8-1976

The Relationships Between Maternal Locus of Control, Maternal IQ & Infant Development

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1976

THE RELATIONSHIPS BETWEEN MATERNAL LOCUS OF CONTROL, MATERNAL IQ AND INFANT DEVELOPMENT

A Thesis

Presented to

the Faculty of the Department of Psychology

Western Kentucky University

Bowling Green, Kentucky

In Partial Fulfillment

of the Requirements for the Degree

Master of Arts

by

Vernon S. Westrich

August 1976

THE RELATIONSHIPS BETWEEN MATERNAL LOCUS OF CONTROL,
MATERNAL IQ AND INFANT DEVELOPMENT

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A group of mothers and their infants enrolled in a rural child development center served as the subjects for this study. This investigation was designed to study the relationships between maternal locus of control, maternal IQ and their effects upon an infant's rate of mental and motor development.

Locus of control was measured by a newly developed I-E scale designed for use with populations of low reading levels and low intelligence levels. The mother's IQ was measured with the PPVT, an instrument that yields passive, verbal intelligence scores. An infant's level of development was assessed with the Bayley Scales of Infant Development. The Bayley Scales results are expressed in terms of mental and motor development indices. These indices are not synonymous with IQ; they are measures of development at a given point in time in comparison with other infants of the same age.

No significant relationship between locus of control and intelligence was found for the mothers in this population. The infants' mental levels of development were significantly related to the maternal passive, verbal IQ, although the infants' motor development levels were not significantly related to maternal verbal IQ. Both mental and motor developmental rates were significantly related to maternal locus of control orientation.

CHAPTER I

INTRODUCTION

Many theories have been offered to explain the different developmental rates of infants. While for many this debate remains on the academic level, for at least one group, this issue can be charged with emotion. For this group, the mothers of young children, much more is at stake than resolving a theoretical issue: for this group, feelings of self-worth are on the line.

The mothers of young children interact so closely with their children that often the child is seen as an extension of the mother. Often, mothers become so personally invested in the development of their children that the child's achievements are the mother's achievements. This close interaction between mother and infant creates an environment where the mother fulfills the role of primary educator, and her personality has a profound influence upon a child's development.

As Munsinger (1971) stated, during the first three years of a child's life, the mother functions as the most influential individual for most infants. Past research has supported this observation. Beckwith (1971) reported that the amount

of vocalizations of the mother was the single most important variable correlating with infant intelligence. Also, Yarrow (1965) reported that achievement stimulation, social stimulation and stimulation adaptation as modeled by the mother were the most important factors contributing to the infant's intelligence at age six months.

While researchers have investigated many different variables that affect infant intelligence, in general, past research supports the theory that it is mother behavior which is the most crucial factor in infant intelligence. At times the behaviors of fathers, nursery personnel or baby sitters are substituted for the mother's behavior for short periods of time. When extended for long intervals, these substitutions appear to produce sensory deprivation, with many detrimental effects on the child, ranging from developmental retardation to regression (Caldwell, 1970; Yarrow, 1961).

For some mothers, this role of facilitator is one of choice; but for others, it is a role imposed by society. Howe (1973) reported that despite increased flexibility in defining the female role in recent years, there is still social consensus regarding appropriate behavior for mothers of young children. Except in cases of financial need, society still expects women to devote themselves to child-rearing during the early stages of their children's lives.

The following advertisement for Dr. Genevieve Painter's Teach Your Baby highlights the extent of the acceptance of the role of educator supreme that society assigns to mothers.

This advertisement appeared in the March-April edition of the Pre-Natal Mothers Manual:

> "You are the most important teacher your child will ever have.
>
> No matter how many years he may spend in school; no matter how many inspiring teachers he studies under; the fact is, what your baby learns in the first years of his life will influence forever his intelligence, his potential, and his eagerness to learn.
>
> Recent and dramatic discoveries by early childhood educators reveal that your child's success in school depends on what you do now, before he ever meets another teacher.
>
> Now, Teach Your Baby, a new book shows you how to get started and exactly what to do from the day your baby is born, until he's ready for nursery school." (P 22)

Past research, investigating the importance of the mother role, has attempted to define specifically which behaviors and characteristics enhance child development. Some of the variables that have been examined are social class, race, basic intelligence of the mother and the number of children in the family.

While all of these variables may contribute to the mother's ability to influence infant development, an important variable seems to have been neglected in the research. The effects of a mother's internal-external orientation, or her locus of control, upon early infant development have not been investigated. This study attempted to examine the relationship between locus of control and early infant development and the direction of the effects of this relationship.

CHAPTER II

REVIEW OF THE LITERATURE

The concept of locus of control refers to an individual's tendency to either perceive reinforcement as the result of one's own behavior or as the result of other extrinsic factors. Those who believe that they possess control over their destiny are considered to be internally controlled. Those who believe that their reinforcement is controlled by other people or circumstances are considered to be externally controlled.

In the years following the evolution of locus of control from social learning, much research has been compiled. This vast amount of research has helped to clarify and expand the implications of locus of control. Much of the early research on the locus of control variable was conducted by J. B. Rotter (Schroder and Rotter, 1954; James and Rotter, 1958; Rotter, 1960; Holden and Rotter, 1963; and Rotter and Mulry, 1965). As an outgrowth of his pioneering research, many personality variables have been found to be related to locus of control. Within this wealth of research are several studies with implications for infant development.

In order to fully understand the conclusions of the locus of control research, some knowledge concerning the history of measurement of locus of control is necessary. The first standardized attempt to measure individual differences in a generalized expectancy or belief in external control as a psychological variable was begun by Phares (1957) in his study of chance and skill effects on expectancies of reinforcement. This scale consisted of a Likert type scale of 13 items stated as external attitudes and 13 internal attitudes.

James (1957), in a refinement of the scale, retained the Likert format and wrote 26 items and filler items based on the items which appeared to be most successful in the Phares study. James reported low but significant correlations between his test and behavior in a task situation. A correlation of .51 with the California F Scale was seen as indicative of a successful measurement in both scales of the degree to which individuals see the world as containing powerful forces that they cannot influence.

These two attempts at measuring the I-E variable were further developed by S. Liverant, J.B. Rotter and D. Crowne. Initially, they attempted to broaden the test by developing subscales for different areas such as achievement, affection and general social and political attitudes and to control for social desirability. The revised scale included 100 forced choice items, each one comparing an external belief with an internal belief. Following factor analysis, the scale was reduced to 60 items because of a failure to meet internal

consistency criteria.

Item analysis indicated that the subscales were not generating separate predictions. For this reason, attempts to measure specific subscores of Internal-External control were discontimued. Then the scale was revised to make the items appropriate for noncollege adults and upper level high school students. From these 60 items, the scale was reduced to 23 items. The items that were eliminated were those that had a high correlation with the Marlowe-Crowne Social Desirability Scale, a proportional split so that one of the alternatives was endorsed more than 85% of the time, a nonsignificant relationship with other items or a correlation approaching zero with both validation criteria. Six filler items were added to make the purpose of the test somewhat ambiguous. All items deal exclusively with the subject's belief about the nature of the world. They deal with expectations about how reinforcement is controlled. Therefore, the test is a measure of generalized expectancy and not a measure of preference of control.

Correlation of the I-E Scale and the Marlowe-Crowne Social Desirability Scale range from -.07 to -.35. The I-E Scale has split-half reliability of .65 and Spearman-Brown reliability of .70.

The first of the important aspects of locus of control to be discussed is the relationship between locus of control and achievement. Internal-External control has been measured by scales stressing academic interests; therefore, it seems

likely that achievement behaviors would be related to internal-external control. This internal locus of control to high achievement bond is strengthened by the findings of a report on equality of educational opportunities, the Coleman Report. Based upon this report, locus of control was a better predictor of school achievement among children of minority groups than any other attitudinal, familial, school or teacher variable (Coleman, Campbell, Holson, McPartland, Mood, Weinfeld and York, 1966). In this report's findings, internal orientation of control was associated with high achievement.

Later research by Nowicki and Walker (1974) also reported a significant positive correlation between internal control and achievement as measured by GPA's for college students. Duke and Nowicki (1974) reported a significant positive correlation of internal control to achievement for males but not for females.

Basically, two explanations for this correlation between internal locus of control and high achievement are offered. The first explanation states that because an internal person perceives that he controls his fate, he strives to perform at his best and therefore achieves at a higher rate than does an external person. Research findings lend credibility to this theory. Procuik and Breen (1975) reported that internals have more efficient study habits than externals. Bassbarry, Ollindick and Vuchinich (1974), in research dealing with college males, concluded that internals utilize study

time more efficiently than do externals. Warehime (1972) reported that under experimental conditions, internals would work harder to receive reinforcement than would externals.

The other explanation for the association of internal control and high achievement is the view that locus of control is nothing more than a function of intelligence. Proponents of this view equate being more intelligent with being more successful and with an internal locus of control orientation. The logic for this association is that people are more likely to accept responsibility for their actions if they are a success and are more likely to be a success if they are intelligent. Heisler (1974) reported that, in a survey of a government agency, individuals of an internal orientation realized more of the five factors of success than externals. Those five factors of success included the number of promotions, number of salary raises, awards, current salary and grade differential.

Although Heisler's research did support the premise that people tend to accept responsibility for their actions more readily if they are a success rather than a failure, it did not establish a cause and effect relationship as to which factor leads to the others. Crandall, Katovsky and Preston (1962) reported that acceptance of responsibility was more a function of a sex variable than a success-failure variable. Their results indicated that early grade school girls were more willing to accept responsibility for their academic success or failure than were boys. When these

results are interpreted considering the different rates of maturity for males and females, they are consistent with other results. Because the early grade school girl is more mature, she is more likely to obtain better grades than her male counterpart. In this framework, internal control is again associated with success and success with accepting responsibility.

Several investigators have found that intelligence is positively correlated with perceived internal control (Bialer, 1961; Crandall, Katovsky, and Crandall, 1965). In investigations which produced conflicting results, it was found that the variables of race and social class were related to intelligence more than locus of control. Lower class Negroes with high IQ's were more external than middle class whites with low IQ's. Additional evidence for rejecting the intelligence-locus of control connection was reported by Hersch and Scheibe (1967), who found no correlation between the I-E total score and intelligence as measured by three different intelligence scales.

At this point, the final determination of locus of control's relationship to intelligence is uncertain. Some relationship between these two variables does seem to exist, but the abundance of variables influencing both locus of control and intelligence has so far made complete disclosure of this relationship impossible. What is certain is that any future study concerning locus of control must account for and control the possible confounding effects of intelligence. If control for the effects of intelligence is not established, the

confounding effects of intelligence will seriously limit any conclusions concerning locus of control and any other variable.

Another important variable that is associated with locus of control is the ability to predict one's own ability or performance. An internal individual feels that he controls his life to some degree. Because of this, the decisions made by an internal are seen as being of more consequence than those decisions that are made by an external. Logically, if these decisions of the internal are more important than those of an external, the internal is more likely to base his decisions upon careful analysis of available information than is the external. This analysis leads to a better understanding of one's own capabilities and better prediction of performance. Research supports this hypotheses that internals do process data more efficiently than externals. Seeman and Evans (1962) and Seeman (1963) reported that perceived internal control is associated with superior acquisition and retention of personally relevant information. This finding was further supported by Davis and Phares (1957) and Phares (1968) who reported that internals tend to seek information more actively and to utilize it more fully than do externals. Lefcourt (1966) noted that, in situations where perceived internal control is experimentally induced, a subject tends to perceive changes in his situation more accurately than under conditions of perceived external control.

Also, DuCette and Wolk (1973) reported that externals

are less active and less efficient information seekers and users than are internals. Rotter (1966) proposed that the generalized expectancy for internal versus external control of reinforcement is a key determinant of the individual's awareness of potentially useful information for future predictions of behavior.

Having established that internals do function better as processors and utilizers of personally relevant information, it would be expected that based upon this information internals would be more accurate predictors of their own behavior than externals.

Past research associating locus of control to ability to predict one's own behavior indicates that internals are capable of better prediction of their own behavior than are externals. On performance of tasks of short duration, externals frequently changed estimates of their own performances and were unable to arrive at evaluations of their own skill (Rotter, 1954). Other research, limited to college students, indicates that internals do predict academic success more accurately than externals (McGhee and Crandall, 1968).

Wolfe (1972) asked beginning college students to predict their GPA at three points in the semester. His findings indicate that internals are superior to externals in predicting future GPA's. Also, the effects of locus of control are most apparent the more short range the predictions. When asked to predict GPA's at the end of the semester, too many

variables confound the issue. As a result, both internals and externals have difficulty focusing on relevant information.

Steger and Simmons (1973) also reported that internals function better at predicting an immediate or short term estimate than do externals. By asking college students to estimate their number grades on an exam just completed, based only on the mean and standard deviation, internals were significantly more accurate than externals.

Although the locus of control literature has some areas where consistent relationships have not been accomplished, there are several important, generally accepted findings. While these findings typically have been applied only to individuals, they include implications for developmental levels of children as well. Past locus of control research has been restricted to individual implications only; therefore, no theory presently exists to relate locus of control of the mother to developmental rates of her child. It is this issue to which the present study was addressed.

Each of these previously reported conclusions regarding locus of control, along with the implications for child development and the logic for these predictions, warrants analysis. Because child development is a critical variable in this study, a single model of both child development theory and assessment is necessary. The adherance to a single, consistent child development theory and assessment technique will facilitate the investigation of the relationship between

maternal locus of control and child development.

One of the recognized authorities on the subject of infant development is N. Bayley. According to Bayley (1969), evaluation of the developmental status of infants requires special methods and procedures. Bayley reported two major differences between infants and older children or adults that necessitate this special methodology.

The first of these differences is that during the first year of life, a child has no previously established "set" for following instructions of problem solving on request. Instead, an infant attends to and responds to situations and tasks that interest him. To compensate for this difference in attention, assessment must be accomplished through the use of stimuli that are attractive to the child. In this manner, measurement of relevant behavior variables can be gained with tasks that hold an infant's interest and solicit his participation.

The second major difference between infants and older children or adults that necessitates special techniques of assessment is that during a child's first two years abilities are not arrayed in orderly, concurrently developing clusters of mental or motor functions. Instead, a limited set of functions develops first. These initial functions are basic for later development of other abilities which are gradually differentiated with growth. As a result, any attempt to classify abilities into long range, concurrently developing systems of different factors is of little utility. Tests employing this technique of developing clusters of

complimentary items are useful only if the range included is short age spans.

With these limitations of infant tests as guidelines, Bayley developed the Bayley Scales of Infant Development (BSID). The first two parts of the BSID, the mental and motor scales, are based upon three California developmental scales: The California First-Year Mental Scale (Bayley, 1933), the California Preschool Mental Scale (Jaffa, 1934), and the California Infant Scale of Motor Development (Bayley, 1936). This original Bayley scale of infant development covered only the first fifteen months of life.

The expanded version of the BSID expanded the age range to thirty months. The mental scale of the BSID is designed to assess sensory-perceptual acuities, discriminations, and the ability to respond to these; the early acquisition of "object constancy" and memory, learning, and problem-solving ability; vocalizations and the beginnings of verbal communication; and early evidence of the ability to form generalizations and classifications, which is the basis of abstract thinking (Bayley, 1969).

The motor scale is designed to provide a measure of the degree of control of the body, coordination of the large muscles and finer manipulatory skills of the hands and fingers (Bayley, 1969). Both mental and motor scores are converted to development index scores.

Bayley cautions against equating mental and psychomotor development index scores with intelligence. Rates of devel-

opment for children in the first two years of life varies a great deal over a few months. As a result, the use of mental and psychomotor scores as predictors of later abilities is not justified. The primary value of the development indexes is to provide tha basis for establishing a child's current level of functioning and thereby to determine the extent of any deviation from normal expectancy.

For this study, Bayley's concept of development was used, i.e., development does not equal adult IQ but rather indicates where the child is functioning at a particular point in time in comparison to children of the same age.

With this framework as a guide, the first relevant locus of control findings were presented, along with the implications for child development. As determined earlier, internals feel that they control their world more than externals do. In addition to this, mothers have been told by society that what they do or do not do will influence the development of their child. Because an internal mother feels that she does control and is responsible for her world, she is more likely to sense the importance of her interactions with her child than is the external mother. Therefore, the internal mother will strive to direct her child to perform at his best. This attempt by the mothers would be expected to produce accelerated infant development. The external mother is not accepting of the premise that she is influential concerning her child. She feels that the child's development is controlled by variables other than her behavior. As a result, she experiences less motivation to direct her

child's behavior and exerts fewer efforts to increase her child's developmental rate.

Another finding of the locus of control literature that has possible implications for child development is the finding that internals tend to have higher achievement levels than do externals. A mother often derives achievement satisfaction from the success of her children. Because a mother views the child's achievement as her own, she is involved to the extent that the child's behavior is seen as her own achievement for which she is responsible. If one accepts this logic that a mother does view a child's behavior as her own, the findings indicating that internals have higher achievement levels than externals take on added significance. If internals have higher achievement levels than externals, and a mother assimilates a child's achievement level with her own, the children of internal mothers would be expected to have higher achievement levels than the children of external mothers.

Further evidence to suggest a link between locus of control of the mother and her child's development rate is found in the ability of internals to function better as processors and utilizers of personally relevant data than do externals. This finding, when logiacally extended to include developmental rates of children, would indicate accelerated rates of development for children of internal mothers. At a time soon after birth, a mother and her child initiate a contingency schedule for each other. The internal mother, because she processes

and utilizes personally relevant data better than the external mother, will recognize and react to these behaviors that comprise the mutual contingency schedule more quickly and more consistently than the external mother. This superior ability to function within the contingency schedule will allow the internal mother to more readily identify the behaviors deemed acceptable for reinforcement and to strengthen the bond between a child's behavior and her reward more efficiently. Having established these guidelines for this contingency schedule, the internal mother is then in the position to raise the standards of acceptable behavior faster than is the external mother. This would be expected to result in accelerated development for the child of an internal mother.

This schedule of mother-child interaction is alluded to in the literature. Yarrow and Pedersen (1972) stated that the first social tie that develops, the bond between mother and infant, serves as a prototype for all later relationships. This relationship is reciprocal and is an interactive process. The infant elicits caretaking and other responses from the mother, and the mother in turn evokes visual regard, vocalization, smiles and approach movements from the infant. These infant responses in turn stimulate further nuturant and affectionate behavior in the mother. While it is true that this emotional development is not equal to physical and intellectual development, as Yarrow and Pedersen (1972) pointed out, the social, emotional growth rate is intimately tied to other aspects of growth such as development of visual and auditory

discrimination, growth of contingency awareness and the development of cognitive abilities.

The final characteristic of locus of control that has implications for child development is an internal's ability to more accurately predict his own performance than does an external. To appreciate the importance of expectation of ability to predict, one must realize that we often perform to meet the standards set by ourselves or by others. Cromwell (1963) found that a diagnosis of retardation led to lower success expectations accompanied by an equal decrease in efforts to achieve. Therefore, by raising or lowering the standards, we raise or lower the performance. If an individual underestimates his potential, his performance will probably be less than it could be. On the other hand, if a person sets unreasonable goals or expectations that are not within the bounds of his potential, he will continually not be reinforced. Obviously, the ideal situation is a realistic prediction that sets goals high enough to motivate but not so high as to frustrate.

Having established that internals function better at predicting their own behavior than externals, and accepting the theory that a mother often views her child's performance as her own, logical implications for mother locus of control and her child's development level again surface. If internals are better at predicting their own performance than externals, and if mothers identify with their child's performance to the point where the child's behavior is accepted as their own, and

if maximum performance by a child depends upon reasonable predictions of his capabilities, then the internal mother should have children with higher developmental rates than an external mother.

To confound the problem of child development measurement, in past research, contradictory reports exist concerning the differential developmental rates of infants based upon sex. Moss (1967) reported that differences in behavior based upon the sex of the infant existed as early as three weeks of age. Similarly, Kagan (1971) stated that mothers have different ideas concerning areas in which boys and girls would excel. Boys are expected to be strong and active and generally proficient in gross motor skills. Girls are expected to excel in vocalizations and verbal problem solving. Based upon these expectations, mothers react differently to boys and girls. This results in different types of development for infants. On the other hand, Bayley (1965) reported that on the mental and motor scales of the BSID, no significant differences existed between males and females for ages one through fifteen months. Because of conflicting findings concerning the effect of the child's sex upon development, any research dealing with child development must account for a possible sex difference.

STATEMENT OF THE PROBLEM

As stated earlier, the implications of maternal locus of control research for rates of development for children have not been established. Rather, they are theoretical relations

that have not been researched. This study was initiated in an attempt to study the relationship between maternal locus of control and the rates of development of their children, and maternal locus of control and intelligence.

It was hypothesized that:

1. A positive significant relationship would exist between maternal IQ and infant developmental levels.

2. A positive significant relationship would exist between maternal locus of control and infant developmental levels.

3. No significant relationship would exist between locus of control and IQ.

4. No significant difference between male and female infants would exist on scores of development.

CHAPTER III

METHOD

Subjects

The subjects were 40 infants between the ages of 12 and 30 months and their mothers. Of these 40 infants, 28 were male and 12 were female. The infants and their mothers were participants in an early child development center in rural Kentucky. The mothers of these infants differed from the average mother in at least two important aspects. All of these mothers represent families whose income is below the poverty level, and less than 25% of the mothers are high school graduates. While this group differs from the typical mother, they represent a subculture in which the greatest potential for facilitation of child development exists. Therefore, the selection of this population for use in the study of child development seemed appropriate.

Instrumentation

The Bayley Scales of Infant Development (BSID) was administered to the infants under standard instruction as outlined in the Bayley Scales of Infant Development Manual (Bayley, 1969). According to Bayley, the BSID was designed

to adequately measure the development of the infant. The test consists of three parts: the mental scale, the motor scale and the infant behavior record. This study used only the mental and motor scales because these two scales yield standard scores. These standard scores have a mean of 100 and a standard deviation of 16. The mental scale consists of 163 items, and the motor scale has 81 items. The test was standardized on a sample of 1,262 children and equally distributed among 13 age groupings from 2 through 20 months. Bayley reported split-half reliability coefficients for the mental scale ranging from .81 to .93. For the motor scale, the reliability coefficients ranged from .68 to .92. This lower reliability for the motor scale was explained in terms of the number of items on each scale. The motor scale has only half as many items as the mental scale.

Peabody Picture Vocabulary Test (PPVT)

The PPVT-Form A was administered to the mothers of the infants under standard instructions as outlined in the PPVT Manual (Dunn, 1965). This test yields a standard score of 100 for the mean and a standard deviation of 15. The test was standardized on a sample of 4,012 subjects varying in age levels. Alternate form reliability coefficients reported ranged from .67 to .84 with a median of .77.

Internal-External Locus of Control Measurement

Orientation of control measurement was accomplished with the use of an internal-external instrument designed for the subject population. Use of existing I-E scales was rejected for two reasons. First of all, adult scales stressed school

situations often dealing with acquisition of grades to the extent that it would be difficult for the subject population used to identify with these scales. Secondly, adult scales required a reading level that exceeded the subject population's ability. Special scales that have been created to measure a child's locus of control were rejected because they seemed invalid for this population.

The I-E scale developed consisted of 24 forced choice items. Each item consisted of a Rosenzweig picture frustration drawing with two responses provided, one reflecting an internal locus of control orientation and the other indicating an external locus of control orientation. Internal responses were designed to reflect the subject's acceptance of responsibility and control of the situation. External responses were designed to reflect the subject's rejection of responsibility and control of the situation. Responses were judged by a panel familiar with the I-E variable to satisfy face validity criterion.

Validity of the measure was established by administering the experimental scale and the Rotter I-E Scale to 21 female students enrolled in an undergraduate psychology class. A rank order correlation of .72 between the two measures was obtained. This correlation was considered to be of sufficient magnitude to justify the use of this scale in measuring internal-external orientation. For a complete list of scores on both I-E measures, see Appendix A.

Procedure

All of the tests were administered by two male psychology

graduate students of approximately the same age as the mothers. The same procedure was followed by all subjects. First, the I-E scale was administered to the mother while the infant adjusted to the examiner and the surroundings. Standard instructions were provided for all subjects. Each subject was instructed to, "Consider each of the following cartoons and pretend that you are the person with the blank caption. Then select the one of the two responses that comes closer to what you would actually say." If it appeared that a subject was having difficulty reading the I-E scale, the examiner read it to her. For a complete list of the possible responses, see Appendix B.

After the I-E scale was complete and the infant had adapted to the situation, the Bayley Scales of Infant Development were administered. Throughout this test presentation, standard instructions were adhered to, and mothers were encouraged to assist by encouraging their children to perform tasks that might have been refused if asked by the examiner. In this manner, the scores yielded tend to reflect optimum performance levels of the children.

Finally, the PPVT was administered to the mothers. Standard instructions were followed throughout this administration. In addition, a warm, supportive attitude was adopted by the examiner to solicit increased effort and maximum performance from the mothers.

CHAPTER IV

RESULTS

The data obtained in this study were analyzed by separate Pearson product moment correlation coefficients between each factor and the two dependent variables of mental and motor scores on the BSID. All scores are presented in Appendix C.

A *t*-test of significance was computed to determine if a significant difference existed between sexes in this study and if the subjects should be considered as a total group or subdivided into sex groups. Results of the *t*-test for the mental scale yielded a *t* value of 3.243, with 38 degrees of freedom and a $P < .01$. For the motor scale, *t* value equaled 7.439, with 38 degrees of freedom and a $P < .01$. These results indicated that significant differences did exist between sexes on the two variables of mental and motor scores; therefore, they were treated as two separate groups.

The null hypotheses associated with each of the correlation coefficients was that no correlation that would significantly differ from a zero correlation would be obtained between mental or motor BSID scores and I-E scores of PPVT scores. Also, no correlation that would significantly differ from

zero correlation would be obtained between PPVT scores and I-E scores. Significance levels at or beyond the P_.01 level were considered significant.

The results for the female population are presented in Table 1.

TABLE 1
(N=12 Pairs)

CORRELATIONS OF MATERNAL PPVT, MENTAL AND MOTOR BSID AND MATERNAL I-E SCORES FOR FEMALE INFANTS

	correlation	significance level
PPVY--BSID mental	.21	.253
PPVT--BSID motor	.05	.433
PPVT--IE	.18	.292
IE --BSID mental	.36	.122
IE --BSID motor	.28	.189

The correlation coefficients obtained between a female infant's mental and motor levels of development and maternal locus of control and IQ were not significant. Also, for the female infant group, no significant correlation existed between maternal IE and maternal IQ.

The results for the male population are presented in Table 2.

TABLE 2
(N=28 Pairs)

CORRELATIONS OF MATERNAL PPVT, MENTAL AND MOTOR BSID AND MATERNAL I-E SCORES FOR MALE INFANTS

	correlation	significance level
PPVT--BSID mental	.55	.001+
PPVT--BSID motor	.38	.024
PPVT--IE	.28	.077
IE --BSID mental	.45	.008+
IE --BSID motor	.51	.003+

(+ indicates acceptable significance levels)

Unlike the female population, the correlation coefficient obtained between male mental developmental levels and maternal

IQ was significant.

When comparing the male infant's motor developmental levels with maternal IQ, results were consistent with the results for females. The correlation coefficient obtained between these two variables was not significant.

Male population results comparing maternal locus of control to maternal IQ were consistent with the female results. For the male group, no significant relationship existed between these two variables.

Higher correlation coefficients were obtained between the male population's mental and motor levels of development and maternal locus of control than were obtained for the females. While in the female group, only a nonsignificant tendency existed to associate these variables; for the male population, these correlations were significant. This indicated that a significant relationship existed between an infant's mental and motor level of development and maternal locus of control orientation for the male group.

The results for the total population are presented in Table 3.

TABLE 3
(N=40 Pairs)

CORRELATIONS OF MATERNAL PPVT, MENTAL AND MOTOR BSID AND I-E SCORES FOR ALL INFANTS

	correlation	significance level
PPVT--BSID mental	.47	.001+
PPVT--BSID motor	.32	.02
PPVT--I-E	.25	.06
IE --BSID mental	.43	.003+
IE --BSID motor	.43	.003+

(+ indicates acceptable significance levels)

The correlation coefficient obtained between infant men-

tal levels of development and maternal IQ indicated that a significant relationship existed between these two variables for the total population.

When comparing the results of an infant's motor level of development and maternal IQ, the correlation coefficient indicated that no significant relationship existed between these two variables for the total population.

Results of the correlation coefficient obtained between a mother's IQ and her locus of control indicated that, for the total population, no significant relationship existed.

When examining the relationship between an infant's mental and motor levels of development and maternal locus of control, the correlation coefficient indicated that a significant relationship existed between these variables for the total population.

CHAPTER V

DISCUSSION

Measurement of maternal locus of control was accomplished with the use of an I-E scale specifically developed for a population with a low reading level and a relatively low intelligence level. Although this scale's correlation with the Rotter I-E was high (.72), the scale is still experimental. While this experimental scale appeared to yield meaningful results, further research is needed to establish the value of this scale. The fact that this scale is new and virtually unresearched should be taken into consideration when interpreting the results of this study.

Results of the present study indicate that locus of control is more than a function of intelligence. For all groups, correlations between intelligence and locus of control tended to be low and did not reach the significance level. This finding is consistent with the findings of other researchers who found that locus of control was a unique personality variable and could not be explained in terms of intelligence (Battle and Rotter, 1963; Hersch and Scheibe, 1967).

The results of the other variables were not as consistent

as the correlation between locus of control and intelligence. When considering the total group and male data, I-E orientation of the mother is related to both mental and motor developmental levels of infants. Analysis of the female group data indicated that the locus of control of the mothers was not associated with the mental or motor developmental rates of their infants.

If the differences reported between sexes is only attributible to sex differences, these findings would be weakened and would require interpretation to be in terms of sexes rather than the total group. In this study, it is possible that the reported difference between males and females on developmental measures could be the result of variables other than sex.

Post hoc analysis indicated that, for this population, as the children's ages increased, mental development levels decreased significantly. A correlation of -.37 and significance level of .009 existed between the age of the infant and the infant's mental development level for the total population. A strong but nonsignificant tendency existed between the infant's age and his motor developmental level. A correlation of -.28 and a significance level of .038 was computed between the age of the infant and the infant's motor developmental level for the total population.

Further analysis of the characteristics of this population indicated that males had a mean age of 18.8 months, while females had a mean age of 20.2 months. At this stage of childhood it would seem that a difference of 1.4 months

could be very important.

More evidence that the difference in mental and motor developmental levels was the result of an age function and not a sex function is suggested by comparison of groups based upon age and groups based upon sex. Using the mean age of the total population, 19 months, as a cutoff point, the total population was divided into those older than the total population mean age and those younger than the total population mean age. Then the following four groups--older male, younger male, older female, younger female--were analyzed.

Results of the comparison of these groups, as seen in Appendix D, indicated that the difference in mental and motor BSID scores was the result of an age difference and not a sex difference. A 13.6 point difference existed between mental BSID mean scores for male above average age infants and male below average age infants. A 19.6 point difference existed between mean female above average age infants and female below average age infants on the mental scale. In comparison, a difference of only 4.6 points existed between male and female means for above average age infants and a difference of only 1.4 points between means for male and female below average age infants on the mental scale.

Motor BSID mean scores yielded a 13.8 point difference between male above average age and male below average age infants and a 12.7 point difference for females between above average age and below average age infants. Only a 10.3 point difference in mean scores existed between above average age

male and female infants, and a 9.2 point difference in mean scores existed between below average age male and female infants. In all categories, larger differences existed between age groups than between sex groups. Therefore, the reported differences between groups appear to be a function of the environment of this population where developmental rates are retarded by age related factors not yet identified.

When explaining this negative relationship between age and developmental rates, it is important to consider the fact that this population of mothers is not typical of the general population. This group of mothers had a mean IQ of 94. To a certain extent, their personal resources for assisting their children in development are below the level of the average mother. In such groups with limited potential, both internal and external mothers view the child development center as an ideal standard for the learning process to follow. While internal mothers, and external mothers to a lesser degree, attempt to copy these child development techniques for their children, perhaps the child development center's activities are not those that enhance child development to the highest degree. These data suggest that the center may be geared toward and more successful at developing skills during early infancy than in later infancy. As a result, important gains in development are realized in early infancy; but as the child grows older, the activities of the center lose their ability to facilitate child development. When this point is reached, both mental and motor development levels begin to decrease.

While this research indicated that the internal mother does tend to facilitate infant development more than the external mother, there was another factor that was important for child development. A mother's IQ was shown to be an important factor associated with child developmental rates.

An infant's mental developmental level correlated significantly with maternal IQ for the total group and male groups only. Failure of the female group's infant mental developmental levels to correlate significantly with maternal IQ is again a function of this population where age of the infant yields a decrease in developmental rates and where the females are older than the males. Even though there are some inconsistencies in this relationship between developmental levels and maternal IQ, one consistency was evident. For all three groups, maternal IQ was more closely related to an infant's mental development than to his motor development.

These nonsignificant relationships between infant motor development levels and maternal IQ are possibly a function of the type of IQ assessment used. The PPVT assesses verbal intelligence and does not attempt to measure motor skills. For this reason, a maternal PPVT score would correlate more highly with an infant's mental development than with his motor development level.

In this study, the PPVT was used to assess maternal intelligence because it yielded a reliable IQ with a minimum amount of time required for administration. If more time could have been allocated for assessment of the mother's IQ, a more thorough test that would have yielded more than a passive language

ability assessment would have been utilized. The Wechsler Adult Intelligence Scale (WAIS) by David Wechsler (1955) is such a measure and would have been a better instrument to use for assessing the mother's IQ if time would have permitted. The WAIS yields both a verbal and a performance IQ. If the WAIS would have been used, it would be expected that maternal verbal IQ would have correlated significantly with an infant's mental development index, and maternal performance IQ would have correlated significantly with an infant's motor development index.

While the relationship between infant motor development and maternal IQ was nonsignificant, it is consistent with other findings when separated into male and female groups. For the total group and the male group, a tendency for infant motor development to correlate with maternal IQ was found, while infant mental development levels correlated significantly with maternal IQ. Analysis of the female infant mental developmental levels and mother IQ indicated a tendency for these two variables to correlate, but a near zero correlation between female infant motor development levels and maternal IQ was established. Based upon this, it appears that for both male and female groups, stronger relationships existed between infant mental development levels and maternal IQ than between infant motor development levels and maternal IQ.

An interpretation of the results of this study yield the following implications for the general population:

1. An infant's mental developmental level is more closely related to maternal verbal IQ than is his motor development level.

2. Locus of control is a personality variable that is not significantly related to maternal intelligence.

3. Mental and motor developmental levels of infants are associated with maternal locus of control.

In addition to these conclusions, several limitations were evident in this study that warrant further research. The first of these limitations is the result of the experimental I-E scale used to assess maternal locus of control. Further research is needed to refine this instrument to a point where it is shown to be both highly reliable and valid. Only then will generalizations based upon this instrument's results be fully justified.

The second major limitation of this study is a function of the characteristics of the subject population. Because the mothers in this population were of slightly below average intelligence, it would be expected that their resourcefulness in child rearing practices would be restricted in comparison with the normal population. As viewed by the women of this subject population, the only appropriate mode of interaction with infants was the way that was modeled at the child development center. This limited range of acceptable interaction with children would be expected to greatly reduce the effects of maternal locus of control upon an infant's development levels. Further research is necessary to further specify characteristics of this population in order to determine the appropriateness of generalizations to a normal population. Replication of this study with a middle class population would help to establish the population and to what extent these results were a function of the sample population.

While the findings of the present research do have important implications for child development, further research of the locus of control variable will strengthen the conclusions of this study and also specifically define the importance of locus of control in child development.

APPENDIX A

Scores on Rotter I-E & Revised PF I-E

Subject Number	Rotter I-E	PF I-E
1	20	16
2	19	16
3	17	19
4	16	17
5	16	17
6	14	15
7	14	17
8	14	13
9	14	18
10	14	15
11	13	17
12	13	17
13	11	16
14	11	16
15	9	14
16	9	11
17	18	20
18	8	7
19	6	7
20	4	5
21	4	2

APPENDIX B

Locus of Control Responses for the Rosenzweig P-F Study

Picture

1. A. I should have been watching for cars.
   B. You should not have been driving so fast.

2. A. Sometimes accidents like that just happen to me.
   B. I should have been more careful.

3. A. I should have picked the seats more carefully.
   B. What bad luck to get tickets behind her.

4. A. I should have planned to leave earlier in case something happened.
   B. Machines have a way of ruining people's plans.

5. A. I'm sorry, it seems as though the company sure didn't make these watches very dependable.
   B. I'm sorry, I should have checked it before you bought it.

6. A. I don't mind, I'll just come back later to get others.
   B. That's o.k., rules are rules.

7. A. I want it fixed right, or I won't pay for it.
   B. If you are going to be so obnoxious, I'll just take it like it is.

8. A. She can do whatever she wants to do.
   B. I won't let her go with you.

9. A. It's going to be your fault if I get soaked.
   B. It's my umbrella, and I intend to get it now.

10. A. I don't know what has come over you to make you talk like this.
    B. I didn't know what I said would upset you this much.

11. A. That's o.k., the phone company is always doing things like that.
    B. That's o.k., I wasn't asleep anyway.

12. A. That's what I get for buying a hat just like Fred's.
    B. Why didn't Fred take the time to check for the name tag.

13. A. Things like that are always happening to me.
    B. I suppose I should have called this morning to make sure we could meet.

14. A. I knew we should have picked her up.
    B. She was probably delayed by the heavy traffic.

15. A. Don't worry, I made some mistakes too.
    B. That's just the luck of the cards.

16. A. I'm sorry, I wasn't watching where I was going.
    B. I'm sorry, but the brakes failed.

17. A. I couldn't help it--the keys are just gone.
    B. O.K. so it's my fault the keys are gone.

18. A. I knew that I should have bought one sooner.
    B. Well, that's just my luck.

19. A. Why don't they put those school signs where a person can see them.
    B. I just didn't see the school signs.

20. A. The invitation probably got lost in the mail.
    B. She didn't invite us because she knew I wouldn't come.

21. A. I feel as if I almost wished her bad luck.
    B. Isn't it strange the way fate treats people the way they deserve.

22. A. How clumsy, I should have been more careful.
    B. I wish you would have told me about that step.

23. A. If she wants us to wait, I guess we'd better wait.
    B. Tell her we are sorry, but we need to leave immediately.

24. A. Little kids do things like that--don't worry about it.
    B. That's o.k.--I read it already anyway.

APPENDIX C

Raw Data

Subject Number	Sex of Infant	Age of Infant (months)	BSID Mental Score	BSID Motor Score	Maternal PPVT IQ	Maternal I-E Score
1	M	23	85	69	59	16
2	M	15	95	110	56	19
3	M	14	108	122	94	10
4	F	18	121	138	87	16
5	M	12	119	105	92	17
6	M	17	124	115	102	18
7	M	17	106	93	61	13
8	M	13	91	120	77	19
9	M	24	106	99	91	11
10	M	25	102	141	98	16
11	F	25	111	97	104	11
12	M	13	112	82	80	13
13	M	19	88	90	56	14
14	F	17	124	147	95	13
15	M	13	115	99	110	19
16	M	12	124	111	89	12
17	M	18	150	150	101	23
18	M	24	123	82	83	6
19	F	21	101	121	89	8
20	M	13	118	104	93	17
21	M	24	87	99	91	11
22	M	16	105	110	62	11
23	M	18	134	150	102	14
24	F	29	85	69	59	16
25	M	18	115	107	85	17
26	F	13	115	125	77	19
27	M	19	122	128	57	12
28	F	19	85	69	59	16
29	M	28	112	132	89	15
30	M	27	114	110	91	13
31	M	21	60	72	55	4
32	M	20	107	131	67	16
33	F	24	76	105	71	9
34	F	20	97	102	72	9
35	M	18	88	102	84	8
36	F	19	100	100	73	13
37	M	15	124	146	91	17
38	F	13	120	120	84	14
39	F	24	106	121	98	16
40	M	30	100	62	87	9

APPENDIX D

Comparison of Mean Scores on the BSID for Groups of Infants Based upon Age and Sex

Mental Scale

	Above Average Age	Below Average Age
Male	99.6	113.2
Female	95.0	114.6

Motor Scale

	Above Average Age	Below Average Age
Male	99.7	113.5
Female	110.0	122.7

REFERENCES

Bassbarry, A., Ollendick, T. H., & Vuchinich, R. E. Study habits as a factor in locus of control-academic achievement relationships. Psychological Reports, 1974, 34, 906.

Battle, E., & Rotter, J. B. Children's feelings of personal control as related to social class and ethnic group. Journal of Personality, 1963, 31, 482-490.

Bayley, N. The California First-Year Mental Scale. Berkeley: University of California Press, 1933(A).

Bayley, N. The California Infant Scale of Motor Development. Berkeley: University of California Press, 1936.

Bayley, N. Comparisons of mental and motor test scores for ages 1-15 months by sex, birth order, race, geographical location and education of parents. Child Development, 1965, 36, 379-411.

Bayley, N. Manual for the Bayley Scales of Infant Development. Berkeley: University of California Press, 1969.

Beckwith, L. Relationships between infant's vocalizationa and their mother's behaviors. Merrill-Palmer Quarterly, 1971, 17, 211-226.

Bialer, I. Conceptualization of success and failure in mentally retarded and normal children. Journal of Personality, 1961, 29, 303-320.

Caldwell, B. M. The effects of psychosocial deprivation on human development in infancy. Merrill-Palmer Quarterly, 1970, 16, 260-277.

Coleman, J. S., Campbell, E. Q., Holson, C. J., McPartlan, J., Mood, A. M., Weinfeld, F. D., & York, R. L. Equality of Educational Opportunities. (Report from the office of education) Washington, D.C.: U.S. Government Printing Office, 1966.

Crandall, V. C., Katkovsky, W., Crandall, N. J. Children's belief in their own control of reinforcements in intellectual-academic achievement situations. Child Development, 1965, 36, 91-109.

Crandall, N. J., Katkovsky, W., Preston, A. Motivational and ability determinants of young children's intellectual achievement behaviors. Child Development, 1962, 33, 643-661.

Cromwell, R. L. A social learning approach to mental retardation. In N. R. Ellis (Ed.) Handbook of Mental Deficiency. New

DuCette, J., Wolk, S., Soucar, E. Atypical patterns in locus of control and nonadaptive behavior. Journal of Personality, 1972, 40, 287-297.

Duke, M. P., Nowicki, S. Locus of control and achievement: The confirmation of a theoretical expectation. Journal of Psychology, 1974, 87, 263-267.

Dunn, L. M. Expanded Manual for the Peabody Picture Vocabulary Test. Minneapolis: American Guidance Service, Inc., 1965.

Heisler, W. J. A performance correlation of personal control beliefs in an organizational context. Journal of Applied Psychology, 1974, 59, 504-506.

Hersch, P. D., Scheibe, K. E. On the reliability and validity of i-e control as a personality dimension. Journal of Consulting Psychology, 1967, 31, 609-614.

Holden, K. B., Rotter, J. B. supplementary report: A nonverbal measure of extinction in skill and chance situations. Journal of Experimental Psychology, 1963, 63, 519-520.

Howe, R. R. Relationship between female role concepts and anxiety among employed mothers of pre-school age children. Dessertation Abstracts, 1973, 33, 7037-7038.

Jaffa, A. S. The California Preschool Mental Scale. Berkeley: University of California Press, 1934.

James, W. H. Internal versus external control of reinforcement as a basic variable in learning theory. Unpublished Doctoral Dissertation, Ohio St. U1, 1957.

James, W. H., Rotter, J. B. Partial and 100% reinforcement under chance and skill conditions. Journal of Experimental Psychology, 1958, 55, 397-403.

Kagan, J. Change and Continuity in Infancy. New York: Wiley, 1971.

McGhee, P. E., Crandall, V. C. Beliefs in internal-external control of reinforcements and academic performance. Child Development, 1968, 39, 91-102.

Moss, H. A. Sex, age and state as determinants of mother-infant interaction. Merrill-Palmer Quarterly, 1967, 13, 19-36.

Nowicki, S., Walker, C. The role of generalized and specific expectancies in determining academic achievement. Journal of Social Psychology, 1974, 94, 275-280.

Painter, G. Advertisement for Teach Your Baby. Pre-natal Mothers Manual, 1976, April-May, 34.

Phares, E. J. Expectancy chances in skill and chance situations. Journal of Abnormal and Social Psychology, 1957, 54, 339-342.

Pikunas, J. Human Development. St. Louis, MO: McGraw-Hill Book Co., 1976.

Prociuk, T. J., Breen, L. J. Locus of control: Study habits and attitudes and college academic performance. Journal of Psychology, 1975, 88, 91-95.

Rotter, J. B., Mulry, R. C. Internal versus external control of reinforcement and decision time. Journal of Personality and Social Psychology, 1965, 2, 598-601.

Rotter, J. B. Some implications of a social learning theory for the prediction of goal directed behavior from testing procedures. Psychological Review, 1960, 67, 301-316.

Rotter, J. B. Generalized expectancies for internal versus external control of reinforcement. Psychological Monographs, 1966, 80, 1-28.

Schorder, J. M., & Rotter, J. B. Generalizations of expectancy changes as a function fo the nature of reinforcement. Journal of Experimental Psychology, 1954, 48, 343-348.

Steger, J. A., Simmons, W. L., & Lavelle, S. Accuracy of prediction of own performance as a function of locus of control. Psychological Reports, 1973, 33, 59-62.

Warehime, R. G. Generalized expectancy for locus of control and a controlled performance. Psychological Reports, 1972, 30, 314.

Wechsler, D. Manual for the Wechsler Adult Intelligence Scale. New York: The Psychological Corp., 1955.

Wolfe, R. N. Perceived locus of control and prediction of own academic performance. Journal of Consulting and Clinical Psychology, 1972, 38, 80-83.

Yarrow, L. J. Maternal deprivation: Toward an empirical and conceptual re-evaluation. Psychological Bulletin, 1961, 58, 459-490.

Yarrow, L. J., & Goodwin, M. S. Some conceptual issues in the study of mother-infant interaction. American Journal of Orthopsychiatry, 1965, 35, 473-481.

Yarrow, L. J., & Pedersen, F. A. Attachment: Its origin and course. Young Children, 1972, 27, 302-312.