. Further research will be necessary to reach tenable findings in this area. For the exploratory factor analyses in this study, the BMD08M program with varimax rotation was used.
The findings from this study will be discussed in this chapter. The discussion of these findings will be organized into five sections, the first four will address the questions to be answered and the fifth section will report the findings of the exploratory question.

The first major section of this chapter is devoted to examining the relationship between locus of control and ability. The second section discusses the difference in the amount of variance in the two ability populations: average and gifted. The third section examines the relationship among the three locus of control measures used in this study. The fourth section discusses the relationship between each locus of control measure and each achievement measure. The fifth and final section will examine the results of the exploratory factor analysis of the three locus of control measures.

**Question 1**

What is the relationship between locus of control and ability?

**Hypothesis 1**

Children in the gifted range of intelligence will score significantly higher internally on the three locus of control measures than will children in the average range of intelligence.

The data necessary to answer this question were derived by comparing the means of the two groups of gifted and average ability children on
each of the three locus of control measures. The significance of the difference between the means of two groups is determined by comparing this difference to the standard error of the differences between means (Kerlinger, 1973). If this obtained difference is sufficiently greater than the standard error as to be unlikely to have occurred by chance, the difference is considered to be statistically significant. To determine the statistical significance of the difference between the mean score of the gifted group on each locus of control measure and the mean score of the group of average ability, Fisher's $t$ formula for testing the significance of a difference between uncorrelated means on two samples of equal size was used (Guilford & Fruchter, 1973).

Additionally, $t$-tests were run on the internal plus (I+), the tendency to accept responsibility for positive experiences, and the internal negative (I-), the tendency to accept responsibility for negative experiences. Although the information is not part of the question asked, $t$-tests were also run to determine any significant differences in the locus of control measures with respect to grade and sex.

Table 1 displays the means, standard deviations, and $t$-test results for each of the locus of control measures. Examination of the data between the gifted and average groups reveals that there is a strong, significant relationship between locus of control and ability for average and gifted fourth and fifth grade children. On all three measures of locus of control, the gifted children are significantly higher internally in locus of control than children with average ability. Additionally, gifted children are also significantly higher than average
TABLE 1

Means, Standard Deviations and T-Values of Gifted and Average Children on Locus of Control Measures

<table>
<thead>
<tr>
<th>Locus of Control</th>
<th>M</th>
<th>SD</th>
<th>T-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nowicki-Strickland</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gifted</td>
<td>26.28</td>
<td>3.92</td>
<td></td>
</tr>
<tr>
<td>Average</td>
<td>22.18</td>
<td>3.57</td>
<td>5.47***</td>
</tr>
<tr>
<td>Crandall Total</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gifted</td>
<td>25.52</td>
<td>3.62</td>
<td></td>
</tr>
<tr>
<td>Average</td>
<td>19.48</td>
<td>5.54</td>
<td>6.46***</td>
</tr>
<tr>
<td>Crandall Positive</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gifted</td>
<td>14.42</td>
<td>2.06</td>
<td></td>
</tr>
<tr>
<td>Average</td>
<td>10.94</td>
<td>3.18</td>
<td>6.49***</td>
</tr>
<tr>
<td>Crandall Negative</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gifted</td>
<td>11.10</td>
<td>2.75</td>
<td></td>
</tr>
<tr>
<td>Average</td>
<td>8.54</td>
<td>3.60</td>
<td>4.00***</td>
</tr>
<tr>
<td>Bialer</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gifted</td>
<td>15.75</td>
<td>2.91</td>
<td></td>
</tr>
<tr>
<td>Average</td>
<td>13.02</td>
<td>2.24</td>
<td>5.25***</td>
</tr>
</tbody>
</table>

*p < .05  **p < .01  ***p < .001
children in I+ and I-, as measured on the Crandall's locus of control measure. All five measures are significant at the .001 level or lower. Therefore, the findings do support the hypothesis that gifted children are more internal on locus of control measures than average children.

Table 2 displays the means, standard deviations, and t-test results on all five measures by grade. It can be noted that there is a significant difference in two measures only. The total Crandall internal score shows that the fourth graders are significantly more internal (F = 1.93, significant at the .01 level) than the fifth graders. Also, the Crandall's internal positive (I+) results indicate a significant difference (F = 1.77, significant at the .05 level), with the fourth graders demonstrating higher internal scores than the fifth graders. Examining the results by grades in general, there does not appear to be an overall significant pattern. The two measures which do reach significance are both Crandall measures, with both reporting fourth graders as more significantly internal or internal positive. The general conclusion is that there is not enough evidence to report significance in the population sampled according to grade.

Table 3 reports the means, standard deviations, and t-test results of the locus of control measures by sex. Two of the measures reach significance. The Crandall negative (I-) shows a significant difference of 2.52 at the .001 level with the females being significantly more internal. The Bialer indicates a high level of significance (F = 4.44, at the .001 level), showing the males to be more internal than females. The data on sex show some significance in the areas of internal negative
TABLE 2
Means, Standard Deviations and T-Values of Locus of Control Measures by Grade

<table>
<thead>
<tr>
<th>Locus of Control</th>
<th>M</th>
<th>SD</th>
<th>T-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nowicki-Strickland</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fourth</td>
<td>23.76</td>
<td>4.19</td>
<td></td>
</tr>
<tr>
<td>Fifth</td>
<td>24.70</td>
<td>4.33</td>
<td>1.10</td>
</tr>
<tr>
<td>Crandall Total</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fourth</td>
<td>23.56</td>
<td>4.90</td>
<td></td>
</tr>
<tr>
<td>Fifth</td>
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<td>1.93**</td>
</tr>
<tr>
<td>Crandall Positive</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fourth</td>
<td>13.24</td>
<td>3.03</td>
<td></td>
</tr>
<tr>
<td>Fifth</td>
<td>12.12</td>
<td>3.28</td>
<td>1.77*</td>
</tr>
<tr>
<td>Crandall Negative</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Fourth</td>
<td>10.32</td>
<td>3.16</td>
<td></td>
</tr>
<tr>
<td>Fifth</td>
<td>9.32</td>
<td>3.66</td>
<td>.41</td>
</tr>
<tr>
<td>Bialer</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fourth</td>
<td>14.26</td>
<td>3.06</td>
<td></td>
</tr>
<tr>
<td>Fifth</td>
<td>14.50</td>
<td>2.81</td>
<td>.42</td>
</tr>
</tbody>
</table>

*p < .05  **p < .01  ***p < .001
TABLE 3  
Means, Standard Deviations and T-Values of  
Locus of Control Measures By Sex

<table>
<thead>
<tr>
<th>Locus of Control</th>
<th>M</th>
<th>SD</th>
<th>T-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nowicki-Strickland</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>24.04</td>
<td>4.01</td>
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<tr>
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<tr>
<td>Male</td>
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<td>.92</td>
</tr>
<tr>
<td>Female</td>
<td>23.04</td>
<td>5.07</td>
<td></td>
</tr>
<tr>
<td>Crandall Positive</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>12.26</td>
<td>3.10</td>
<td>1.40</td>
</tr>
<tr>
<td>Female</td>
<td>13.15</td>
<td>3.26</td>
<td></td>
</tr>
<tr>
<td>Crandall Negative</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>9.76</td>
<td>3.58</td>
<td>2.52**</td>
</tr>
<tr>
<td>Female</td>
<td>14.92</td>
<td>2.86</td>
<td></td>
</tr>
<tr>
<td>Bialer</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>13.91</td>
<td>2.92</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>9.89</td>
<td>3.30</td>
<td>4.44***</td>
</tr>
</tbody>
</table>

*p < .05       **p < .01       ***p < .001
responses for females and a strong significance on the Bialer for
the male internal scores being higher than the female internal scores.

In interpreting all of the above results, it is necessary to remember that these results apply only to the populations sampled, mainly fourth and fifth graders who fall within the gifted or average ranges of intelligence. Because other grades or other intelligence ranges were not sampled, general conclusions about children in general cannot be reached. It should be remembered that this study is examining the differences between gifted and average children in the fourth and fifth grades.

**Question 2**

Is there less variance within the gifted child population than within the average intelligence range child population on measures of locus of control?

**Hypothesis 2**

There is significantly less variance within the gifted child population than within the average intelligence range child population on measures of locus of control.

To test this hypothesis, it was necessary to determine the statistical significance of the difference between the variances of the two groups. When estimates of population variances are obtained from two independent samples, the significance of their difference is tested by forming their ratio, termed the $f$ ratio. As the difference between the variances increases, the ratio increases from the 1.00 value which represents total agreement, and becomes increasingly significant (Guilford & Fruchter, 1973).
An F test was used to determine the statistical significance of the difference between the variance of the scores obtained by the gifted group on the locus of control measures and the variance of the scores obtained by the average group. According to Guilford and Fruchter (1973), when using this particular use of the variance ratio F, with a two tailed test, an important modification in interpreting an obtained F is necessary. The necessary placing of the larger variance in the numerator doubles the probability of obtaining deviations above the mean. Therefore, it is necessary to double the probability of the .05 and .01 regions, making them .10 and .02 respectively.

When a comparison of the variances of the gifted group and the average group for each locus of control measure was made, it was determined that there was significantly less variance among the scores of the gifted on the three variances associated with the Crandall test. Application of the F test for statistical significance revealed that the difference for the total Crandall internal variance was significant at the .02 level ($F = 2.35$), the Crandall positive variance was significant at the .02 level ($F = 2.38$), and the Crandall negative variance was significant at the .10 level ($F = 1.63$).

The above findings, in part, support Hypothesis 2 in that there is significantly less variance in the three Crandall measures for the gifted group than for the average group, but that there is no significant difference in the variances in the Nowicki-Strickland and the Bialer measures for the gifted and average groups.
Question 3

Is there a relationship among the locus of control measures?

Hypothesis 3

There is a significant correlation among the three locus of control measures.

The data necessary to provide the answer to this question consist of product-moment correlations (rs) between each locus of control measure and each of the other locus of control measures for the total group of children measured. In addition to the three measures administered, namely the Nowicki-Strickland, Crandall, and Bialer, the two sub-dimensions of the Crandall, the Crandall positive and Crandall negative, are included in the correlational data. These correlations (rs) are summarized in Table 4 on the following page.

Although not directly related to the question asked, Table 5 summarizes the findings for the product-moment correlations (rs) among each of the five dimensions of locus of control described above using the data from the gifted group only. Table 6 summarizes these product-moment correlations (rs) for the average group only. In this way, the correlational relationships can be examined for the total population sampled, the gifted group alone, and the average group alone.

The coefficient of correlation is a summarizing number which can vary from a value of +1.00, which is perfect positive correlation through zero, which means complete independence or no correlation at all, and down to -1.00, which means perfect negative correlation. A correlation
TABLE 4
Intercorrelations Among Locus of Control Measures
for Total Gifted and Average Children

<table>
<thead>
<tr>
<th>Locus of Control</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Nowicki-Strickland</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Crandall Total</td>
<td>.27*</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Crandall Positive</td>
<td>.33**</td>
<td>.83***</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Crandall Negative</td>
<td>.13</td>
<td>.85***</td>
<td>.41***</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>5. Bialer</td>
<td>.62***</td>
<td>.32***</td>
<td>.37***</td>
<td>.18*</td>
<td>1.00</td>
</tr>
</tbody>
</table>

*p < .05
**p < .01
***p < .001
TABLE 5
Intercorrelations Among Locus of Control Measures for Gifted Children

<table>
<thead>
<tr>
<th>Locus of Control</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Nowicki-Strickland</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Crandall Total</td>
<td>-0.06</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Crandall Positive</td>
<td>-0.10</td>
<td>0.65***</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Crandall Negative</td>
<td>-0.00</td>
<td>0.82***</td>
<td>0.11</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>5. Bialer</td>
<td>0.58***</td>
<td>-0.00</td>
<td>-0.07</td>
<td>0.05</td>
<td>1.00</td>
</tr>
</tbody>
</table>

*p < .05
**p < .01
***p < .001
### TABLE 6
Intercorrelations Among Locus of Control Measures for Average Ability Children

<table>
<thead>
<tr>
<th>Locus of Control</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Nowicki-Strickland</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Crandall Total</td>
<td>0.06</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Crandall Positive</td>
<td>0.23</td>
<td>0.79***</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Crandall Negative</td>
<td>-0.10</td>
<td>0.84***</td>
<td>0.33**</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>5. Bialer</td>
<td>0.40**</td>
<td>0.19</td>
<td>0.36**</td>
<td>-0.03</td>
<td>1.00</td>
</tr>
</tbody>
</table>

*p < .05
**p < .01
***p < .001
is statistically significant when, after applying a product-moment
correlational statistical method, the resulting correlation is
significantly different from .0.

Examination of the rs for the total gifted and average groups
reveal many statistically significant rs, some of them weak and some
strong. In fact, with the exception of the r between the Nowicki-
Strickland and Crandall negative, all correlations are statistically
significant at least at the .05 level. Although there are not indica­
tions of strong relations in some instances, this does show that there
is a relationship to some extent among these locus of control measures.
This would be expected since all measures are purporting to measure the
same general construct. Therefore, the more important question is not
whether or not there is a relationship, but rather to determine the
strength of these relationships.

When examining the above findings, it is important to remember that
significance per se is not in itself an adequate indicator of the strength
of a relationship. In addition to statistical significance, there must
be substantial variance common to the two variables (Garrett, 1966).
To determine the common variance, it is necessary to compute the square
of the rs between the two variables which will result in a decimal value
which is then converted into a percentage by multiplying by one hundred.
It is necessary to consider this common variance because statistical
significance is largely a function of sample size. This means that the
larger the sample size, the smaller the r needed for significance, if
other things are equal. The examination of the formula for the standard
error of a correlation coefficient (r) which is \( \frac{1}{\sqrt{N}} \) helps to explain this.
As would be expected, the highest correlations are evident with the Crandall, especially the rs of both Crandall positive and Crandall negative with the Crandall total. Both of these correlations are highly statistically significant, and the tests share a common variance with the Crandall total of 69% and 72% respectively. This significance is probably due to the fact that the Crandall positive and Crandall negative are subtests of the Crandall total and therefore share some commonality.

In addition to the within-Crandall correlations, there are other strong rs which will be reported here in order of decreasing r. The r between the Nowicki-Strickland and the Bialer is statistically significant (F = .62, at the .001 level) and also meets the common variance requirement by sharing a common variance of 38%. The r between the Crandall positive and Bialer is statistically significant (F = .35, at the .001 level) and the two measures share a common variance of 14%. The r between the Crandall positive and the Nowicki-Strickland is statistically significant (F = .32, at the .001 level) and the tests have a common variance of 10%. The only other statistically significant r, which is between the Bialer and the Crandall negative (F = .18, at the .15 level) should not be considered as a significant relationship due to the low common variance of 3%.

In summary, when Crandall positive and negative are excluded, the significant relationships exist between Nowicki-Strickland and Crandall total, Nowicki-Strickland and Bialer, and Crandall total and Bialer. In essence, each of the three total measures of locus of control is significantly correlated with each of the others.
In examining Table 5, which reports the intercorrelations among the locus of control measures for the gifted group, the results are rather clear-cut. Again, the Crandall is highly significant with both Crandall positive and Crandall negative, both in statistical significance and common variance percentage. However, the Crandall total shows an extremely weak relationship with both the Nowicki-Strickland ($F = .06$) and Bialer ($F = .001$). However, on the two remaining measures (other than the Crandall measures), the $r$ for Nowicki-Strickland and Bialer is statistically significant ($F = .58$, at the .001 level) and the two measures share a common variance of 34%.

From the above findings, it can be summarized that with the high ability grouping of the gifted, the Crandall test and its sub-tests are intercorrelated more highly because the Crandall is the only test which measures locus of control in the academic setting alone. Because gifted children succeed as a whole at the top academically, it is probable that these high Crandall correlations are due more to the effect of the high ability factor rather than to the ranges within the groups.

Table 6 examines the $r$s among the locus of control measures for average ability children. The same pattern exists for the average group as for the gifted group. Again, all Crandall measures are highly statistically significant. In fact, for the average group, significant $r$s are slightly higher than for the gifted group. As with the gifted group, the $r$ for the average group is statistically significant ($F = .40$, at the .01 level) for the Nowicki-Strickland and Bialer with a common
variance of 16%. The only additional significant $r$ is between the Bialer and Crandall positive ($F = .35$, at the .01 level).

On the basis of the above findings, Hypothesis 3 can be accepted. For the total group, all three main measures of locus of control are significantly correlated. However, when the correlations for the gifted group or the average group are examined, a different pattern can be noted. For these two groups, significance is evident within the Crandall dimensions and also between the Nowicki-Strickland and Bialer. Chapter 5 will include a discussion of the practical significance of these correlations.

**Question 4**

What are the relationships among the locus of control measures and achievement measures?

**Hypothesis 4**

There is a significant correlation among the locus of control measures and the achievement measures.

The data necessary to provide the answer to this question consist of product-moment correlations ($r$s) between each achievement measure and each locus of control measure and each of the other achievement measures for the total group of gifted and average ability children. These correlations ($r$s) are summarized in Table 7.

Although not directly related to the question asked, Table 8 summarizes the findings for the product-moment correlations ($r$s) between each achievement measure and each locus of control measure and each of the other achievement measures for the gifted group of children only. Table 9 summarizes these product-moment correlations ($r$s) for the
TABLE 7
Intercorrelations Among Locus of Control Variables and
Achievement Scores for Total Gifted and Average Group

<table>
<thead>
<tr>
<th>Variable</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
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<td></td>
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<td>.24**</td>
<td>.38***</td>
</tr>
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<td>2. Crandall Total</td>
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<td>3. Crandall Positive</td>
<td>.52***</td>
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<td>4. Crandall Negative</td>
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<td>.12</td>
<td>.16</td>
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<td>5. Bialer</td>
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<td>.39***</td>
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<td>8. Math</td>
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<td>.49***</td>
<td>1.00</td>
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*p < .05
**p < .01
***p < .001
### TABLE 8
Intercorrelations Among Locus of Control Variables and Achievement Scores for Gifted Group

<table>
<thead>
<tr>
<th>Variable</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Locus of Control</strong></td>
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<td></td>
<td></td>
</tr>
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<td>1. Nowicki-Strickland</td>
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<td>.02</td>
<td>.22</td>
</tr>
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<td>2. Crandall Total</td>
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<td>3. Crandall Positive</td>
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<td>- .03</td>
</tr>
<tr>
<td>4. Crandall Negative</td>
<td>.14</td>
<td>.16</td>
<td>.02</td>
</tr>
<tr>
<td>5. Bialer</td>
<td>.26*</td>
<td>.03</td>
<td>.25</td>
</tr>
<tr>
<td><strong>Achievement</strong></td>
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</tr>
<tr>
<td>6. Reading</td>
<td>1.00</td>
<td>.31*</td>
<td>.42***</td>
</tr>
<tr>
<td>7. Spelling</td>
<td>.31*</td>
<td>1.00</td>
<td>.28*</td>
</tr>
<tr>
<td>8. Math</td>
<td>.42***</td>
<td>.28*</td>
<td>1.00</td>
</tr>
</tbody>
</table>

*p < .05
**p < .01
***p < .001
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<thead>
<tr>
<th>Variable</th>
<th>6</th>
<th>7</th>
<th>8</th>
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</thead>
<tbody>
<tr>
<td><strong>Locus of Control</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>1. Nowicki-Strickland</td>
<td>.09</td>
<td>.10</td>
<td>.17</td>
</tr>
<tr>
<td>2. Crandall Total</td>
<td>.24*</td>
<td>- .16</td>
<td>.05</td>
</tr>
<tr>
<td>3. Crandall Positive</td>
<td>.26*</td>
<td>- .07</td>
<td>.14</td>
</tr>
<tr>
<td>4. Crandall Negative</td>
<td>.14</td>
<td>- .17</td>
<td>- .05</td>
</tr>
<tr>
<td>5. Bialer</td>
<td>- .01</td>
<td>- .03</td>
<td>.15</td>
</tr>
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<td><strong>Achievement</strong></td>
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<td></td>
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<tr>
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<td>.43***</td>
<td>.22</td>
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<tr>
<td>7. Spelling</td>
<td>.43***</td>
<td>1.00</td>
<td>.55***</td>
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<tr>
<td>8. Math</td>
<td>.22</td>
<td>.55***</td>
<td>1.00</td>
</tr>
</tbody>
</table>

*p < .05

**p < .01

***p < .001
TABLE 10:
Means and Standard Deviations of Gifted Children
On Ability and Achievement Measures

<table>
<thead>
<tr>
<th>Variable</th>
<th>M</th>
<th>SD</th>
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<tr>
<td>Individual Ability</td>
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<tr>
<td>Group Ability</td>
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<td>Reading Grade</td>
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<tr>
<td>Spelling Grade</td>
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</tr>
<tr>
<td>Math Grade</td>
<td>5.42</td>
<td>1.07</td>
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</table>
TABLE 11
Means and Standard Deviations of Average Children
On Ability and Achievement Measures

<table>
<thead>
<tr>
<th>Variable</th>
<th>M</th>
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</thead>
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<tr>
<td>Group Ability</td>
<td>99.04</td>
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<tr>
<td>Reading Grade</td>
<td>4.30</td>
<td>1.38</td>
</tr>
<tr>
<td>Spelling Grade</td>
<td>6.47</td>
<td>1.66</td>
</tr>
<tr>
<td>Math Grade</td>
<td>4.57</td>
<td>0.64</td>
</tr>
</tbody>
</table>
average ability group only. Therefore, the correlational relationships can be examined for the total population sampled, the gifted group alone, and the average ability group alone.

Examination of the $r$s for the total gifted and average groups reveal many statistically significant $r$s. The most consistent pattern of significant $r$s can be seen in the correlation of other variables with reading. When the correlation is examined between reading and each locus of control measure, it can be noted that each correlation is statistically significant at least at the .001 level. Highest correlations are identical for reading and Crandall total and reading and Crandall positive ($r = .52$, at the .001 level) and in each instance the variables share a common variance of 27%. It should be noted here again that the Crandall test and its sub-parts are school-related items. The Crandall negative and the reading measure, although still statistically significant ($r = .36$, at the .001 level) and sharing a 13% common variance, show the lowest $r$s of reading with any locus of control measure. This means that although there is still a statistically significant relationship between reading and the tendency to accept responsibility for negative events, this relationship is not as strong as the relationship between reading and the other locus of control measures. The Nowicki-Strickland and the Bialer result in a statistically significant relationship with reading ($r = .42$, at the .001 level and .39 at the .001 level, respectively).

The $r$s between spelling and each locus of control measure reveals some statistically significant relationships, but not nearly so strong as in the reading area. The Nowicki-Strickland and spelling show the
strongest \( r \), although there is only a 5% common variance (\( r = .24 \), at the .01 level).

In examining the relationship between math and each locus of control measure, it can be seen that math significantly correlates most highly with the Nowicki-Strickland (\( r = .38 \), at the .001 level) and the Bialer (\( r = .39 \), at the .001 level), and these measures share a 14% and 15% common variance, respectively. Other weaker relationships can be observed between spelling and Crandall total and spelling and Crandall positive.

It appears that in the achievement area, reading correlates most highly with locus of control measures. However, even though all relationships are not strongly correlated, Hypothesis 4 can be accepted on the basis that there is a statistically significant relationship between each of the achievement measures and each of the three main locus of control measures. This means that children who score higher in reading, spelling and math also tend to be more internal on locus of control measures.

Additionally, each of the three achievement measures is statistically correlated with each of the other achievement measures at the .001 level. \( R_s \) range from .48 to .53 in these relationships. This means that fourth and fifth grade children in the gifted and average ability ranges combined who score higher on reading, spelling or math achievement tests also tend to score higher in the other two achievement areas.

Table 8 displays the relationships between each measure of achievement and each locus of control measure and between each of the achievement scores. In contrast to the data for the total group of
gifted and average, the data for the gifted group alone reveals few
significant relationships. Only one $r$ is statistically significant
between any achievement and locus of control measure, namely the $r$
between reading and the Bialer ($F = .26$, at the .05 level) and this
relationship is not a strong one, with the two variables sharing only a
7% common variance. However, when the achievement measures are examined
in relationship to each other, reading and math have the highest
statistically significant $r$ ($r = .42$, at the .001 level), followed by
lower but still statistically significant $rs$ for reading and spelling,
and for spelling and math, both at the .05 level. Therefore,
this means that within the gifted group, those who score higher
internally on locus of control measures do not tend to achieve higher
in reading, spelling, and math, with the one possible exception of
reading and the Bialer. However, within this same gifted group, those
who achieve higher in reading, also tend to achieve higher in math and
some additional relationships are evident between reading and spelling,
and spelling and math.

In examining Table 9, which deals with the $rs$ among the achievement
measures with locus of control scores and other achievement scores for
the average ability group alone, only a few weak relationships are
noted between achievement and locus of control. These $rs$ involve
reading and Crandall measures. This means that within the average
ability group, those children with higher internal locus of control scores
do not tend to score significantly higher in achievement. This has been
noted within both groups of gifted and average children and can probably
be attributed to the smaller range of individual differences when these
groups are examined separately. Marked significant differences do appear when the relationships are examined within the total group, where, by the very definition of the combined groups, a much wider range of differences are evident. However, once again, there are statistically significant correlations among the achievement measures alone. These can be seen in the $r$ between reading and spelling ($r = .43$, at the .001 level) and spelling and math ($r = .53$, at the .001 level). It is interesting to note that in the gifted group alone, the highest $r$ is between reading and math, but that in the average ability group, this $r$ is not significant.

Exploratory Question 5

Are the factor structures different for the gifted than for the average ability children on the Crandall locus of control measure?

As previously mentioned, the question addressed in this section is done so in an exploratory fashion only. This decision was made because the study does not lend itself to a statistically sound full-interpretation of a factor analysis of the data obtained. Although the measures presented could be factor analyzed, a much larger sample size would be necessary to make this question into a legitimate hypothesis for this study. For this reason, the decision was made to factor only the Crandall measure. This was chosen because of the literature which indicates that Crandall feels the importance of having this measure factored, and in fact, is planning to do so in the near future. Although her research would undoubtedly include a much larger $N$, it would still be interesting to compare the findings here with her research findings. The Crandall
was also chosen because it is a school-related measure, and may therefore tend to be less multi-dimensional than other locus of control measures.

To determine the factors for this factor analysis, the BMD08M System was used. The Varimax Rotation system, a standard orthogonal technique, was used to perform the computations involved in factor extraction and rotation. Five factors were controlled for extraction because of the number of subjects and items and because previous research reported five factors for other adult locus of control measures. Research does not report any factor analytic studies of children's locus of control measures.

Listed below are the items under each factor number and appropriate factor caption describing the commonality of the variables that are loading that particular factor. A loading of .30 was determined to be a minimum on a factor for it to be included. This was chosen because .30 loading gives assurance that at least 9% of the variance in that item is accounted for by the factor. The items are listed in order of magnitude. When an item loads on more than one factor, the other factor numbers are listed in parentheses.

**Gifted/Factor 1--Reinforcement for trying hard.**

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?  

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

If a boy or girl tells you that you are bright, it is  
a. because you thought up a good idea, or  
b. because they like you?
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. It is likely to happen
   a. because she was more particular than usual, or
   b. because you answered too quickly?

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 feel cranky?

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?

When you find it easy to work arithmetic or math problems at 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?

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?

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?

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?

The items loading on this factor tend to be concerned with the results or reinforcements gained when students try to do their best in school. Consequences are described that are the result of both trying and not trying.

There are no additional factor loadings on the four items with the strongest loadings, and those items which are common to other factors are evenly distributed among other factors.
Gifted/Factor 2—Influence over negative events.

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? .64

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? -.57 (4)

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? -.48

Suppose you study to become a teacher, scientist, or doctor and 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? .47 (5)

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? -.40 (3,4)

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? -.40 (5)

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? -.39

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? -.36

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 feel cranky? .33 (1)
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?

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

Most of the items that load on this factor deal with the influence or lack of influence on the negative events that happen in one's life. Of the eleven items, ten deal with negative happenings. These same ten items are termed as Crandall internal negative (I-) items on the measure. This factor is the only one of the factors for the gifted that is heavily loaded on negative events. The only item that is not a negative event item has one of the lower loadings (-.32).

Gifted/Factor 3--School success.

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

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?

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?

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?

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?
When you find it easy to work arithmetic or math problems at 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?

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?

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?

Although almost all items on the Crandall discuss school success or performance in some way, Factor 3 appears to deal more in a general "pass or fail" and "do well-don't do well" type of question. This factor is not so clear-cut as some of the others, but does seem to lend itself to general school success more than any other factor.

Gifted/Factor 4--Dependence on others for success.

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

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?

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?

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 had problems that were too hard?
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?

Because this factor had only five items loading on it, and because only two of these items had strong loadings, it is difficult to feel certain about commonality on this factor. Additionally, the three weakest loadings are also loaded on other factors. However, the factor of depending on others for success in school appears to be the strongest.

Gifted/Factor 5--Influence on positive events.

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?

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?

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?

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?

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?

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?
In contrast to Factor 2 which deals with influence on negative events, Factor 5 is more heavily loaded with items that affect the positive events in a student's life. Five of the six items loading on this factor are termed as being internal positive (I+) items by Crandall.

**Average Ability/Factor 1--Perception by others.**

When you find it easy to work arithmetic or math problems at school, it is usually
a. because the teacher gave you especially easy problems, or
b. because you studied your book well before you tried them?

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?

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

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?

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?

When you win 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?

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?
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?

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?

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?

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?

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?

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?

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?

Many of the items loading on Factor 1 have "feeling type" words included in them. Some of these words or phrases are "likes you," "feeling good," "work is fine," "tell you you are bright" and "encourage pupils." This factor includes more descriptors of how others perceive or feel about a student. It can be noted that items loading on this factor are frequently loaded on Factor 4, which deals with influencing how others feel about you, an area that shares much with this factor.
Average Ability/Factor 2--Influence over negative school events.

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?

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?

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?

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?

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?

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?

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?

All seven items loading on Factor 2 discuss the events that influence negative events that happen in school. Three items also deal with the lack of school success. This is the only factor in either the gifted or average factors which is totally negative or positive according to Crandall's internal negative or internal positive catagORIZATION.
Average Ability/Factor 3--Reinforcement for trying hard.

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? .59

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? .53 (1, 2, 4)

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? .48

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? .47 (5)

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? .46

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? .42 (1, 2, 4)

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? .39 (5)

Suppose you're not sure about the answer to a question your teacher asks you and the answer 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? .37

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? .36
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?

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?

This factor is less definitive than the other factors. It can only be said that the items tend to load more heavily on reinforcements for trying hard than on any other factor.

Average Ability/Factor 4--Influencing the way others think about you.

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?

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?

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

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 clearly written?

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?

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 feel cranky?
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?  

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?  

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?  

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?  

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?  

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?  

   Items loading on this factor deal with the reasons significant others feel the way they do and say the things they do about the student. The items loading on this factor are also heavily loaded on all other factors.

Average Ability/Factor 5--Intellectual ability.

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?  

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?
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?

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?

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?

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?

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?

Items loading on this factor tend to have in them words dealing with low or high intellectual ability or pursuits. These include "became a teacher, scientist, or doctor," "dumb," and "bright and clever." Within this broad area, the items are associated with failing to succeed in a chosen career and reasons for being called dumb or clever by peers, other persons, and parents.

Summary. In answer to the exploratory question of "Are the factor structures different for the gifted and average ability groups of children?", the answer would have to be that although there are some similarities, the two groups do present a different factor structure on Crandall's locus of control measure. The similarities include a factor
entitled Reinforcement for trying hard in both the gifted and the average factor structures. Also, both groups report a factor that loads heavily on Influencing negative events. Although both groups list a factor dealing with influencing others, the emphasis for the gifted group is dependence on others for success, while the average group emphasizes influencing how others feel about the student. The gifted group alone has School success and also an Influence over positive events factors while the average ability group alone lists a Perception of others and an Intellectual ability factors.

It can be said that there are glimpses of similarities in the two groups. It is difficult to determine how much of this similarity is due to the fact that this measure is academically-oriented, and has many questions that are so similar in nature. Also, it is not known in what way the factor structures would change with a larger sample size. For these reasons, it is well to keep in mind that this was developed and researched as an exploratory question only.
CHAPTER V

DISCUSSION

With the recent surge of interest in individual differences, the area of giftedness has seen a slow but steady increase in related research. Cognitive styles, or the manner in which individuals perceive, store, transform, and utilize information are an important part of individual differences. One of the cognitive styles which is receiving much attention in the literature is locus of control, or the degree to which a person believes that he rather than someone else or something else controls the events which occur in his life. Although both gifted and locus of control literature are on the increase, no studies have investigated locus of control in gifted children in America.

Previous research has found that internal locus of control increases with age (Penk, 1969), has a weak relationship to intelligence (Rotter, 1966), can be altered by specific change techniques (Lefcourt, 1966), and has been shown to be a desirable trait in children and adults (MacDonald, 1976). The original objectives of this study were to investigate the relationships among locus of control scores and the ability and achievement scores for children in the gifted and average ranges of intelligence and to examine the relationships among the three locus of control scales for children. In addition to these stated objectives, the general goal was to initiate research on locus of
control in the gifted area, in hopes of laying the ground for future research in this domain.

This discussion chapter will consist of four sections. Section one discusses the relationship of locus of control to intelligence. Section two examines locus of control and achievement. In section three, the three locus of control measures used in the study will be compared. The fourth and final section discusses the possibilities for future research in the area.

Locus of Control and Intelligence

The findings discussed in this study concerning locus of control and intelligence do not support the previous research findings of, in most instances, a weak relationship between locus of control and intelligence. Many studies attempting to relate I-E with intelligence have produced conflicting results. Studies by Crandall (1962) and Chance (1965) found a correlation between intelligence and I-E for boys only. Kiehlbaugh (1967) and Hersch and Scheibe (1967) report insignificant correlations, while Rotter (1966) had found, at best, a low correlation between I-E and intelligence.

As reported in Chapter 4, in this study using children in the gifted and average ranges of intelligence, the findings are that there is a strong, significant relationship between locus of control and intelligence for these ranges. On all three measures, the gifted children were significantly higher in I-E scores than the average ability children. On the Bialer only, the males were significantly more internal than were females. Previous Bialer studies had shown males to be more internal than females, but only mentally retarded students were used in
the study. Coleman et al. (1966), in his classic study found that in only the Oriental sample was there a sex difference in I-E with the males being more internal than females.

The most probable explanation for the highly significant relationships found between intelligence and I-E on all three measures and on the I+ and I- dimensions lies in difference in ranges of IQ sampled in this study and previous studies. Other studies included random samples of students from regular classrooms, with the exception of Bialer studies, which report mostly scores from mentally retarded students. Therefore, most studies have not controlled for intelligence level and therefore most subjects would be scoring at or near the average range of intelligence. In the present study, two distinct intelligence ranges, gifted ability and average ability were used in the sample. Eliminating the high average range created an even wider difference between the two groups. Therefore, although the hypothesis is accepted concerning the significant relationship between I-E and intelligence, it needs to be understood that this relationship has been shown only when these two distinct ranges are sampled.

Ideally, all groups sampled for a study would be individually tested on an IQ measure. The requisite time and school consent for this were not possible for this study. However, for the following reasons, the selection method of individual-test identification for the gifted and group-test identification for the average is felt to be acceptable.

1. According to Simpson and Martinson (1961), in a study of 332 gifted (minimum IQ of 130 on an individually administered test), over half failed to score the minimum 130 on a group
administered test. According to data provided by the California Test Bureau (1954), the scores of students who score in the average range on individual tests had comparable scores on the group test. Therefore, although data were available that could have led to identification of both groups by group-test results alone, research has shown that although within the average population group test scores are adequate for identification, for gifted identification, individual test scores must be employed.

2. Sheldon and Manolakes (1954) compared results of the Stanford-Binet Intelligence Scale with the results of the California Test of Mental Maturity from which the Short Form Test used in this study was derived. They found that at the 130-139 IQ range, the average difference was ten points in favor of the individual test scores.

3. Although previous individual test results were available for only seven of the students in the average range sample, all seven of these did have individual IQ scores which fell in the average range.

In summary, although ideal research conditions would include individual test scores on all students, this author feels that previous group versus individual test results have shown that the chosen method of identifying students for the gifted and average groups is acceptable.

Locus of Control and Achievement

The findings of this study showing that on all three I-E measures, there is a significant correlation with achievement, agree with
previous research showing that achievement scores and grades of internal children are significantly higher than for external children (Crandall, 1965, Messer, 1972). Although these data confirm other research, the findings had previously not included a significant number of gifted students. The significant relationship between the Bialer scores and achievement scores can be considered as a new finding since previous studies with the Bialer had included mainly mentally retarded persons.

The new data in this study also confirm the Coleman report findings that there is a high correlation between a child's school achievement and his perception of his controlling power for his own life. Although this research cannot confirm that a child's I-E is most highly related to achievement, since all other school variables investigated in the Coleman Report were not studied here, it does confirm that a child's degree of I-E is highly correlated with achievement.

It has been shown that although achievement correlates highly with I-E, school grades correlate even higher. Interesting research arising from this finding would be to attempt to determine the reasons for this. Of children with equal achievement test scores, are those who are more internal also those who put forth more effort in the classroom because they perceive themselves as controlling their academic environment? Therefore, are the higher grades actually given to children who the teacher perceives as making more effort rather than to those children who actually are achieving higher?
Locus of Control Scales

Within the total gifted and average population, the three I-E scales administered were all significantly related. This confirms the scant previous research on these measures. For example, a significant correlation was found by Bialer (1961) between the Nowicki-Strickland and the Bialer. However, only 29 children were included in that sample. Also, correlations have been reported between the Nowicki-Strickland and the Crandall total and Crandall positive. A study by Crandall (1965) found a non-significant correlation between the Crandall total and the Bialer. However, in that sample, only blacks were included.

For the total gifted and average group, the only non-significant relationship was between Nowicki-Strickland and Crandall negative. A study by Crandall (1965) found the Crandall total and positive correlated significantly with the Nowicki-Strickland, but the same results were reported on that study as in this present study, i.e., a non-significant correlation between Crandall negative and Nowicki-Strickland.

Excluding within Crandall correlations, the highest correlation is between the Bialer and the Nowicki-Strickland. This is true on the total gifted and average group, the gifted group alone, and the average group alone. The probable explanation for this is that the Bialer and the Nowicki-Strickland are generalized measures of locus of control and Crandall is a situation specific (school oriented) measure. Although the general construct is the same in all three measures, which could account for the minimal significant relationships that the Crandall shares with the other two measures, the much higher correlation between
the Bialer and the Nowicki-Strickland can be explained by their more generalized similar formats.

The above findings add power to the multidimensional nature theory of locus of control scales. Educators and psychologists who use the locus of control scales with children need to be aware of the practical implications they intend for the results obtained. If a locus of control scale that measures only school-related issues can be so distinct from the two more generalized scales, perhaps, it is necessary for educators to consider constructing scales to fit other situations, such as home life, peer relations, etc. Another practical application of the issue raised here would be to construct a scale which would yield an overall I-E score, but would also give sub-scores for specific situations.

Another area which appears to be a limitation of the present I-E scales is that they depend on a child's reporting his own perception of his behavior. Scales that could measure actual internal-type behavior, such as studying hard for a test, attempting to persuade family members or assuming leadership-influence roles with peers, could be used as actual measures of I-E, rather than just a child's perception of his own influence. It would be important for the child's teacher, parent, or peers to share their perceptions of a child's locus of control behavior. It is evident, that although much research is being conducted with the I-E construct, there are many issues that are still in need of exploration.

Implications

Because all research points to the conclusion that people are handicapped by an external locus of control belief (MacDonald, 1976), the
implications arising from this study and other studies need to receive serious consideration by educators and researchers today. As in many other areas, in the locus of control domain there are too many studies which have come to interesting and perhaps worthwhile results, but which need additional follow-up research to help provide meaningful data for the educational field today.

The following seven implications for further study have evolved from the literature and the research results of this study.

1. As previously mentioned, the higher correlations between the Nowicki-Strickland and Bialer as compared with any correlations with the Crandall indicate the need for locus of control measures that are more situation specific, such as school, home, or peer oriented. To aid in developing more differential scales, a factor analysis of the present scales could help by clarifying what factors are present now. By being able to utilize situation-specific scales, internal growth within these specific situations could be measured. By being able to measure growth, strategies for increasing internality could then be evaluated. This, in turn, would lead to planning based on research data that could aid in educational programming. The gifted domain could profit from this, as well as regular and special educational units. According to Gallagher (1975), gifted underachievers generally have poor self-concepts. It would be worthwhile to look at the locus of control for underachieving gifted children in future research.
2. Throughout this research and all literature reviewed, children have been referred to in terms of "more internal" or "more external." If educators are to effectively use the I-E construct in planning, it will be necessary to develop norms across measures that will allow those using these data to compare students with other students and to measure growth within an individual student. In other words, similar to an IQ score or an achievement standard score, it will be necessary to speak of 75% internality or an internal standard score of 80. This could be a built-in part of Implication 1 discussed above.

3. Studies have shown that a person increases in external control as he becomes elderly. In many cases, this is a reality as older people do, by their very needs, become more dependent on others for much of what happens in their lives. Although no research has been found on the relationship of I-E to the handicapped, it appears that I-E would be highly correlated with various handicapping conditions. Scales that measure locus of control for specific handicaps, such as deafness and blindness, could help in programming handicapped people toward a more internal orientation.

4. Although this study investigated locus of control and the gifted and average and Bialer has studied locus of control and the mentally retarded, there are still gaps in intelligence ranges that have not been fully explored. For example, although most of Bialer's work was with mentally retarded children, he
combined the trainable and educable mentally retarded in some studies. No separate studies have investigated the relationship of the low average range of intelligence or the high average range of intelligence. If studies are to refer to the retarded, the gifted, and the average, a comprehensive study is warranted so that relationships can be examined across all segments.

5. The literature presents contradictory results when sex and locus of control are investigated. With the current trend toward sexual equality in the school, the sex variable needs to be explored in terms of its value for furthering non-sexist roles for children. If it is found that girls are more external at certain grade levels or within particular intelligence ranges, an internalizing program would be warranted for the particular population.

6. Second only to further work on developing scales of practical significance is the value of further research on techniques for changing locus of control. Perhaps by investigating what teacher attributes and characteristics are associated with a more internal change in students in a given year, further work could be initiated to help teachers develop these characteristics. Rather than examining the effects on I-E change in one-to-one situations such as psychotherapy, a more universally practical site for examining change techniques would be in the public schools where uniform monitoring can be controlled in large populations and where the change
strategies can become part of the regular school curriculum
to begin purposefully promoting more internal orientations
in children. The entire field of locus of control has numerous
practical implications for the educational setting.

7. The relationship between locus of control and cognitive com-
plexity for children in the gifted and average ranges of
intelligence will be examined at a later date. This is
possible because the author of this dissertation and Joan
English, researcher on cognitive complexity, used the same
population (with a few exceptions) for their research. Each
researcher was responsible for administering the tests
necessary for her research and the responsibility for admin-
istering the group intelligence test was shared. It is the
feeling of both researchers that working together as fellow
researchers was a useful idea because it allowed for an
additional proctor during testing time and it permitted a
double checking system in many instances of scoring.

Summary

There appears to be an increased interest in the area of giftedness
and individual differences in educational and psychological literature.
This research examines locus of control in fourth and fifth grade
students in the gifted and average ranges of intelligence. Areas of
investigation include the relationship of locus of control with
intelligence, the differing amounts of variance in locus of control
within the two ranges studied, the relationships among the three locus
of control measures administered, and the relationships among the locus
of control measures and achievement measures in reading, spelling, and math. In an exploratory fashion only, the Intellectual Achievement Responsibility Questionnaire was factor analyzed.

The findings in the areas discussed above include the following.

1. In the fourth and fifth grades examined, the gifted students were significantly higher in internal locus of control on all three measures and on the Crandall subtests, I+ and I-, which measure perception of control for positive experiences and negative experiences.

2. There is significantly less variance within the gifted population than within the average population on all locus of control measures examined.

3. There is a significant correlation among the three locus of control measures and the subtests. The highest correlations are evident within the Crandall measures and between the Nowicki-Strickland and the Bialer.

4. With the exception of the Crandall negative, all locus of control measures are significantly correlated with the three achievement measures. Reading was the most highly correlated achievement measure with locus of control.

5. The exploratory question investigating the factor structures of the Crandall measure for the gifted and average ranges found that there are both similarities and differences in the two ranges of intelligence on factor structures.
### Behavior Checklist

**Student**  
**School**  
**Teacher**  
**Grade**

<table>
<thead>
<tr>
<th>Behaviors</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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</thead>
<tbody>
<tr>
<td>1. Learns rapidly and easily.</td>
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<td>2. Uses a great deal of common sense and practical knowledge.</td>
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<td>3. Reasons things out, thinks clearly, recognizes relationships, comprehends meanings.</td>
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<td>4. Retains what he has heard or read without much rote drill.</td>
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<td>5. Knows about many things of which most students are unaware.</td>
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<tr>
<td>6. Has a large vocabulary which he uses easily and accurately.</td>
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<td>7. Can read books that are one or two years in advance of the rest of the class.</td>
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<td>8. Performs difficult mental tasks.</td>
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<td>9. Asks many questions, has a wide range of interest.</td>
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<tr>
<td>10. Does some academic work one or two years in advance of his class.</td>
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<tr>
<td>11. Is original in his thinking, uses good but unusual methods</td>
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<tr>
<td>12. Is observant and responds quickly.</td>
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</tbody>
</table>

**Directions for Using Enrichment Checklist**

For each behavior listed, please mark whether the student:

- 5 = always exhibits this behavior
- 4 = frequently exhibits this behavior
- 3 = sometimes exhibits this behavior
- 2 = rarely exhibits this behavior
- 1 = never exhibits this behavior
Dear Parents:

As part of our graduate work at Ohio State University, we are conducting a joint research study under the supervision of Dr. Ann Engin and Dr. Ray Swassing into the way children learn. We are gathering information about why they believe things happen in their daily lives and about how they think about their social world.

We would like your permission for your child ______________ to participate in this study.

The paper-and-pencil activities that we are using will take about an hour of the children's time. There will be a set of questions about whether the children feel that the outcomes of their behavior are controlled by themselves, by luck, or someone else. They will also be asked to show the number of categories they use to describe other people. We will also use short tests of ability and achievement. We will be working with the children in small groups at their school during the regular school day.

Your child's name would not be used in any publication or report, and no information about individual children will be given to the school. You would have the right to withdraw your child from this study at any time.

We believe that this would be an interesting and worthwhile activity for your child, and it will help us and other educators to learn more about effective ways to work with children.

Please complete the enclosed form to tell us whether your child will be part of our group, and use the stamped envelope to return it to us.

If you have any questions about this project, please call either one of us after 6:00 on weekday evenings or any time during weekends - Joan English, 457-8303 or Joan Lynne, 888-6681.

Thank you.

Sincerely,

Joan Lynne
Joan English
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