

SOCIAL CLASS DIFFERENCES AND DIVERGENCE OF COGNITIVE DEVELOPMENT
DURING THE FIRST TWO YEARS OF LIFE

By

Mary Anne Lamm

A Thesis Submitted to the Faculty of the
SCHOOL OF HOME ECONOMICS
In Partial Fulfillment of the Requirements
For the Degree of
MASTER OF SCIENCE
In the Graduate College
THE UNIVERSITY OF ARIZONA

1 9 7 4

STATEMENT BY AUTHOR

This thesis has been submitted in partial fulfillment of the requirements for an advanced degree at The University of Arizona and is deposited in the University Library to be made available to borrowers under rules of the Library.

Brief quotations from this thesis are allowable without special permission, provided that accurate acknowledgments of source is made. Requests for permission for extended quotation from or reproduction of this manuscript in whole or in part may be granted by the head of the major department or the Dean of the Graduate College when in his judgment the proposed use of the material is in the interests of scholarship. In all other instances, however, permission must be obtained from the author.

SIGNED: Mary Anne Lamm

APPROVAL BY THESIS DIRECTOR

This thesis has been approved on the date shown below:

Nylda Lopez
NYLDA LOPEZ
Assistant Professor of Home Economics

7-11-74
Date

ACKNOWLEDGMENTS

I am deeply indebted to Dr. Nylda Lopez, my thesis director, for her guidance and assistance throughout the course of this study. Special thanks are extended to Val Farmer for his helpful suggestions and encouragement. For serving on my committee, I am grateful to Dr. James Hine and Dr. Robert Rentfrow. I also wish to express my gratitude to the sixty-eight families who participated in this study.

TABLE OF CONTENTS

		Page
	LIST OF TABLES	v
	ABSTRACT	vi
1.	INTRODUCTION	1
	Problem Statement	3
	Hypotheses	4
	Definitions	4
2.	REVIEW OF LITERATURE	6
	Piagetian Theory	6
	Cognitive Development	8
	Infant Assessment	13
	Social Class Differences	16
3.	PROCEDURE	19
	Sample Selection	19
	Instrument	21
	Collection of Data	24
	Administration of IPDS	25
	Scoring of IPDS	26
	Treatment of Data	27
4.	RESULTS AND DISCUSSION	28
	Results	28
	Discussion	39
	Recommendations and Implications	45
5.	SUMMARY	47
	APPENDIX A: REQUEST LETTER TO PARENTS	49
	APPENDIX B: SCORE SHEET FOR IPDS	50
	LIST OF REFERENCES	52

LIST OF TABLES

Table		Page
1	Number of Subjects in Each of the Four Experimental Groups	19
2	Scores on Development of Means Subscale for Infants Seven - Ten Months Old According to Social Class	29
3	Scores on Vocal Imitation Subscale for Infants Seven - Ten Months Old According to Social Class	30
4	Scores on Causality Subscale for Infants Seven - Ten Months Old According to Social Class	31
5	t Values Comparing Infants at the Seven - Ten Month and Seventeen - Twenty Month Ages for Each IPDS Subscale	31
6	Age in Months for the Four Experimental Groups by Class	33
7	t Values Comparing Mean Ages of Lower Class and Upper Class Infants	33
8	Scores on Development of Means Subscale for Infants Seventeen - Twenty Months Old According to Social Class	35
9	Scores on Vocal Imitation Subscale for Infants Seventeen - Twenty Months Old According to Social Class	35
10	Scores on Causality Subscale for Infants Seventeen - Twenty Months Old According to Social Class	36
11	Scores on Pleasure in Task Performance and Involvement with Materials According to Age and Social Class	38
12	t Values Comparing Infants at Seven - Ten and Seventeen - Twenty Months for Each Motivational Factor	38

ABSTRACT

Social class differences and divergence of cognitive development during the first two years of life was the subject of this study. The sample consisted of sixty-eight infants from lower and upper socioeconomic level families in Tucson, Arizona. The infants ranged in age from seven to ten and seventeen to twenty months.

The Infant Psychological Development Scale (IPDS) was the instrument utilized for this study. It yielded scores for three subscales: Development of Means for Achieving Desired Environmental Ends, Vocal Imitation, and Causality. Mean scores and standard deviations for each subscale were computed for each experimental group.

A test on the difference of means was used on the following hypotheses:

1. There will be no difference in cognitive skills between lower and upper class children between the ages of seven and ten months as measured on the IPDS.
2. There will be no differences in cognitive skills between lower and upper class children between the ages of seventeen and twenty months as measured on the IPDS.

The first hypothesis was accepted for all three subscales while the second hypothesis was accepted for two subscales and rejected for the third. Conclusions of this study should not be extended beyond the present sample.

CHAPTER 1

INTRODUCTION

The past decade has evidenced a revival of interest in early infant cognitive processes and development. Interest has also been directed to investigation of when learning begins (Dittmann, 1968; Hunt, 1968). Yet much of the research has been limited by four methodological problems (Caldwell, 1971). First, samples of infants used were very narrow. After the infant was taken home from the hospital he was essentially lost to researchers (Caldwell, 1971; B. White 1969). Therefore, the neonatal period was studied excessively while the infancy period was neglected. Second, there was a shortage of assessment techniques which could be used for evaluating infants. Each researcher was forced to prepare his own instrument and this was very time-consuming. Third, there were constraints among the main theories. Fourth, there was a separation between those who studied physiological development and those who studied psychological development processes rather than an interrelation of the two. With these stumbling stones mainly in the past, research can now proceed.

Rapid social evolution has pointed to the fact that every individual has the right to develop fully their own potential and to demand the kinds of environments that will support the full realization of that potential. This demand has brought about a major growth of

nursery schools and day care centers which provide supportive environments for three, four and five year old children. Yet, if one waits until the age of three to begin intervention, one may have waited too long. Burton White, in his research, has found that some three year olds were not qualitatively different from six year olds in their abilities to anticipate and plan, understand complex sentences, and attract adult attention. He called for earlier extensive studies and programs during infancy (White and Watts, 1973).

Studies are also necessary since research has shown that heredity was not the sole factor in intellectual formation. The environment also plays its role, and a very important role at that (Bloom, 1965; Hunt, 1961; Kessen, 1963; and Piaget, 1952).

There has been evidence of definite critical periods for learning in animals (Lorenz, 1957; Scott, 1963) as well as in humans, though the human research has not been adequate (Elkind, 1967). Studies with animals have shown that early experience has a profound effect on primates and mice (Beach, 1942; Harlow, 1958; and Nissen, 1954). Findings from animal studies have led to studies which have indicated that early experiences have a profound effect on humans as well (Fowler, 1962; Hunt, 1961). The age from ten to eighteen months has been specifically defined as the critical period for development of competence in infants (White and Watts, 1973). Thus, there has been shown a need to investigate various learning

environments for infants during this period in order to determine the effects of differing environments on development.

Many factors appear to be related to differences in learning environments. One such factor is socioeconomic level. Previous studies have shown that socioeconomic status and intelligence (cognitive development) were related (Laird, 1957; McNemar, 1942). Thus in order to help each individual develop his full potential and in order to give our infants the best start in life, it would be very worthwhile to study the early learning environments within socioeconomic groups and their effects on cognitive development.

Problem Statement

This study has attempted to investigate the relation between socioeconomic background and cognitive development in infants. Between group comparisons have been made of infants from low socioeconomic background and high socioeconomic background. The comparisons have been made both prior to and after the defined critical period of ten to eighteen months (White and Watts, 1973).

This study was part of a larger intervention study co-sponsored by the University of Arizona Medical School Pediatric Department and the University of Arizona Psychology Department. For overall results of the complete study refer to theses and dissertations by Farmer, Berg, and Ketchel on file in the University of Arizona Main Library (Berg, 1974; Farmer, 1974; Ketchel, 1974).

Hypotheses

The following hypotheses will guide the present investigation:

1. There will be no differences in cognitive skills between lower class and upper class children between the ages of seven and ten months as measured on the IPDS scores for:
 - a. Development of Means for Achieving Desired Environmental Ends Scale
 - b. Vocal Imitation Scale
 - c. Causality Scale
2. There will be no differences in cognitive skills between lower class and upper class children between the ages of seventeen and twenty months as measured on the IPDS scores for:
 - a. Development of Means for Achieving Desired Environmental Ends Scale
 - b. Vocal Imitation Scale
 - c. Causality Scale

Definitions

Cognitive: the full range of complex processes which are part of knowing and understanding the world. Behavior ordinarily considered indicative of intelligence.

Critical Period: a period of rapid growth when an organism is particularly vulnerable to change and during which certain experiences are crucial.

Early Experience: an experience during the time from birth to approximately two years of age.

Early Learning Environment: that set of experiences that a child receives during the day mainly from mother or principle caretaker, but also from self and others.

High Socioeconomic Group: those volunteer subjects with family income over \$15,000 per year and at least one parent a college graduate.

Low Socioeconomic Group: Those volunteer subjects from the Neighborhood Health Center with a family income of less than \$6,000 per year and neither parent a college graduate.

Neighborhood Health Center: clinic for out-patient treatment which serves persons who register from within the model cities boundaries.

Older Infant Group: infants between the ages of seventeen and twenty months.

Stimulation: provision of stimuli capable of eliciting developmental advances exceeding those which could be expected in a natural environment.

Younger Infant Group: infants between the ages of seven and ten months.

CHAPTER 2

REVIEW OF LITERATURE

Piagetian Theory

The first interest in the work of Jean Piaget appeared in the United States around 1930. That interest died for some twenty years before reviving actively about 1955 (Baldwin, 1968). Today, the work of Piaget has influenced theories and philosophies of many of the leading child developmentalists such as J. McVicker Hunt, Jerome Bruner, and Burton White.

During his lifetime, Piaget has progressed through three periods of interest. In each of these periods he has investigated an area of child development. Early, his main interest was in the area of language development in children. Findings during this stage led to a period of studies with infants during preverbal development. During the third period Piaget focused his interest on the exploration of the development of intelligence from the ages of five through adolescence. Investigations during each of these three periods has led to Piaget's formulation of a developmental theory.

Underlying his theory, Piaget made three central assertions:

First, intelligence is only one aspect of the general biological adaptation to the environment. Second, intellectual adaptation is the progressive differentiation and integration of inborn reflex mechanisms under the impact of experience. Third, the differentiation of inborn reflex structures and their functions

give rise to the mental operations by which man conceives of objects, space, time and causality, and of the logical relationships which constitute the basis of scientific thought (Wolff, 1960, p.9).

Piaget has suggested that the development of intellectual capacity went through a number of stages whose order was constant, but whose time of appearance may have varied with both the individual and society. Each new level of development was a new structuring of elements which until that time had not been systematically related to each other. There were four factors contributing to this development: Nervous maturation; encounters with experience; social transmission; and equilibration or auto-regulation (Honstead, 1968). Piaget concluded that an individual's intellectual development was a process of equilibrations, where the individual himself was the active motor and coordinator of his own development. The fundamental tendency was to establish an equilibrium between assimilation and accommodation of any one schema or between schemata (Piaget, 1952).

Intellectual growth has been viewed by Piaget as being active. An individual comes to see the world as coherent, as structured to the extent that he acts upon the world. He transforms it and succeeds in coordinating these actions and transformations. Development proceeds as partial understandings are reversed, broadened and related to one another. Piaget's model for this was one of auto-regulations (equilibrations) to attain even broader and more stable equilibrium in the individual's dealing with his world.

Piaget postulated four major periods in development: the Sensorimotor (birth to two years); Preoperational Period (two to seven

years); Concrete Operations (seven to eleven years); and Formal Operations (eleven and above). Reviews of each of these stages have been given by several developmentalists (Baldwin, 1968; Boyle, 1969; Evans, 1971; Honstead, 1968; Mussen, Conger, and Kagan, 1963; Ripple and Rockcastle, 1964).

This investigation has been concerned entirely with the Sensorimotor Period which has itself been subdivided into six stages. Boyle (1969) has presented an excellent summary of these substages.

Goldschmid (1971) has warned that sequence of cognitive development may indeed exist but the rate may vary considerably from group to group and between individuals within a group. Therefore, care must be taken not to label specific ages with specific abilities in infants. Such a mistake could lead to the same problems that are being experienced by use of normative test scores during infancy and early childhood.

Cognitive Development

There has been almost universal agreement on the importance of environment for cognitive development in humans with large numbers of studies having been reported in this area (Bruner, 1960; Fowler, 1962; Hunt, 1961; and Watson, 1928). There are several differing interpretations of cognitive development yet most stem from a single definition of the term. Cognition has been defined as "that which has to do with knowledge and with the processes by which it is acquired and utilized" (Elkind, 1967 p. 361). The basic postulates of the theory of cognitive

development have been carefully discussed by a few child development-
alists (Elkind, 1967; Hunt, 1969, 1971 (b); and Kohlberg, 1968).

The intital investigations on the effects of environment on
cognitive functioning were studies on infants in stiffling institutional
settings (Bowlby, 1952; Dennis and Najarian, 1957; Goldfarb, 1945, 1954;
Provence and Lipton, 1962; and Spitz, 1945, 1946). These studies showed
that the bland, unstimulating and therefore depriving environments which
institutions offered had harmful effects on human infants. One view was
that the harm was due to maternal deprivation which should not have been
equated with maternal separation (Yarrow, 1961). Another view suggested
that the lack of stimulation in those environments was the main factor
itself which caused the deficits (Casler, 1961; Yarrow, 1961).

At any rate, the institutional studies further supported the
belief of importance of the environment so that several researchers
began in-depth studies with animals. The most popular of these have
been the studies with rhesus monkeys on the effects of infant experience
with surrogate mothers (Harlow, 1962; and Harlow and Harlow, 1966). Results
showed the importance of warmth and nourishment for the developing infants.
Denenberg (1964, 1967) and Levine (1962) have shown that the amount of
handling or tactile stimulation during infancy could enhance the adult
open-field behavior of mice. The importance of particular periods --
termed "critical period" -- for the development of social attachment in
animals has been studied. Lorenz (1937, 1957) has worked mainly with
gray-leg geese on the concept of imprinting while Scott (1963) has used
dogs to look at critical periods.

Prior to the 1950's, cognitive development or the development of intelligence was attributed to predetermined genetic and maturational factors (Anderson, 1939; and Furfey and Muehlenbein, 1932). In the early 1960's, Kessen (1963) came forth with the view that the infant was showing himself to be more competent than was generally believed. This idea has stimulated much research on the behavior and development of human infants. Most studies have focused on particular behaviors such as smiling or sucking (Kagan, 1971; Staples, 1932; Uzgiris and Hunt, 1970; and Watson, 1969) with a few studies relating a particular behavior to cognitive functions such as attention and memory (Bell, Weller and Waldrop, 1971; Kessen, 1967; Sequiland, 1969; and Wolff, 1966). A summary of the current research has been reported by Kagan (1970) and Lacrosse et al. (1970).

Since the 1960's, importance of the effects of early experience or environment have been stressed. One general concept to support this new view was that of critical periods for learning during infancy. Several studies, as summarized by Caldwell (1962) and Scott (1963), have shown the usefulness of this hypothesis. The majority of the critical period studies looked at the effects of understimulation during the critical period when in fact overstimulation may also have been a deficit (Denenberg, 1964). All in all, the most recent research has shown that the infant is a highly sophisticated learning being -- more so than was ever believed prior to this time (Bower, 1971; Hunt, 1971(a); Kagan, 1972; and Sequiland, 1969).

White and Watts (1973) through research at Harvard Preschool Project, specifically defined the time from ten to eighteen months as a critical period for the development of cognitive competence in infants. White began his study by looking at children between three and six years of age. He began to find trends showing that no qualitative differences existed in competence between some advanced three year olds when these were compared to a group of average six year olds. This led him to an in-depth study of the first three years of life. He found the ten to eighteen month period to have particular importance for the development of general competence.

Other developmentalists recognized the importance of the infancy period. Bowlby (1969) investigated the development of attachment to the principle caretaker, usually the mother. Brazelton (1960) looked at the amount of stimulation necessary for optimal development and Kagan (1972) has worked with the thought process during infancy. Benjamin Bloom (1965) has put forth the thesis that approximately 50% of adult intelligence has already developed by age four.

Jerome Bruner (Pines, 1969) has, until recently, studied how children three through twelve years of age process information. He found that "by age three a repertory of skills has already been developed" (Bruner, 1969, p. 205). Therefore he began studies prior to age three. Bruner believed that the infant developed through three distinct stages of cognitive growth (Bruner, 1968). Throughout these periods

the major role in selecting and continuing activity for individual skill level should be played by the infant rather than by an adult (Bruner, 1973).

J. McVicker Hunt (1961), an avid supporter of Piaget's work, concluded that experiences of the first two years of life were of very great importance for all that followed. Intellectual capacity and intrinsic motivation were especially vulnerable during infancy. The infant needed to confront appropriate variations in circumstances in order to develop an adequate schematic framework.

Physical environment is not the only important experiential factor. Recently, motivational factors have been found to have a profound effect on infant development and learning during the first years of life (Schaefer, 1970; R. White, 1959; and Yarrow et al., 1972). Studies have shown the motivational measure "pleasure in problem solving" to be highly correlated with cognitive development (Birns and Golden, 1972; Harter, Shultz, and Blum, 1971; Kagan, 1971; and Levenstein, 1970).

Taking all of this new emphasis into consideration has led to a growth, within the past decade, of infant educational and day care programs (Silverstone, 1970; Starr, 1971; Evans and Saia, 1972; and Lacrosse et al., 1970). Research results are starting to pour in, many of which are surprising to even the program directors themselves (Caldwell, 1967, 1972; and Lacrosse et al., 1970). Thus, we may look forward to more such programs investigating many of the untapped areas of infant development.

Infant Assessment

Beginning in the mid-20th Century the first real use of infant tests for detection of abnormalities was made known (Escalona, 1954; Graham, 1956; and Griffiths, 1954). Prior to this, infant mental tests were used merely to measure the intellectual functioning in children. Studies reported by Nancy Bayley (Bayley, 1958) were carried out to test and retest school-aged children. The differences between the test and retest scores were not great and therefore it was concluded that I.Q. was constant and representative of inherently fixed lifetime characteristics. At this time workers in the field of intelligence were convinced of I.Q. constancy and expanded tests with infants. These workers also developed mental ages for infants as young as one month. Testers hardly bothered with retests to check for constancy.

Careful studies (Bayley, 1933) of the growth of normal infants were started in the early 1930's. They indicated that development during infancy was irregular and for the most part unpredictable. Bayley (1933) in the Berkley Growth Study showed that childrens' scores during the first year were completely uncorrelated with I.Q. scores at three years. The Iowa Child Research Station showed similar results (Bayley, 1958).

In the 1940's Gesell and Cattell (Simon and Bass, 1956) worked on the assumption that the rate and limits of future mental development were foreshadowed by the manner and fullness with which a child completed the first stages of development. Therefore the scales measured levels of

development achieved up to three years of age. Gilliland in 1948 pointed out that there was disagreement within the field that intelligence of infants could be measured. After further studies on this issue, new views on development were disseminated (Bradway, Thompson and Cravesn, 1958; and Fremon, 1971).

In 1961, Hunt (Lewis and Goldberg, 1969, p.81) stated: "not all intelligence is inherited -- at least some aspects of intellectual ability are learned, that is, influenced by experience. In the early months the child is responsive primarily to changes in stimulation which influences learning". This stimulation is controlled by the mother. Therefore the mother or caretaker is potentially important for intellectual development not just emotional development as earlier stressed by Freud and those associated with the Psychoanalytic School of Thought (Baldwin, 1968). The frequency and variation of the stimulation are important in early development but it must be remembered that quality is more important than the amount of stimulation. Hunt further implied that the most important factor was not that the child learned a particular behavior but rather that the child recognize that the behavior could affect his environment.

Also in 1961, Escalona showed that intelligence was the result of continuous transactions between the organism and the surrounding field. This field was the "sum total of physical and social environmental conditions" (Escalona and Moriarty, 1961, p. 598). The traditional use of

normative test scores obscured individual differences which were due at least in part to environmental influences. Thus the need for a new approach to test scores was made clearer.

The mid 1960's brought new emphasis in the field of infant assessment (Stott and Ball, 1965; and Thomas, 1970). The most promising approach to evolve from that new emphasis was the construction of mental tests along the lines established by the work of Jean Piaget (1952). Such Piaget-based scales (Cormon and Escalona, 1969; Decarie, 1965; Giblin, 1971; and Uzgiris and Hunt, 1966) were sequential-ordinal scales rooted in the nature of the developmental process. They were neither norm-referenced (Binet, 1939) nor criterion-referenced (Glaser and Nitko, 1971). "The meaning of a child's performance comes, insofar as the tests prove to be sequentially ordinal, from its place in a universal developmental order." (Hunt, 1973, p.4). This novel ordinal approach to the assessment of psychological development has many advantages over traditional infant tests (Uzgiris and Hunt, 1974).

Another breakthrough in the field of infant assessment has been the use of motivational assessment to further evaluate the infant's development. Several studies have reported results that point to the fact that pleasure in problem solving facilitated cognitive development (Birns and Golden, 1972; Hendrick, 1943; Levenstein, 1970; and R. White, 1963). It is possible that a combination of these two new approaches

to infant assessment will be very helpful in understanding more fully the course of cognitive development and factors affecting this course.

Social Class Differences

Differences in cognitive competence between advantaged and disadvantaged segments of society have been identified and examined for more than fifty years. Gordon (1923) studied the relation between opportunities for learning and I.Q. level in canalboat children in Britian. This pioneer study led to investigations of the degree of isolation and cultural backwardness versus test performance for isolated mountain children in the U.S. (Sherman and Henry, 1933; and Sherman and Key, 1932). Further, studies using the Weschler Intelligence Scale for Children (e.g., Laird, 1957) and the Stanford-Binet (e.g., Haggard, 1954; and McNemar, 1942) have shown positive correlation between I. Q. test performance and socioeconomic status.

By the beginning of the second half of the present century, a variety of studies had been amassed to show that the more disadvantaged a child the lower his performance on standarized tests of intelligence (Havighurst and Breese, 1947; Havighurst and Janke, 1944; Herrick, 1951; and Loevenger, 1940). These social class differences were found on children entering public school. They caused a shift in focus to studies of early childhood and infancy (Anastasi and D'Angelo, 1952; Anastasi and DeJesus, 1953; Berieter and Engelman, 1966; Gray and Klaus, 1965; Hertzig, Birch, Thomas, and Mendez, 1968; and Pasamanick and Knoblach, 1955).

Studies of infants prior to fifteen months of age resulted in findings that socioeconomic differences did not exist during that period when using traditional infant tests (Bayley, 1965; Golden and Birns, 1968; and Knoblach and Pasamanick, 1953). Later studies also by Golden et. al., (1971) showed socioeconomic differences had first manifest themselves approximately between eighteen and thirty-six months of age -- a period of rapid language growth. Further, personality and motivational factors from eighteen and twenty-four months could be used to predict performance on the Stanford-Binet at three years. A possible reason for the findings of no differences prior to eighteen months could have been that the infant tests used were not sensitive enough to detect cognitive differences (Golden, et. al., 1971). A study using the new Piaget-based scales -- Infant Psychological Development Scales (Uzgiris and Hunt, 1966) -- showed socioeconomic differences earlier than previously believed possible (Wachs, Hunt and Uzgiris, 1971).

Several ideas have been put forth as to why socioeconomic differences exist. Birch (1968) and Birch and Gussow (1970) hypothesized that the socially disadvantaged scored at lower levels of cognitive performance due to poor health, inadequate nutrition, and other biological factors. Jensen (1969) attributed the differences solely to genetic factors.

Many researchers felt that the differences in child rearing practices contributed most to the cognitive differences. Parental behavior as teachers (Hess and Shipman, 1965, 1967, 1972; Lewis and Goldberg, 1969, and Sroufe, 1970), knowledge, attitude and style (Hertzog, 1971; Klatskin, 1952; Maccoby and Gibbs, 1954; and M. White, 1957) have been shown to be the main factors related to child rearing practices which had an effect on cognitive skills. Lesser, Fifer, and Clark (1965) and Hertzog (1971) have taken this idea one step further to show that language style of different classes was the important contributing factor. Bernstein (1962, 1964) has shown that lower class individuals tended to use more informal language. According to him they tended to convey concrete needs and immediate consequences rather than relations among concepts as was the case with middle class. As a result, lower class children possess fewer language skills and are less well able to use such skills in the course of cognitive work (Bernstein, 1962, 1964; Deutch, 1964, 1965; and John, 1963).

Not enough is sufficiently understood as to the process by which the social and cultural environment shapes patterns of cognitive development. The suggestion by Caldwell and Richmond (1967) to begin to trace the full cycle of social class influence rather than just group trends seems to be an excellent idea.

CHAPTER 3

PROCEDURE

Sample Selection

The sample of the present study consisted of a total of sixty-eight infants (see Table 1). Twenty of the infants were from a high socioeconomic group with nine of these infants between the ages of seven and ten months and eleven infants between the ages of seventeen and twenty months. Forty-eight of the infants were from a low socioeconomic group with nineteen infants between the ages of seven and ten months and twenty-nine between the ages of seventeen and twenty months of age.

TABLE 1

NUMBER OF SUBJECTS IN EACH OF THE
FOUR EXPERIMENTAL GROUPS

Socioeconomic group	7-10 months	17-20 months
Lower	19	29
Upper	9	11

The high socioeconomic group infants were chosen from among patients of three Tucson, Arizona pediatricians who volunteered their time. Each pediatrician compiled a list of infants who fulfilled the

criterion for age, family income level and parent educational level. To participate the families had to have an income over \$15,000 per year with at least one parent a college graduate and with an infant between seven and ten months or seventeen and twenty months of age. A total of fifty-seven families were contacted first through mail (see Appendix A). Those interested in participating in the study contacted this author by phone to set up the testing appointment. Of the fifty-seven contacted, thirty-two responded and twenty-eight were tested. Eight of the infants who were tested had fallen out of the age groups necessary and were dropped from the study. As a result, a total of twenty higher socioeconomic group infants were used.

The lower socioeconomic group infants were chosen from among participants at the El Rio-Santa Cruz Neighborhood Health Center in Tucson, Arizona. This clinic services a low income population residing within the original Model Cities boundaries of Tucson, Arizona. A volunteer team of Neighborhood Health Center employees nominated the sample upon recommendation by the staff physicians.

Only families fulfilling the age, family income level, and parent educational level were nominated. Those were families whose income level was below \$6,000 per year with neither parent a college graduate and with an infant between seven and ten months or seventeen and twenty months of age. The subjects were chosen from among those of a much larger research study as described in "Problem Statement" section (see page 2).

Of the 143 nominated, 67 consented and 48 were actually used in this study. The remainder had either fallen out of the age ranges (seven to ten months and seventeen to twenty months of age) by testing date or had received two tests with reference to the overall study. Those nineteen infants were subsequently dropped from the study.

Instrument

The instrument used for the assessment of cognitive development in this investigation was the Infant Psychological Development Scales (IPDS) constructed by Uzgiris and Hunt (1966, 1968). The instrument consisted of six subscales of which three were utilized: the Development of Means for Achieving a Desired Environmental End, the Development of Vocal Imitation, and the Development of Operational Causality. The initial two subscales have been found to be sensitive to SES differences during the first and second year of life (Wachs, Hunt, and Uzgiris, 1971). The Causality subscale was chosen due to its exceptionally high degree of ordinality.

Three subscales were not utilized for this study: one concerned with the Development of Visual Pursuit and the Permanence of Objects, one concerned with the Development of Object Relations in Space and one concerned with the Development of Schemas for Relating to Objects. These were not chosen due to the excessive amount of testing time that would have been necessary in administering all six scales.

The IPDS provided a set of assessment tools of considerable utility for investigating the structural aspects of psychological development which have been so well hidden by the metrics of mental age and the I.Q.. The IPDS did not give an I.Q. score or compare development on the basis of mental age -- it simply gave a level at which the infant functioned. Groups of infants have been compared on the basis of the total score that each received on each subscale. An overall normative comparison has not been made.

These ordinal scales of sensorimotor development were inspired by the observations of Piaget (1952, 1954) yet they did not presume Piaget's six stages of the sensorimotor phase of development. The six subscales were developed after compiling a list of behavioral landmarks and then separating the list into six series which were more practical and less clumsy. Each series or subscale was so chosen only after at least cross-sectional evidence of a high level of ordinality in each was found (Hunt, 1973).

The subscale on "Development of Means for Achieving a Desired Environmental End" consisted of twelve items. These items pertained mainly to what infants did to obtain various events and/or things that they came to desire. In the language of Piaget (1952) these behavioral items began with "secondary circular reactions" in which the infant acted with anticipatory attention on the result produced by his actions in the external environment. Infants began by using already familiar schemas

as means in already familiar circumstances. Then they used familiar schemas as means in new situations which in turn led to the development of new schemas and finally to the appearance of the use of foresight. The ordinality ($I = .812$) of this subscale was well above the cut-off point of .5 which was considered to be minimally satisfactory for scaling by Green (1956 in Uzgiris and Hunt, 1968).

The "Development of Imitation" subscale consisted of seven behavioral items based on the auditory system. Again the ordinality of these items was high ($I = .89$). This subscale began with observation of a mere response by the infant to vocalization. It then proceeded to imitation of familiar then unfamiliar sound patterns and finally to imitation of familiar then unfamiliar words.

The "Development of Operational Causality" subscale was concerned with one branch of what Piaget (1954) has called the "construction of reality" (causality, space and time). This scale contained nine behavioral items which commenced with basic items such as grasping and repeating an action. It progressed to the point where the infant recognized other persons as having some significance and eventually as being independent casual agents. The series ended with the infant recognizing that he himself could be the casual agent. The degree of ordinality was exceptionally high ($I = .991$).

Previous research (Uzgiris and Hunt, 1966, 1968) on this instrument has shown it to have adequate test-retest and inter-observer

reliability. Studies (Hunt, 1973; Paraskevopoulos and Hunt, 1971; Uzgiris and Hunt, 1968) have also shown the IPDS to have a high degree of ordinality as well as evidence of construct validity (Wachs, 1970).

The IPDS has been used in several studies to compare groups of infants. Wachs (1970) used the IPDS to measure intellectual functioning of older preschool age mentally retarded children. He found many advantages to utilization of this type of assessment including the accuracy with which the children's development could be assessed. Infants from three different rearing environments were compared showing that the IPDS could discriminate among learning environments (Hunt, et. al., 1973; and Paraskevopoulos and Hunt, 1971). In another study by Wachs, Hunt and Uzgiris (1971) the IPDS was used as one means of assessment to compare cognitive development in infants from different age levels and from different environmental backgrounds. Again the IPDS was found to be an effective device for defining group differences.

In still another study (King and Seegmiller, 1973) black male infants were studied and tested at two different age levels. It was found that the IPDS measured specific abilities. Also it was most applicable below eighteen months of age due to a ceiling effect.

Collection of Data

Consenting parents contacted this examiner to set up an appointment for the testing. At the time of the test the mother and infant came,

or were brought, to the test center. The majority of the infants were tested at the University of Arizona Medical Center in Tucson, Arizona. Most of the remaining infants were assessed at the El Rio-Santa Cruz Neighborhood Health Center also in Tucson, Arizona with the extra few being tested at their own homes. In each of these three situations the testing area was set up in the same manner, with little disturbing outside stimulation. The same set of toys for eliciting the desired behaviors were used with all infants.

Administration of the IPDS

The infant was seated in a high chair perpendicular to the examiner with the mother seated on the opposite adjacent side of the infant. Conversation was initiated with the mother to explain procedures of the test and to elicit answers to questions concerning the speech patterns of the infant. During this conversation, play was also initiated with the infant. As the examiner felt the infant's readiness to participate, the actual testing began. Items were presented in any order since it was found that the order in which the situations were presented had no influence on the level of development a child manifested (Miller, Cohen, and Hill, 1970). During the time of the test, the mother was encouraged to urge the child to cooperate by echoing the examiner's words of encouragement and praise. Items were administered as described in the general directions for administering the six series (Uzgiris and Hunt, 1966). The total testing time averaged approximately forty-five minutes.

Scoring of the IPDS

A group of six examiners, two graduate students and four undergraduate students were trained in both group and individual sessions. They observed a variety of infants in the seven to ten and seventeen to twenty month age ranges being tested. They also viewed videotapes of IPDS testing on these scales. Trainees were then allowed to test and score at least three infants while being observed by a trained examiner. One trainee at a time then tested a different infant in order to establish reliability between the principal examiner and the trainee on the scoring of three subscales. Mean inter-scorer agreement was computed for each of the trainees with percentage agreement ranging from the high 90's to the low 80's. Scoring followed the method used by Wachs et al. (1971) in awarding points to emphasize ease of passing as well as successful or unsuccessful performance.

The examiner marked the score sheet (see Appendix B) at periodic intervals during the examination. Scores were assigned on the Development of Means as follows: 5 = Immediate and perfect performance on every trial of the task, 4 = Success on the task but only after one or more failure attempts, 3 = Partial success on the task, 2 = Failure on the task.

The examiners presented twelve tasks in the Development of Means subscale. Their scores were collapsed into various binary pass-fail combinations to permit Guttman scaling techniques to be applied for tests of ordinality of the scale items. It was found that collapsing

categories 5, 4, and 3 into one category of "pass" and maintaining category 2 as "fail" produced the highest coefficient of reproducibility in the scaling procedure. Vocal Imitation consisted of seven items and was scored on a pass-fail basis. The infant was credited with having passed all items below the highest item passed on Causality subscale. This was due to reports by the test constructors that lower order behaviors would drop out of the child's behavioral repertoire as higher order behaviors developed.

After the examiners completed the testing, they rated the child on two motivational variables, "pleasure in task performance" and "involvement with materials". The ratings were on a three-point scale, with 3 = high, 2 = medium, and 1 = low. Though definitions of the ratings were discussed, no attempts were made to establish inter-rater reliability on these judgements. The examiners were unaware of social class grouping of the infant. These scores have merely been used for comparison between groups.

Treatment of Data

A t test on the difference of mean scores for each subscale and for motivational factors was run on computers at the University of Arizona Medical Center, Department of Data Processing with the aid of Mr. John Gaynes. The .05 level of significance was utilized as criteria for determining the statistical significance of results obtained through testing.

CHAPTER 4

RESULTS AND DISCUSSION

Results

The first hypothesis stated that there was no difference in cognitive development between lower class and upper class infants, between seven and ten months of age as measured on the IPDS scales, was accepted for the three subscales: Development of Means, Vocal Imitation and Causality.

As shown in Table 2, the mean score achieved by low class infants on the Development of Means subscale was greater than the mean score achieved by the upper class infants. This difference in means, however, was not great enough to be statistically significant at the .05 level (see Table 5). The value needed for .05 level significance (26 d.f.) was 2.056. The value yielded by the t test was .55. Therefore there was no significant difference in cognitive development between upper and lower class infants at the younger range as measured on the Development of Means subscale for this sample.

The range of possible scores on the Development of Means subscale was 0 - 12. Table 2 also shows that both lower and upper class infants as a group were able to pass just better than 60% of the Development of Means items.

TABLE 2

SCORES ON DEVELOPMENT OF MEANS SUBSCALE FOR INFANTS
SEVEN - TEN MONTHS OLD ACCORDING TO SOCIAL CLASS

Class	N	Mean	SD
Lower	19	7.53	2.20
Upper	9	7.11	.78

Table 3 shows mean score achievement on the Vocal Imitation subscale. The lower class infants once again exceeded upper class infants on mean score. Although this difference in mean scores did show a strong trend favoring the lower class infants. Table 5 shows that the t value yielded when comparing lower and upper class infants at the younger age on the Vocal Imitation subscale was 1.34. This value was less than 2.056 which was the value necessary for significance at the .05 level (26 d.f.).

The range of scores possible on the Vocal Imitation subscale was from 0 - 7. Both upper and lower class infants were able to pass approximately 26% of these items.

TABLE 3

SCORES ON VOCAL IMITATION SUBSCALE FOR INFANTS SEVEN - TEN MONTHS OLD ACCORDING TO SOCIAL CLASS

Class	N	Mean	SD
Lower	19	2.68	1.25
Upper	9	2.11	.33

On the Causality subscale, lower class infants achieved higher than upper class infants when comparing mean scores (see Table 4). This difference of the means, once again, was not statistically significant at the .05 level. The value needed for significance (.05 level, 26 d.f.) was 2.056. The t value yielded when comparing class differences on the Causality subscale at the younger age was .51 (see Table 5). This showed that there was no significant difference in cognitive ability between upper and lower class infants between seven and ten months in this sample as measured on the Causality subscale.

With the possible range of scores being between 0 - 9, Table 4 shows that infants in this study at the younger age were able to pass approximately 50% of the items on the Causality subscale.

TABLE 4

SCORES ON CAUSALITY SUBSCALE FOR INFANTS SEVEN - TEN
MONTHS OLD ACCORDING TO SOCIAL CLASS

Class	N	Mean	SD
Lower	19	4.53	1.68
Upper	9	4.22	.83

TABLE 5

t VALUES COMPARING INFANTS AT THE SEVEN - TEN MONTH
AND SEVENTEEN - TWENTY MONTH AGES
FOR EACH IPDS SUBSCALE

Age	Development of Means	Vocal Imitation	Causality
7-10 months*	.55	1.34	.51
17-20 months**	1.70	1.52	2.50

*the t value needed for significance at the .05 level (26 d.f.)
was 2.056

**the t value needed for significance at the .05 level (26 d.f.)
was 2.024

It is interesting to note that on all three subscales, the lower class infant's performance exceeded the upper class infant's achievement even though it was not statistically significant. To further investigate the result a t test to determine possibilities of a significant difference between the classes on age at testing was computed. A t more than 2.056

was necessary in order to find statistical significance at the .05 level (26 d.f.).

Table 6 gives the mean age of each experimental group at the time of testing. The t test on mean ages comparing class at the younger age yielded a value of 2.13 which exceeded the necessary value of 2.056 (see Table 7). Therefore a significant difference at .05 level was found for age at which upper class and lower class infants were tested.

As shown in Table 6, the lower class infants were tested at a mean age of 9.21 months while the upper class infants were tested at a mean age of 8.44 months. Thus, the lower class infants were significantly older than the upper class infants at the younger age range in this study. A reason for this could have been the fact that both upper and lower class subjects were contacted at the same age but the lower class mothers broke more appointments for testing than the upper class mothers. By the time the tests were rescheduled and administered the lower class infants had advanced significantly in age. This tended to favor the lower class infants and may be one reason for their scoring higher than the upper class. It would be interesting to replicate this study using infants whose age did not differ significantly at the time of the testing.

TABLE 6

AGE IN MONTHS FOR THE FOUR EXPERIMENTAL GROUPS BY CLASS

Experimental Group	N	Mean	SD
Lower class 7- 10 mo.	19	9.21	.71
Upper class 7- 10 mo.	9	8.44	1.24
Lower class 17- 20 mo.	29	18.86	1.13
Upper class 17 -20 mo.	11	18.09	1.20

TABLE 7

t VALUES COMPARING MEAN AGES OF
LOWER CLASS AND UPPER CLASS INFANTS

Age	t value	t value needed for significance
7-10 months	2.13	2.056
17-20 months	1.87	2.024

As a further comparison of age, a t test comparing class and the mean age at the time of testing was calculated for the older age infants. The t value yielded was 1.87 (see Table 7). This value was less than 2.024 which was the value needed for significance at .05 level. Thus a significant difference between lower and upper class age at the time of testing was not found for the older age group.

It is also interesting to note that a strong trend favoring lower class infants was found for the Vocal Imitation subscale. This was not the case for both task-oriented subscales - Development of Means and Causality. This could mean that vocal imitation developed independently of task oriented behavior for infants in this sample.

The second hypothesis stated that there was no difference in cognitive development between lower class and upper class infants between seventeen and twenty months of age as measured on the IPDS scales. It was accepted for two subscales - Development of Means and Vocal Imitation -- but was rejected for the Causality subscale.

Table 8 shows that the mean score achieved by the upper class infants was greater than that of the lower class infants on the Development of Means subscale at older age range. This difference was not great enough to be statistically significant at the .05 level. The value necessary for significance was 2.024 (.05 level, 38 d.f.) while the t value yielded was 1.70 (see Table 5). The difference of means was, however, great enough to indicate a strong trend favoring upper class infants on the Development of Means subscale.

The older aged infants, both upper and lower class, passed approximately 83% of the items on the Development of Means. This may be compared to the 60% passed by the younger infants. Thus it may be said that the Development of Means subscale tended to be sensitive to age differences for this sample because older infants consistently exceeded younger infants in performance.

TABLE 8

SCORES ON DEVELOPMENT OF MEANS SUBSCALE FOR INFANTS
SEVENTEEN - TWENTY MONTHS OLD ACCORDING TO SOCIAL CLASS

Class	N	Mean	SD
Lower	29	9.59	1.40
Upper	11	10.36	.81

For the Vocal Imitation subscale, upper class infants scored higher than lower class infants, though not significantly higher (see Table 10). The value necessary for statistical significance was 2.024 while the computed t value for the relationship between class for the Vocal Imitation subscale was 1.52 (see Table 5). This t value indicated a trend favoring the upper class infants at the older age.

At the older age infants passed 50% of the items on the Vocal Imitation subscale while at the younger age the infants passed only 26%. These results once more tended to show the age sensitivity of the Vocal Imitation subscale in relation to this sample.

TABLE 9

SCORES ON VOCAL IMITATION SUBSCALE FOR INFANTS SEVENTEEN -
TWENTY MONTHS OLD ACCORDING TO SOCIAL CLASS

Class	N	Mean	SD
Lower	29	4.17	1.34
Upper	11	4.91	1.30

A significant difference was found in cognitive ability between upper and lower class infants at the older age as measured on the Causality subscale. The t value computed was 2.50 (see Table 5) which was greater than 2.024, the t value necessary for significance at the .05 level (38 d.f.). Thus the difference in mean scores as shown in Table 9 was found to favor upper class infants significantly on the subscale.

At the younger age, 48% of the items were passed by infants from both lower and upper classes. At the older age this increased to 89% showing a trend for sensitivity to age of the Causality subscale for this sample. This also showed that the ceiling effect reported by King and Seegmiller (1973) near the end of the second year may indeed exist for this sample on the Causality subscale.

TABLE 10

SCORES ON CAUSALITY SUBSCALE FOR INFANTS SEVENTEEN -
TWENTY MONTHS OLD ACCORDING TO SOCIAL CLASS

Class	N	Mean	SD
Lower	29	7.48	1.30
Upper	11	8.55	.69

Tables 11 and 12 report the data collected for two motivational factors - Pleasure in Task Performance and Involvement with Materials.

No hypothesis for comparing infants on these two factors was stated. However, since the data was available and showed trends, this author felt it her responsibility to report the findings.

Upper class infants scored higher as a group than the lower class infants on both motivational measures, at the younger age and at the older age (see Table 11). As shown in Table 12, none of these differences were significant at the .05 level.

The most probable reason for the lack of statistical significance of this trend even though it appeared to be rather strong, was that no inter-rater reliability on these two measures was established prior to rating the infants. Further, scores were not clearly defined. It may be beneficial to include these factors only after scoring has been standardized since several studies have shown similar factors to be related to cognitive development (Birns and Golden, 1972; Kagan, 1971; and Levenstein, 1970). This author believes that had inter-rater reliability been determined, there may have been statistically significant differences to report.

TABLE 11

SCORES ON PLEASURE IN TASK PERFORMANCE AND INVOLVEMENT
WITH MATERIALS ACCORDING TO AGE AND SOCIAL CLASS

Group	N	Pleasure in Task Performance		Involvement with Materials	
		Mean	SD	Mean	SD
Lower class 7-10 mo.	19	2.11	.74	2.05	.78
Upper class 7-10 mo.	9	2.22	.67	2.11	.78
Lower class 17-20 mo.	29	2.31	.76	2.38	.73
Upper class 17-20 mo.	11	2.64	.67	2.46	.69

TABLE 12

t VALUES COMPARING INFANTS AT SEVEN TO TEN AND SEVENTEEN -
TWENTY MONTHS FOR EACH MOTIVATIONAL FACTOR

Age	Pleasure in Task Performance	Involvement with Materials
7 - 10 mo.*	.42	.19
17 - 20 mo.**	1.21	.30

*t value needed for significance at the .05 level (26 d.f.)
was 2.056

**t value needed for significance at the .05 level (38 d.f.)
was 2.024

It is interesting to report that the standard deviations (SD) for mean scores of the lower class infants were greater across the board on each of the three IPDS subscales than SD of the upper class infants (see Tables 2, 3, 4, 8, 9, 10). This may indicate strong within class differences especially for the lower class. For further investigation of this phenomena refer to Farmer (1974) which describes within class differences for many of the same lower class subjects used in this study. Studies of within class differences such as those by Farmer (1974) have been called for by Wachs, Hunt and Uzgiris (1971).

It must be stressed that the results of this study pertain to this particular sample only and may not be generalized to any other sample or any population. The significance of the relationships disclosed perhaps could be considered indicative of the kinds of trends and relationships that might well exist in this population, i.e., infants from lower and upper class between seven and ten and seventeen and twenty months of age in the county of Pima, but this inference would have to be verified by further research.

Discussion

The findings reported in this study warrant the discussion of several topics. In general, results of this study paralleled results by Paraskevopoulos and Hunt (1971) in showing that there is a social-psychological aspect even to such early development. Yet, most studies prior to this time have shown no differences in cognitive development

between classes up to fifteen months of age (Bayley, 1965; Hindley, 1960; and Knoblock and Pasamanick, 1953). In these previous studies, differences may not have shown up earlier because of the tests used. Most infant tests - ex. Cattell - largely measured perceptual motor skills and might not have been sensitive enough to detect differences (Golden et al., 1971).

This study showed trends indicating class differences as early as ten months of age. This tended to support findings by Wachs, Hunt and Uzgiris (1971) who showed social class differences by seven months of age. Further, Kagan has reported that class differences emerged clearly by twelve months of age (in Pines, 1969). Kagan (1972) also reported that differences among infants in motor and cognitive development up to six months of age were fairly independent of social class and rearing conditions, however, by twelve months, differences in rearing seriously affected cognitive functioning.

Specifically this author has found that performance differences among infants younger than ten months from diverse social backgrounds were usually minimal and nonsignificant or else favored the child from the lower socioeconomic level. Beginning around eighteen months to two years the developmental curve representing disadvantaged groups began to drop and at that time ability and achievement curves favored upper class. This supported the prediction concerning social class differences which was made by Caldwell (1967).

The results of this study also tended to support the critical period theory set forth by White and Watts (1973). Obviously, something happened between ten and eighteen months which caused upper class infants in this study to pull out ahead of the lower class infants. Was the ten to eighteen month period important mainly because of the increased vulnerability during that time to intellectual capacity and intrinsic motivation (B. White, 1971)? Just what happened between ten and eighteen months to make that period so important? A look at the characteristics of a "typical" one to one and one-half year old may lend some insight into the issue. During this age, the child masters walking and is not easily confined. He also has an extreme curiosity and zest for learning along with beginning mastery over language. The toddler will assert himself, test limits, and elicit fantasy behavior (White and Watts, 1973). What does this all mean? For the mother or primary caretaker it means the need for much more patience and skill in satisfaction of the toddler's needs and drives.

The caretaker must cope with precocious language while attempting to aid in the receptive language development of the child and the added stress due to locomotion of the toddler, as well as coping with the period of negativism which shows up around fourteen to fifteen months of age (White and Watts, 1973). Finally, the caretaker must cope with a child who actively seeks out stimulation and demonstrates a vigorous appetite for stimulus change (Sequiland, 1969). At the same time she must

aid the toddler in development of self-identity which is brought about in part by interaction with the caretaker.

Kagan reported (Pines, 1969) that in lower class families where there tended to be more children and adults present, more interruptions, and more maternal emotional stress, the caretaker had a harder time demonstrating desired responses to the toddler. It is likely that such a lower class caretaker may use fewer verbal responses, ignore the child, thus stifling curiosity behavior, and on the whole try to keep the child out of the way. Yet there is an over-bombardment of stimuli rather than a deprivation of stimuli among lower class (Wachs, Hunt and Uzgiris, 1971). This has definite negative effects on the cognitive development of the child due to the lack of specificity of stimuli which accompanies overbombardment (White and Watts, 1973).

A look at more specific social class rearing differences seemed pertinent at this time. First, the social class trends reported in this study may have been due to the differences in the child's language experience. Hess and Shipman (1967, p.58) have reported that "structures of the social system and of the family shape communication and language and that language shapes thought and cognitive styles of problem solving". Thus language experiences affect cognitive development. Unfortunately, lower class children possess fewer language skills and are less well able to use such skills in the course of cognitive work (Bernstein, 1962, 1964; Deutch, 1964, 1965; and John, 1963). One reason for this lack of ability on the part of lower class children could be that lower class

tends to use more informal language and uses it mainly to convey concrete needs and immediate consequences. Upper class, on the other hand, uses more formal, diversified and flexible language emphasizing the relationship among concepts (Bernstein, 1962, 1964).

Differences in maternal style could be a second way of explaining the results of this study. It must be stressed here that different mother types have been found to cut across social class lines (Pines, 1969). Therefore, all classes contain all types of mothers which range from excellent to poor. There are however certain trends in maternal teaching style for each class level.

Maccoby and Gibbs (1954), M. White (1957) and Klatskin (1952) have reported that upper class parents generally are less punitive and more in line with "expert" opinion on how to rear children than are lower class parents. Upper class mothers rely less on physical feedback, use more praise and encouragement, reinforce correct responses more than errors, use more specific language with longer and more complex sentences, and give more orientation to tasks than do lower class mothers (Hess and Shipman, 1967).

In contrast, lower class mothers tend to be more disapproving and controlling, more likely to intrude physically with use of negative feedback, and more likely to give specific concrete suggestions to their child than are upper class mothers (Bee et al. 1969).

Thus, maternal teaching style, language style and environment in upper class is more supportive of cognitive processes than in the lower

class. "In an environment which offers availability of alternative ways of action and thought, such as in the upper class, cognitive activity is encouraged, particularly comparison, anticipation of consequences and other features of choice and decision-making." (Hess and Shipman, 1967, p.59).

Recommendations and Implications

The results of this study suggest several courses of action. This study has shown that the ten to eighteen months period indeed holds value for cognitive development within this sample. What types of aid can be given during this time to encourage maximum development of cognitive and motivational systems enabling full participation in even our highly technical culture? One type of aid already under study is that of early stimulation programs. Developmentalists such as Lacrosse et al. (1970), Silverstone (1970), Starr, (1971) and Caldwell (1972) have reported findings favoring group infant programs across all facets of development. However, more work is needed with infant programs in areas other than cognition.

A second type of aid could be that of education for parenthood. In a current study being carried out by White (as reported by White in Phoenix, Arizona on October 21, 1972), "quality" mothers are being used to share many of their own child-rearing techniques. Another approach to the idea of parent education could be to offer courses taught by trained teachers, on child development and preparation for child rearing. At any rate, this would be an interesting area to investigate further.

It would also be interesting and beneficial to replicate this study using a much larger sample with more control for age. Such a study would give a better picture of the social class differences with respect to cognitive development.

Since language development seems to be an important facet of development as well as task development, it seems almost necessary to have more in-depth language studies. Such studies could possibly compare home language style with psychological development.

Another recommendation that might give valuable information would be to carry out a study of this type emphasizing within class differences. A study such as this has been completed by Farmer (1974) yielding interesting results.

Finally, studies to trace the full cycle of social class influences not just group trends have been called for by Caldwell (1967). Such studies are absolutely necessary if better understanding of the factors influencing development is hoped for. Without a knowledge of the important social class influences, further work in this area seems worthless.

CHAPTER 5

SUMMARY

Social class differences and the divergence of cognitive development during the first two years of life was the subject of this study. The sample consisted of sixty-eight infants from families in the lower and upper socioeconomic level in Tucson, Arizona. The infants ranged in age from seven to ten months and seventeen to twenty months.

The instrument that was used was a Piaget-based scale which consisted of six subscales. Three of those six subscales were utilized; the Development of Means for Achieving Desired Environmental Ends Scale, the Vocal Imitation Scale, and the Causality Scale. Mean scores and standard deviations for each of the four experimental groups were computed for each of the three subscales.

The hypothesis that there was no difference in cognitive skills between lower and upper class children between the ages of seven and ten months as measured on the IPDS was accepted for the three subscales. A trend favoring the lower class infants at the younger age for vocal imitation was reported. A reason for acceptance of this hypothesis was thought to be that for infants under ten months of age, social class background was not a major determining factor for cognitive development.

The hypothesis that there was no difference in cognitive skills between lower and upper class children between the ages of seventeen and twenty months as measured on the IPDS was accepted for the Development

of Means and Vocal Imitation subscales. It was rejected for the Causality subscale. Strong trends favoring the upper class infants at this older age were reported. It was concluded that the time from ten to eighteen months of age must have been an important time or a "critical period" for development of cognition. It was during this time that the upper class infants, who tended to perform behind the lower class infants at seven to ten months, pulled ahead and surpassed the lower class infants in performance on the IPDS. Several reasons for this phenomenon were discussed.

Two motivational factors, Pleasure in Task Performance and Involvement with Materials, were also discussed. Upper class infants tended to score above lower class infants on both of these measures both at the younger age and at the older age. Differences in these scores, however, were not statistically significant.

APPENDIX A

REQUEST LETTER TO PARENTS

Dear _____,

The Psychology Department at the University of Arizona is studying infant development in children up to twenty-two months of age. My part in this study, as a graduate teaching assistant in Child Development and Family Relations is to investigate the cognitive development of infants less than ten months and over sixteen months of age.

Dr. _____, your pediatrician, suggested your name as a possible participant in my study. He is in full support of my undertakings.

Will you consider participating in the study by attending (one or both parents) a one hour testing session with your infant? The test consists of my observing your child playing with a series of toys. Several tasks will be observed, i.e. your child's repetition of specific actions.

You will then have the opportunity to participate in two or three other tests if you desire. These tests also require your infant simply to play with a set of toys. The total time involved will be about one hour for the first test and, should you wish to continue, the subsequent tests will take two to three hours more of your time. For your convenience the test area will be located at the University of Arizona Medical Center near the main campus.

In closing I wish to emphasize three points: you will not be separated from your child during any testing; Dr. _____, has given my his support; and individual results of your infant's test(s) will not be published, but will be available to you if you so request.

Please contact me at 622-4063 evenings between 7:00 p.m. and 9:00 p.m. to discuss any questions you have and to set up a convenient appointment for the test. I am looking forward to your call and to meeting with you and your child. Thank you very much for your time.

Sincerely,

Mary A. Lamm

APPENDIX B

SCORE SHEET FOR IPDS

Child's Name _____

Date of Birth _____

Test Results: Development of Means _____
Vocal Imitation _____
Causality _____
Pleasure in Task _____
Involvement with _____
Materials _____

DEVELOPMENT OF MEANS FOR ACHIEVING DESIRED ENVIRONMENTAL ENDS

1. Appearance of hand-watching behavior _____
 2. Achievement of visually-directed grasping _____
 3. Repetition of actions producing an interesting result _____
 4. Letting go of an object in order to reach another _____
 5. Using locomotion as a means _____
 6. Using a support as intermediary (a) _____
 7. Using a support as intermediary (b) _____
 8. Using a string horizontally _____
 9. Using a string vertically _____
 10. Using a stick _____
 11. Showing foresight - necklace and container _____
 12. Showing foresight - solid ring and peg _____
- Total _____

VOCAL IMITATION

- | | |
|--|-------|
| 1. Differentiation of vocalization from crying | _____ |
| 2. Response to familiar vocal productions | _____ |
| 3. Imitation of familiar sound patterns | _____ |
| 4. Imitation of unfamiliar sound patterns | _____ |
| 5. Imitation of familiar words | _____ |
| 6. Imitation of new words | _____ |
| 7. Extensive imitation of words | _____ |
| Total | _____ |

DEVELOPMENT OF CAUSALITY

- | | |
|---|-------|
| 1. Appearance of hand-watching behavior | _____ |
| 2. Repetition of actions producing an interesting result | _____ |
| 3. Using a specific gesture as a procedure | _____ |
| 4. Continuing a familiar activity by starting movement | _____ |
| 5. Continuing performance by direct action on object | _____ |
| 6. Recognizing another person as independent causal agent | _____ |
| 7. Recognizing independent causality with objects | _____ |
| 8. Searching for independent causes of spectacles | _____ |
| Total | _____ |

NOTES AND OBSERVATIONS

LIST OF REFERENCES

- Anastasi, A., and D'Angelo, R. "A comparison of negro and white preschool children in language development and Goodenough Draw-a-man I.Q.", J. of Genet. Psychol., Vol. 81, 1952, pp. 147-165.
- Anastasi, A., and DeJesus, C. "Language development and non-verbal IQ of Puerto Rican preschool children in N.Y.C.," J. Abnorm. and Soc. Psychol., Vol. 48, 1953, pp. 357-366.
- Anderson, L. "The predictive value of infant tests in relation to intelligence at five years," Child Dev., Vol. 10, 1939, pp. 203-212.
- Baldwin, A. Theories of Child Development. New York: John Wiley and Sons, Inc., 1968.
- Bayley, N. "Mental Growth During the First Three Years", Genet. Psychol. Monog., Vol. 14, No. 1, July 1933, pp. 1-93.
- Bayley, N. "Value and Limitations of infant testing," Children, Vol. 5, No. 4, July-August 1958, pp. 29-41.
- 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 Dev., Vol. 36, 1965, pp. 378-411.
- Beach, F. "Comparison of copulatory behavior of male rats raised in isolation, cohabitation and segregation, " J. Genet. Psychol., Vol. 60, 1942, pp. 121-137.
- Bee, H., VanEgeren, L., Streissguth, A., Nyman, B., and Leckie, M. "Social Class differences in maternal teaching strategies and speech patterns, " Develop. Psych., No. 1, 1969, pp. 726-734.
- Bell, R., Weller, G., and Waldrop, M. "Newborn and preschooler: organization of behavior and relations between periods." Monographs of the Society for Research in Child Development. Vol. 36, No. 1-2, 1971.
- Berg, G. "Maternal caretaking practices in relation to infant cognitive development." Master's thesis. The University of Arizona: Tucson, Arizona, 1974.

- Bereiter, C. and Engelman, S. Teaching disadvantaged children in the preschool. Englewood Cliffs, New Jersey: Prentice-Hall, 1966.
- Bernstein, B. "Social class, linguistic codes and grammatical elements," Language and Speech. 1962, pp. 221-240
- Bernstein, B. "Elaborated and Restricted Codes: their social origins and some consequences," American Anthropology, Vol. 66, 1964, pp. 1-34.
- Binet, A. Les idees modernes sur les enfants. Paris: Ernest Flammarion, 1909. Cited from Stoddard, G. "The IQ: its ups and downs," Educational Record, Vol. 20, 1939, pp. 44-57.
- Birch, H. "Health and the education of socially disadvantaged children," Developmental Medicine and Child Neurology, 1968, pp. 580-599.
- Birch, H.G. and Gussow, J. Disadvantaged children: Health nutrition and school failure. New York: Harcourt, Brace and World, Inc., 1970.
- Birns, B. and Golden, M. "Prediction of intellectual performance at three years from infant tests and personality measures," Merrill-Palmer Quarterly, Vol. 18, No. 1, 1972, pp. 54-58.
- Bloom, B. Stability and Change in human characteristics. New York: John Wiley and Sons, 1965.
- Bower, T. "The object in the world of the infant," Scientific American, October, 1971, pp. 30-38.
- Bowlby, J. Mental care and mental health. Geneva, Switzerland: World Health Organization, 1952.
- Bowlby, J. Attachment and loss. London: Hogarth, 1969.
- Boyle, D. A student's guide to Piaget. Oxford, Great Britain: Pergamon Press, 1969.
- Bradway, K., Thompson, C., and Cravens, R. "Preschool IQ's after twenty-five years," Journal of Educational Psychology, Vol. 49, October 1958, pp. 278-281.
- Brazelton, T. Infants and mothers. New York: Vintage Books, 1960.
- Bruner, J. The process of education. New York: Vintage Books, 1960.
- Bruner, J. Processes of cognitive growth: Infancy. Worcester: Clark University Press with Barre Publisher, 1968.

- Bruner, J. "Processes of growth in infancy". A. Ambrose (ed.) Stimulation in early infancy. New York: Academic Press, 1969.
- Bruner, J. "Organization of early skilled action," Child Development, Vol. 44, 1973, pp. 1-11.
- Caldwell, B. "The usefulness of the critical period hypothesis in the study of filiative behavior," Merrill Palmer Quarterly, Vol. 8, 1962, pp. 229-242.
- Caldwell, B. "What is the optimal learning environment for the young child," American Journal of Orthopsychiatry, Vol. 37, 1967, pp. 18-21.
- Caldwell, B. "Critical issues in infancy and early child development." Presented at the Association for Research in Nervous and Mental Diseases, New York, Dec. 3-4, 1971.
- Caldwell, B. "What does research teach us about day care," Children Today, Vol. 1, 1972, pp. 47-54.
- Caldwell, B. and Richmond, J. "Social class level and stimulation potential of the home." in J. Hellmuth (ed.) Exceptional infant. Seattle, Washington: Special Child Publications, 1967.
- Casler, L. "Maternal deprivation: a critical review of the literature." Monographs of the Society for Research in Child Development. Vol. 26, No. 2., 1961.
- Cormon, H. and Escalona, S. "Stages of sensorimotor development: a replication study," Merrill Palmer Quarterly, Vol. 15, 1969, pp. 351-361.
- Decarie, T. Intelligence and affectivity in early childhood. New York: International Univeristy Press, 1965.
- Denenberg, V. "Critical periods, stimulus input, and emotional reactivity: a theory of infantile stimulation," Psychological Review, Vol. 71, 1964, pp. 335-351.
- Denenberg, V. "Stimulation in infancy, emotional reactivity and exploratory behavior". in D. Gross (ed.) Biology and Behavior Neurophysiology and Emotion. New York: Rockefeller University Press, 1967.
- Dennis, W. and Najarian, P. "Infant development under environmental handicaps," Psychological Monographs, Vol. 71, 1957, pp. 329-356.
- Deutsch, M. "The verbal survey," American Journal of Orthopsychiatry, Vol. 34, 1964, pp. 213-214.

- Deutsch, M. "The role of social class in language development and cognition." American Journal of Orthopsychiatry, Vol. 35, 1965, pp. 78-88.
- Dittman, L. (ed.) Early child care -- the new perspectives. New York: Atherton Press, 1968.
- Elkind, D. "Cognition in infancy and early childhood." in Y. Brackbill (ed.) Infancy and early childhood. New York: The Free Press, 1967.
- Escalona, S. "The use of infant tests for predictive purposes." in W. Martin and C. Stendler (eds.) Readings in child development. New York: Harcourt, Brace and World, Inc., 1954.
- Escalona S. and Moriarty, A. "Prediction of school-age intelligence from infant tests," Child Development. Vol. 32, 1961, pp. 597-605.
- Evans, E. Contemporary influences in early child education. New York: Holt, Rinehart and Winston, Inc., 1971.
- Evans, E. and Saia, G. Day Care for Infants. Boston Mass.: Beacon Press, 1972.
- Farmer, V. "Indices of maternal risk and divergance of cognitive development during the second year of life." Master's thesis, The University of Arizona: Tucson, Arizona, 1974.
- Fowler, W. "Cognitive learning in infancy and early childhood," Psychological Bulletin, Vol. 59, 1962, pp. 116-152.
- Fremon, S. "New ways to measure intelligence in infants," Parent's Magazine, Vol. 46, April 1971, pp. 39-41.
- Furfey, P. and Muehlenbein, J. "The validity of infant intelligence tests," Journal of Genetic Psychology, Vol. 40, 1932, pp. 219-223.
- Giblin, P. "Development of imitation in Piaget's sensory-motor period of infant development (stages III-VI)". Proceedings of the 79th Annual Convention of the American Psychological Association. Vol. 6, 1971, pp. 141-142.

- Gilliland, A. "The measurement of the mentality of infants," Child Development, Vol. 19, 1948, pp. 155-158.
- Glaser, R. and Nitko, A. "Measurement in learning and instruction". In R. Thorndike (ed.) Educational measurement. Wash, D.C.: American Council on Education, 1971, pp. 625-670.
- Golden, M. and Birns, B. "Social class and cognitive development in infancy", Merrill Palmer Quarterly, Vol. 14, 1968, pp. 139-149.
- Golden, M. and Birns, B.; Bridger, W.; and Moss, A. "Social class differentiation in cognitive development among black preschool children," Child Development, Vol. 42, 1971, pp. 37-45.
- Golden, M.; Bridger, W.; and Montare, A. "Social class differences in the ability of young children to use verbal information to facilitate learning." Paper presented at the biennial meeting of the Society for Research in Child Development, Philadelphia, Pennsylvania. 1973.
- Goldfarb, W. "Psychological privation in infancy and subsequent adjustment," American Journal of Orthopsychiatry, Vol. 15, 1945, pp. 247-255.
- Goldfarb, W. "Emotional and intellectual consequences of psychological deprivation in infancy: a reevaluation." In P. Hock and J. Zubin Psychopathology of childhood. New York: Grune and Stratton, 1954.
- Goldschmid, M. "The role of experience in the rate and sequence of cognitive development." In D. Green, M. Ford, and G. Flamer (eds.) Measurement and Piaget. New York: McGraw Hill, Inc., 1971.
- Gordon, H. Mental and scholastic tests among retarded children. London: Board of Education, Educational Pamphlet, No. 44, 1923.
- Graham, F. "Behavioral differences between normal and traumatized newborns," Psychological Monographs, Vol. 70, 1956, pp. 602-619
- Gray, S. and Klaus, R. "An experimental preschool program for culturally deprived children," Child Development, Vol. 36, 1965, pp. 887-898.
- Griffiths, R. The abilities of babies: a study in mental measurement. New York: McGraw Hill Book Co., Inc. 1954.

- Haggard, Ernest. "Social status and intelligence: an experimental study of certain cultural determinents of measured intelligence," Genetic Psychological Monographs, Vol. 49, 1954, pp. 141-186.
- Harlow, H. "The nature of love," American Psychologist, Vol. 13, 1958, pp. 673-685.
- Harlow, H. "The development of affection in primates". In E. Bliss (ed.), Roots of behavior. New York: Harper, 1962.
- Harlow, H. and Harlow, M. "Learning to love", American Scientist, Vol. 54, 1966, pp. 244-272.
- Harter, S; Shultz, T; and Blum, B. "Smiling in children as a function of their sense of mastery", Journal of Experimental Child Psychology, Vol. 12, 1971, pp. 396-404.
- Havighurst, R. and Breese, F. "Relations between ability and social status in a midwestern community III: Primary mental abilities," Journal of Educational Psychology, Vol. 38, 1947, pp. 241-247.
- Havighurst, R. and Janke, L. "Relation between ability and social status in a midwestern community I: Ten year old children," Journal of Educational Psychology, Vol. 35, 1944, pp. 357-358.
- Hendrick, I. "The discussion of the "instinct to master", Psychoanalytic Quarterly, Vol. 12, 1943, pp. 561-565.
- Herrick, V. "What is already known about the relationship of the IQ to cultural background." In, M. Eels, A. Davis, R. Havighurst, V. Herrick and R. Tyler (eds.) Intellectual and cultural differences. Chicago: University of Chicago Press, 1951.
- Hertzig, M. "Aspects of cognition and cognitive style in young children of differing social and ethnic backgrounds". In, J. Hellmuth, Cognitive Studies 2 - Deficits in Cognition. New York: Brunner/Mazel, Inc., 1971.
- Hertzig, M.; Birch, H; Thomas, A; and Mendez, O. "Class and ethnic differences in the responsiveness of preschool children to cognitive demands." Monographs of the Society for Research in Child Development, Vol. 33, 1968.
- Hess, R. and Shipman, V. "Early experience and the socialization of cognitive modes in children," Child Development, Vol. 36, 1965, pp. 869-886.

- Hess, R. and Shipman, V. "Cognitive elements in maternal behavior". In, J. Hill (ed.) Minnesota Symposium on Child Psychology. Minn.: University of Minnesota Press, 1967.
- Hess, R. and Shipman, V. "Parents as teachers: how lower class and middle class mothers teach." In C. Lavatelle and F. Stendler (ed.) Readings in Child Behavior and Development. New York: Harcourt and Brace, 1972.
- Hindley, C. "Social class influences on the development of ability in the first five years." In, G. Nielson (ed.) Proceedings of the XIV International Congress of Applied Psychology. Vol. 3, Child and Education. London: University of London, 1960.
- Honstead, Carole. "The developmental theory of Jean Piaget." In, J. Frost, Early childhood education rediscovered. New York: Holt, Rinehart and Winston, Inc., 1968.
- Hunt, J. McV. Intelligence and Experience. New York: The Ronald Press, 1961.
- Hunt, J. McV. "How children develop intellectually" Children, Vol. 11, 1964 (a), pp. 83-91.
- Hunt, J. McV. "The psychological basis for using preschool enrichment as an antidote for cultural deprivation," Merrill Palmer Quarterly, Vol. 10, 1964 (b), pp. 209-248.
- Hunt, J. McV. "Where Education Begins," American Education, Vol. 4, October 1968, pp. 15-19.
- Hunt, J. McV. "The impact and limitations of the giant of developmental psychology". In, D. Elkind and J. Flavell, Studies in Cognitive Development. New York: Oxford University Press, 1969.
- Hunt, J. McV. "Parent and child centers: their basis in the behavioral and educational sciences," American Journal of Orthopsychiatry, Vol. 41, 1971 (a), pp. 13-38.
- Hunt, J. McV. "The epigenesis of intrinsic motivation and early cognitive learning." In, R. Anderson and H. Shane, As the twig is bent: readings in early childhood education. Boston: Houghton Mifflin Co., 1971 (b).
- Hunt, J. McV. Utility of ordinal scales derived from Piaget's observations. Paper presented at American Psychological Association. Montreal, Canada 1973.

- Hunt, J. McV.; Paraskevopoulos, J.; Schnickedanz D.; and Uzgiris, I.; Variations in the mean ages of achieving object permanence under diverse conditions of rearing. Champaign, Illinois, 1973.
- Jensen, A. "How much can we boost IQ and scholastic achievement?", Harvard Educational Review, Vol. 39, 1969, pp. 1-123.
- John, V. "The intellectual development of slum children," American Journal of Orthopsychiatry, Vol. 33, 1963, pp. 813-822.
- Kagan, Jerome. "The determinants of attention in the infant," American Scientist, Vol. 58, 1970, pp. 298-306.
- Kagan, Jerome. Change and continuity in infancy. New York: John Wiley and Sons, Inc., 1971.
- Kagan, Jerome. "Do infants think?", Scientific American, March 1972, pp. 74-82.
- Kessen, W. "Research in the psychological development of infants: an overview," Merrill Palmer Quarterly, Vol. 9, 1963, pp. 83-94.
- Kessen, W. "Sucking and looking: two organized congenital patterns of behavior in the human newborn." In, H. Stevenson; E. Hess, and H. Rheingold (eds.) Early Behavior. New York: Wiley, 1967.
- Ketchel, M.F. "Infant enrichment program: focus on parental training, curriculum and assessment." Doctoral Dissertation, The University of Arizona: Tucson, Arizona, 1974.
- King, W. and Seegmiller, B. "Performance of 14 to 22 month old black, firstborn male infants on two tests of cognitive development: the Bayley Scales and Infant Psychological Development Scale," Developmental Psychology, Vol. 8, 1973, pp. 317-326.
- Klatskin, E. "Shifts in child care practices in three social classes under an infant care program of flexible methodology," American Journal of Orthopsychiatry, Vol. 22, 1952, pp. 52-61.
- Knoblock, H., and Pasamanick, B. "Further observations on the behavioral development of Negro children," Journal of Genetic Psychology, Vol. 83, 1953, pp. 137-157.

- Kohlberg, L. "Early Education: a cognitive-developmental view," Child Development, Vol. 39, 1968, pp. 1013-1062.
- Kopp, C.; Sigman, M.; and Parmelee, A. "Ordinality and sensory-motor series," Child Development, Vol. 44, 1973, pp. 821-823.
- Lacrosse, E.; Lee, P; Litman, F; Ogilvie, D; Stodolsky, S; White, B. "The first six years of life: a report on current research and educational practices," Genetic Psychological Monographs, Vol. 82, 1970, pp. 161-266.
- Laird, D. "The performance of two groups of eleven year old boys on the Wechsler Intelligence Scale for children," Journal of Educational Research, Vol. 51, 1957, pp. 101-107.
- Lesser, G; Fifer, G; and Clark, D. "Mental abilities of children from different social-class and cultural groups." Monographs of the Society for Research in Child Development. Vol. 30, No. 4, 1965.
- Levenstein, P. "Cognitive growth in preschoolers through verbal interaction with mothers," American Journal of Orthopsychiatry, Vol. 40, 1970, pp. 426-432.
- Levine, S. "The psychophysiological effects of infantile stimulation." In E. Bliss (ed.), Roots of behavior. New York: Harper, 1962, pp. 246-253.
- Lewis, M. and Goldberg, S. "Perceptual-cognitive development in infancy: a generalized expectancy model as a function of the mother-infant interaction," Merrill Palmer Quarterly, Vol. 15, 1969, pp. 81-101.
- Loevinger, J. Intelligence as related to socio-economic factors. 39th Yearbook, National Society for the Study of Education, 1940, Part I, pp. 159-210.
- Lorenz, K. "imprinting", The Auk, Vol. 54, 1937, p. 245.
- Lorenz, K. "Comparitive study of behavior In C. Schiller (ed.) Instinctive Behavior. New York: International University Press, 1957.
- Maccoby, E. and Gibbs, P. Methods of child rearing in two social classes. In W. Martin and C. Stendler (eds.) Readings in Child Development. New York: Harcourt and Brace, 1954.

- McNemar, Q. The revision of the Stanford Binet Scale: an analysis of the standardization data, Boston: Houghton Mifflin, 1942.
- Miller, D; Cohen, L; and Hill, K. "A methodological investigation of Piaget's theory of object concept development in the sensory-motor period," Journal of Experimental Child Psychology, Vol. 9, 1970, pp. 59-85.
- Mussen, P; Conger, J; and Kagan, J. Child development and personality. New York: Harper and Row, 1963.
- Nissen, H. Symposium on sexual behavior in mammals. Boston, 1954.
- Paraskevopoulos, J. and Hunt, J.McV. "Object construction and imitation under differing conditions of rearing," Journal of Genetic Psychology, Vol. 119, 1971, pp. 301-321.
- Pasamanick, B. and Knobloch, H. "Early language behavior in Negro children and the testing of intelligence," Journal of Abnormal Psychology, Vol. 50, 1955, pp. 401-402.
- Piaget, J. The origins of intelligence in children. New York: W. W. Norton, 1952.
- Piaget, J. The construction of reality in the child. New York: Basic Books, 1954.
- Pines, M. "Why some three year olds get A's and some get C's." New York Times Magazine, New York Times Co., July 6, 1969.
- Provence, S. and Lipton, R. Infants in institutions. New York: International Press, 1962.
- Ripple, R. and Rockcastle, V. Piaget Reidscovered. New York: Cornell University, 1964.
- Schaefer, E. "Need for early and continuing education." In, V. Denenberg (ed.), Education of the infant and young child. New York: Academic Press, 1970.
- Scott, J. "The process of primary socialization in canine and human infants." Monographs for the Society of Research in Child Development, Vol. 28, 1963.
- Sequiland, E. The development of instrumental exploratory behavior during the first year of human life. Paper presented at the SRCDC. Santa Monica, Calif., March 1969.

- Sherman, M. and Henry, T. Hollow Folk. New York: Thomas Y. Crowell, 1933.
- Sherman, M. and Key, C. "The intelligence of isolated mountain children"; Child Development, Vol. 3, 1932, pp. 279-290.
- Silverstone, N. Programs for infants and young children. Part I: Education and Day Care. Appalachian Regional Commission, 1970.
- Simon, A. and Bass, L. "Toward a validation of infants testing." American Journal of Orthopsychiatry, Vol. 26, 1956, pp. 340-350.
- Sptiz, R. Hospitalism: An inquiry into the genesis of psychiatric conditions in early childhood on the psychanalytic study of the child. New York: International University Press, 1945.
- Spitz, R. Hospitalism: a follow-up report. The psychanalytic study of the child. New York: International University Press, 1946.
- Sroufe, L. "A methodological and philosophical critique of intervention oriented research," Developmental Psychology Vol. 2, 1970, pp. 140-145.
- Staples, R. "The responses of infants to color", Journal of Experimental Psychology, Vol. 15, 1932, 119-141.
- Starr, R. "Cognitive development in infancy: Assessment, acceleration and actualization", Merrill Palmer Quarterly, Vol. 17, 1971, pp. 153-186.
- Stott, L. and Ball, R. "Infant and preschool mental tests: review and evaluation", Monographs of the Society for Research in Child Development, 1965, Vol. 30, No. 3.
- Thomas, H. "Psychological Assessment instruments for use with human infants", Merrill Palmer Quarterly, Vol. 16, 1970, pp. 170-224.
- Uzgiris, I. "Patterns of cognitive development in infancy", Merrill Palmer Quarterly, Vol. 19, July, 1973, pp. 181-204.
- Uzgiris, I. and Hunt, J. McV. An instrument for assessing infant psychological development. Unpublished manuscript. Champaign, Illinois, 1966.
- Uzgiris, I. and Hunt, J. McV. Ordinal scales of infant psychological development. Unpublished manuscript. Champaign, Illinois, 1968.

- Uzgiris, I. and Hunt, J.McV. Toward ordinal scales of sensorimotor development in human infants: tables to correct some misunderstandings of prepublications. Champaign, Illinois, 1968.
- Uzgiris, I. and Hunt, J.McV. "Attentional preference and experience: II an exploratory longitudinal study of the effect of visual familiarity and responsiveness," Journal of Genetic Psychology, Vol. 117, 1970, pp. 109-121.
- Uzgiris, I. and Hunt, J. McV. Toward ordinal scales of psychological development in infancy. University of Illinois Press, 1974 (in press).
- Wachs, T. Report on the utility of a Piaget-based infant scale with older retarded children," Developmental Psychology, Vol. 2, 1970, p. 449.
- Wachs, T.; Hunt, J. McV.; and Uzgiris, I. "Cognitive development in infants of different age levels and from different environmental backgrounds: an exploratory investigation," Merrill Palmer Quarterly, Vol. 17, 1971, pp. 283-318.
- Watson, J. Psychological care of infant and child. New York: International University Press, 1928.
- Watson, J. "Operant conditioning of visual fixation in infants under visual and auditory reinforcement," Developmental Psychology, Vol. 1, 1969, pp. 508-516.
- White, B. Child development research: an ediface without a foundation," Merrill Palmer Quarterly, Vol. 15, 1969, pp. 49-81.
- White, B. Human infants experience and psychological development. Englewood Cliffs, New Jersey: Prentice Hall Inc., 1971.
- White, B. and Watts, J. Experience and environmnet: major influences on the development of the young child. Englewood Cliffs, New Jersey: Prentice Hall, Inc., 1973.
- White, M. Social class, child rearing practices and child behavior," American Social Review, Vol. 22, 1957, pp. 704-712.
- White, R. Motivation reconsidered: the concept of competence," Psychological Review, Vol. 66, 1959, pp. 297-333.

- White, R. "Ego and reality in psychoanalytic theory. A proposal regarding independent ego energies," Psychological Issues, No. 3, 1963.
- Wolff, P. "The developmental psychologies of Jean Piaget and psychoanalysis," Psychological Issues, No. 1, 1960.
- Wolff, P. "The causes, controls, and organization of behavior in the newborn," Psychological Issues, No. 5, 1966.
- Yarrow, L. "Maternal deprivation: toward an empirical and conceptual reevaluation," Psychological Bulletin, Vol. 58, 1961, pp. 459-490.
- Yarrow, L.; Rubenstein, J.; Pedersen, F.; and Jankowski, J. "Dimensions of early stimulation and their differential effects on infant development," Merrill Palmer Quarterly, Vol. 18, 1972, pp. 205-207.

38

003278