

THE EFFECT OF
THE HOME ENVIRONMENT
ON THE
DEVELOPMENT OF THE CHILD
AT
12 MONTHS OF AGE

by
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a thesis


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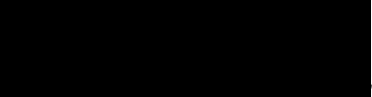
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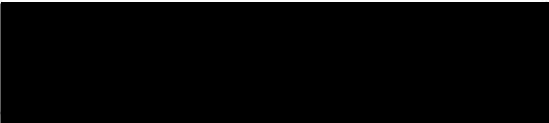
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Dedication

to Bill
for his continued support
and encouragement

to Lisa and Tom
for their cooperation

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Chapter I

INTRODUCTION

The influence of the home environment in accelerating or depressing a child's developmental progress has been recognized. Current studies are attempting to identify those aspects in the environment crucial to a child's reaching full developmental potential.

Studies have shown that certain elements of the home environment can be correlated to a child's later cognitive and language development. Other aspects of child development may also be affected. Knowledge about the effect the home environment has on the development of the young child is especially important. Also important is knowledge of the role the mother plays in providing that environment. Further, it is important to relate changes in women's roles to child development. Since women still provide most of the child care, even when working, they are integral to the home environment. In turn, that environment can affect the eventual development of the young child.

This study is part of an on-going longitudinal study, Feminine Role Congruence and Maternal Attachment (Tomlinson, 1976), which, for the past two years, has been exploring "the impact of changing feminine roles and resultant feminine role conflict on maternal-infant attachment during the first 4 months of the infant's life" (Tomlinson, 1978). The long range goal of the study is "to promote the healthy emotional development of children by improving early nurturant and care-taking experiences of infants who may be affected by this change"

(Tomlinson, 1978).

The relationship between early mothering of the first born infant and possible role conflict resulting from the orientation toward home-making or a working career is being examined. Some women have been able to adapt to these changes and either continue comfortably in the traditional role of homemaker, or comfortably balance the roles of mother and worker. Others have been unable to feel comfortable in either role. This role conflict in the study sample is being measured over time: before delivery, 4 months after the birth of the infant, at 1, 2 and 4 years. Thirty-six subjects, of an eventual 100, are currently in the study. Maternal attachment was assessed at delivery, within 24 hours post delivery, at one month and at 4 months. The effect of what are considered to be important intervening variables is also being measured. Personality characteristics, marital adjustment, and infant temperament are among those variables being measured. The effect of early outcomes was assessed by measuring aspects of the home environment provided the infant at 4 months. However, no attempt was made in the early phase of that study to assess the development of the infant.

This study is an one-year follow-up of the Tomlinson study sample, designed to measure the relationship between the home environment provided to those infants and their consequent development. The review of the literature provides the rationale for the present study.

Review of the Literature

Conceptualization of the Environment

Early writers made a major contribution to our understanding of a child's environment. However, they focused on the presence of a continuous nurturing figure (human element) and did not look at other aspects of the environment.

Yarrow's (1968) conceptualization of the environment of the young child was more inclusive. He identified two major aspects of the infant's early environment—the animate, or human, environment and the inanimate environment. The animate environment included all experiences provided directly by the caregiver in relation to the child's external world. The inanimate environment referred to stimulation provided by the external world when the caregiver was not present or not providing the stimulation (Barnard and Gortner, 1977). The two aspects overlapped somewhat as the caregiver may use inanimate objects to stimulate the child.

Further assisting in the conceptualization of the early environment was the detailed study of the animate and inanimate environment by Yarrow, Rubenstein, Pederson, and Jankowski (1972). They studied 41 black infants, 21 boys and 20 girls, at five months of age. Two home visits, about a week apart, were made. Each visit involved three hours of time-sampling observations when the baby was awake. Besides the time-sampling observations, observers recorded all play materials and household objects within reach of the infant during the time of observation.

Using their list of play materials and household objects available to the child, Yarrow, et al (1972) analyzed the inanimate environment of the child in terms of the dimensions of variety, responsiveness, and complexity. The selection of these dimensions was guided by concepts from several theories.

Variety referred to the number of objects within reach of the infant. Responsiveness referred to the "feedback potential inherent in objects" (p. 207). This feedback potential referred to changes in an object which occurred because of some action by the infant, e.g. a toy that made a sound when squeezed, thus allowing the infant to feel he could have an impact on his environment. Responsiveness had four subscales: moving parts, changes in shape and contour, reflected image, and noise production.

The third dimension of the inanimate environment was complexity. This aspect looked at the number of colors, different shapes and variations in contour, amount of visual and tactile pattern, and degree of responsiveness of the object to manipulation. The score for the dimensions of complexity and responsiveness was determined by summing the components and dividing by the number of toys.

Yarrow, et al (1972) demonstrated that it was possible to do a detailed analysis of the properties of objects available to the infant. Further, they demonstrated it was possible to relate these properties of objects to infant development. These researchers stated that differentiating the details of the environment was important. Making global characterizations of an environment did not consider the complexity of interactions.

Yarrow, et al (1972) also examined the animate environment, studying selected infant and caregiver behaviors, and the social stimulation provided the infant by the caregiver. Social stimulation had four components: 1) level, the amount and intensity of stimulation provided by the caregiver; 2) variety of the types of behaviors elicited by the caregiver and the settings; 3) contingency, the frequency of response to positive vocalization by the infant, or to infant distress; and 4) expression of positive affect, the demonstrativeness of the caregiver.

These researchers demonstrated that it was possible to differentiate the infant's environment into many discrete behaviors of the caregiver. Some of these characteristics had significant correlations with infant functioning. Further, Yarrow, et al (1972) found that the social environmental characteristics were independent of the inanimate environmental characteristics. Thus, it was concluded that both aspects must be examined for a complete picture of the infant's environment. Only the significant relationships between the animate and inanimate environment and language, gross motor, and fine motor development will be discussed here.

Yarrow, et al (1972) found that the amount of vocalization of the infant was related significantly to the mother's contingent response to her infant's vocalization ($p < .05$), and to the variety of types of behavior elicited by the caregiver and by the different physical settings ($p < .05$). The inanimate environment, however, showed no significant relationship to language development.

On the other hand, responsiveness and variety of the inanimate environment were related to both gross and fine motor development (gross motor to variety $p < .01$; fine motor to variety $p < .05$; responsiveness to both gross and fine motor $p < .05$). Similarly, gross and fine motor correlated significantly to the mother's response to her infant's distress signals ($p < .05$). Fine motor also showed a significant correlation with variety of the animate environment ($p < .05$).

In addition, the researchers analyzed the data separately for males and females. They reported that the direction was similar for both, but that the magnitude of the relationship between the infant variables and environmental variables was higher for females.

Other relationships were explored by the researchers, and were significantly correlated. However, none relate to this present study and so will not be discussed here. The researchers concluded that some aspects of infant functioning could be related to the environment during the infant's first 6 months.

Measurement Problems

The paucity of studies examining the relationship of the home environment to child development can be attributed to problems in the identification and measurement of appropriate aspects of that environment. Yarrow's conceptualization of the environment into animate and inanimate dimensions, with operational definitions of attributes, aided researchers in the identification of the qualitative aspects of the home environment.

One person who has been interested in identifying the factors in the environment which influence the development of the young child was Caldwell (1967). It was her belief that a tool was needed which could measure qualities of the environment. Such a tool could be used to help predict later developmental problems and identify specific areas for intervention.

Home Observation for Measurement of the Environment (HOME)

Caldwell became interested in studying children's environments about twenty years ago, when she noticed that very young children, regardless of social or racial origin, performed much the same on developmental tests until 18 months to two years of age. At this time the group scores of children from the lowest socioeconomic level began to drop, and remained significantly lower than other children on measures of ability and achievement (Caldwell and Yahraes, 1971; Caldwell, 1970). Believing that prevention of this drop in ability might be possible, Caldwell set up a day care program to test the hypothesis that "an appropriate environment can be created which can offset any developmental detriment associated with maternal separation and possibly add a degree of environmental enrichment frequently not available in families of limited social, economic, and cultural resources" (Caldwell and Richmond, 1968, p. 327). The program demonstrated that infant day care could provide a stimulating and nurturing environment, unlike the sterility of an institution. Even though mother and infant were separated during the day, their attachment could be maintained. In addition, the stimulating environment could promote

cognitive gains (Caldwell and Smith, 1970; Caldwell, Wright, Honig, and Tannenbaum, 1970).

Caldwell and her associates developed the Home Observation for Measurement of the Environment (HOME). This tool was developed to assess the home environments of the children enrolled in the day care center. It was one of the first major tools to focus on the child's environment (Erickson, 1976).

Based on Yarrow's conceptualization, this environmental tool has been designed to sample both animate and inanimate dimensions of the child's environment. The HOME has two inventories, birth to three years, and three to six years of age. The birth to three years inventory has six subscales. These subscales are: 1) emotional and verbal responsiveness of mother; 2) avoidance of restriction and punishment; 3) organization of physical and temporal environment; 4) provision of appropriate play materials; 5) maternal involvement with child; and 6) opportunities for variety in daily stimulation. The HOME uses interview and observation to assess selected aspects of the environment in which the child spends time. It has gone through four revisions.

The HOME looks at the environment from the child's point of view. As the Manual (4th Revision) states, "the intent of the assessment procedure is to get a picture of what the child's world is like from his perspective" (p. 30). It assesses the environment and the relationship provided by the major caregiver. In this study, the major caregiver was assumed to be the mother.

Today, the HOME is the most widely used tool of all the environmental measures (Barnard, 1979). Many researchers are using it in

their on-going longitudinal studies. In these studies environmental variables are being identified by the HOME and related to selected aspects of later child development.

Studies Using the HOME to Assess Child Development

In particular, Barnard and associates are using the HOME as one of a variety of tools in their longitudinal study. The purpose of this on-going research is "to determine what early factors are predictive of later child development and health status" (Barnard and Gortner, 1977, p. 2.1). Their sample consists of 193 mostly Caucasian mother-infant pairs who have been followed from birth. At the time of the first report, the children were 12 months of age. All mothers were primiparous, averaging 24.9 years of age at the birth of the child. Maternal educational level averaged 13.9 years.

The HOME was used to assess the home environment when the children were 4, 8, and 12 months of age. Barnard and associates found the mean total HOME scores increased as the child became older. The subscales' means varied over time. Subscale I started high and continued to climb. Subscales IV and VI also increased steadily with age. The means of Subscales III and V remained fairly consistent over the time span. In contrast Subscale II, avoidance of restriction and punishment, decreased with the age of the child (\bar{x} = 6.70 @ 4mo, 5.40 @ 12mo). The researchers expected this decrease since a 12 month old is more mobile and needs closer supervision.

No criteria exist to define a "poor" or "good" environment. However, Barnard and Gortner (1977) stated that "in general...the

scores reflect the optimal environments one might expect for a sample such as ours" (p. 4.54). Barnard and associates continue to collect longitudinal data using the HOME as one of their tools.

Using a longitudinal design, Caldwell and her associates have demonstrated that the HOME could measure aspects of a child's early environment and could predict later cognitive functioning. They and other researchers also related aspects of the home environment, as measured by the HOME, to language development. Researchers using the HOME have reported that the specific aspects of the home environment it measures were "overwhelmingly more significant" for future developmental scores than were Apgar scores, prematurity, or social class (Bradley and Caldwell, 1978, p. 125).

Using a longitudinal design, Caldwell and associates assessed the environments of 77 infants, 50 black and 27 white. The 6-, 12- and 24-month assessments of the home environments used the Inventory for Infants of the HOME. The infant's home environment was then related to mental test performance as measured by the Mental Development Index (MDI) of the Bayley Scales of Infant Development at 6 and 12 months, and by the Stanford-Binet scale at 36 months of age. The analysis of the data led them to suggest that aspects of the home environment showed an important relationship to cognitive development by three years of age (Elardo, Bradley, and Caldwell, 1975).

Elardo, et al (1975) reported that the 6-month HOME scores did not show a significant correlation with the 6-or 12-month Bayley MDI, but did with the 36-month Stanford-Binet ($p < .05$ to $< .01$). By the 12-month HOME, the total score and two subscales showed a significant

correlation with the 12-month Bayley MDI ($p < .05$). These subscales were provision of appropriate play materials, and maternal involvement with child. All the HOME scores at 12-month showed a significant correlation with the 36-month Stanford-Binet ($p < .05$ to $< .01$). The 24-month HOME scores all correlated significantly with the 36-month Stanford-Binet ($P < .01$).

When 49 of these children were assessed at 54 months of age using the Stanford-Binet, four of the six-month HOME subscales and all of the 12-month subscales correlated significantly ($p < .05$ or $< .01$). Only the subscales of emotional and verbal responsivity of mother and avoidance of restriction and punishment measured at 6 months did not show a significant correlation (Bradley and Caldwell, 1976b).

Further analysis, by Bradley and Caldwell (1976a), of the scores of the original 77 infants showed that an increase in mental test performance between 6 and 36 months was related to two subscales of the HOME, maternal involvement with child ($p < .001$), and provision of appropriate play materials ($p < .01$). A decrease in mental performance was related to inadequate organization of physical and temporal environment ($p < .03$). Their conclusion was that the home environment might be a contributor to the instability of infant test performance (Bradley and Caldwell, 1976a).

The Inventory for Infants of the HOME was also used by Bradley and Caldwell (1977) in another longitudinal observation study of 91 infants. These researchers were testing the usefulness of the HOME as a screening tool for developmental delay. The HOME Inventory administered at 6 months of age was found to correctly predict 71% of

all children scoring below 70 IQ on the Stanford-Binet at 36 months. The subscales of the HOME associated with this low IQ group were again poorer organization of the physical and temporal environment ($p < .01$), fewer provisions of appropriate play materials ($p < .01$), and less maternal involvement with child ($p < .01$). Thus, the HOME could identify children for whom an early intervention program would be appropriate (Bradley and Caldwell, 1977). Further, these researchers concluded that the aspects of the home environment, which could be measured by the HOME, were more strongly related to a child's cognitive development than were infant tests, level of parental education, or social status (Bradley, Caldwell and Elardo, 1977).

Studies show that language development has been related to environmental factors. Using the Inventory for Infants of the HOME, Elardo, Bradley and Caldwell (1977), in a longitudinal study, related the home environments of 74 normal children to language development at age three. The HOME was used to assess the home environment at 6 and 24 months of age. At age three language development was assessed by the Illinois Test of Psycholinguistic Abilities (ITPA). The researchers concluded that it was possible to identify some of the early experiences which related to aspects of language development.

Three subscales of the HOME showed the strongest overall relation to language competence in this study. Emotional and verbal responsivity of mother, provision of appropriate play materials, and maternal involvement with child at both 6 and 12 months, demonstrated strong correlations ($p < .01$) to many scales of the ITPA. By 12 months, all subscales correlate significantly with total ITPA scores ($p < .01$).

Four of the ten psycholinguistic abilities measured were most strongly associated with the quality of stimulation found in the home environment (Elardo, et al, 1977).

Elardo, et al (1977) also correlated the HOME and ITPA scores according to sex. All six HOME subscales at 24 months correlated significantly with language performance for females ($p < .01$). The strongest correlation was with opportunities for variety in daily stimulation. Only 2 subscales correlated significantly for males: emotional and verbal responsivity of mother, and provision of appropriate play materials ($p < .01$).

Wulbert, Inglis, Kriegsmann, and Mills (1975) also used the HOME to assess the home environment and mother-child interactions of 20 language-delayed children and a matched control of normal preschool children, ages 2.5 to 6 years of age. Eighty percent of the language delayed children were males. These researchers found that scores in 5 out of the 6 subscales of the HOME were significantly lower ($p < .01$) in the language-delayed group. Only subscale III, organization of physical and temporal environment showed no significant difference between the groups.

The researchers also found that low HOME scores were indicative of language delay regardless of socioeconomic standing. Thus, they concluded that the language delay had a stronger negative influence on the mother-child relationship than did socioeconomic factors.

In summary, the HOME has proved to be a valuable instrument in the assessment of environmental influences on child development. It has demonstrated the importance of specific aspects of the animate and

inanimate environment to cognitive and language development in a child below 3 years of age. Two subscales have shown a repeated strong relationship to these developmental areas. These subscales are emotional and verbal responsiveness of the mother, and maternal involvement with child. Subscale III, organization of physical and temporal environment, has also correlated frequently.

Additionally, the tool has been used to analyze intervention programs, equating increases in HOME scores to increases in specific aspects of development. Other researchers have used the HOME to predict future developmental delay and to identify high risk groups.

Child Development

The effect of the environment on mental test scores has been well documented by Caldwell and her associates. Yet, mental development is only one aspect of a child's development. The environment in which a child lives and grows may also affect adaptive, personal-social, fine and gross motor, and language skills. It is also important to be able to recognize the aspects of the home environment which contribute to accelerated, average, or delayed development in these areas.

The time of most rapid development is in the first year of life. During this first year "a large number of neuro-physiologic activities and their associated behavioral patterns must mesh at the proper times to produce healthy progressions" (Knobloch and Pasamanick, 1976, p. 110). The sequences of development are the same for each child. Although the rate may differ, development of each individual can be assessed by

comparison with others at the same age level. If any lags in development are found, an attempt can be made to find the obstacle to the next sequence of development, and to start intervention.

However, most methods used to assess language, cognitive and other aspects of child development require extensive, specialized training. Knobloch, Pasamanick, and Sherard (1966) believed that a developmental screening tool not requiring extensive training was needed. In this way, infants at risk for developmental lag could be easily identified and referred for a complete diagnostic evaluation.

Developmental Screening Inventory (DSI)

To meet the above criteria, Knobloch, et al (1966) developed the Developmental Screening Inventory for Infants (DSI). The DSI consists of selected items from the Gesell Developmental Schedules and measures adaptive, gross and fine motor, language, and personal-social development. The advantage of the DSI is that it can be used by untrained observers and still maintain 100% accuracy in detecting abnormal infants. It will also discriminate between neuromotor and intellectual abnormalities (Knobloch, et al, 1966).

A further advantage of the DSI to other screening tests is that it yields a developmental quotient (DQ). The DQ is obtained by comparing the child's functioning level to his/her chronological age. Thus, this tool can be used both in research and for routine evaluations of children receiving well child care. This developmental evaluation coupled with an environmental evaluation could point out

where individual families need help or assistance to provide their child with an optimal environment for development.

The Gesell developmental schedules, the source of the DSI items, were used to evaluate the caregiver-infant transactions of 51 premature infants (Beckwith, Cohen, Kopp, Parmelee and Marcy, 1976). Naturalistic observations were made in the home when the infants were 1, 3, and 8 months old. The Gesell was administered at 9 months.

Some of their results are of interest to this study. These researchers found that boys and girls differed on the Gesell. Overall, girls performed significantly better than boys ($p < .03$) in all development areas.

Further analyses were done to differentiate the mother's contribution from the infant's effect on the mother. The researchers found that "infants who at 9 months of age obtained higher Gesell DQs spent less of their waking time at 1 and 3 months of age in physical care, that is, in being burped, diapered, dressed, or bathed...caretaking (which) does involve physical restraint and may inhibit freer motor activity" (p. 583).

Further, "higher Gesell DQs were associated with increased criticism and commands at 3 months of age" (p. 585). These researchers report that others found similar results at 1 year. However, by 4 years of age these children had lower IQs. Finally, the researchers reported that the more the infant vocalized to the observer at 8 months, the higher the Gesell DQ. They concluded that focusing on the negative reaction of an infant to a stranger was not enough. The positive social interest of the infant to a visitor in the home environ-

ment was also of significance.

In summary, research has begun to focus on the effect of the environment on child development. One problem has been adequate measurement of the significant environmental variables. The Home Observation for Measurement of the Environment (HOME) is making a major contribution in this area. Measurements of the environment by 12 months of age have been shown to be predictive of later cognitive functioning. Other questions now need to be answered. What other developmental areas can be related to measurable aspects in the environment? What is the earliest age that environmental measurements are predictive of total child development?

Statement of the Problem

The Tomlinson (1976) study, of which this investigation is a part, has been concerned with the effect of feminine role congruence on child development. Of particular interest for this present study were changes occurring in the child's environment between 4 and 12 months of age, and their relationship to child development. When this investigator helped collect data on the home environments when the children were 4 months of age, a wide range of developmental abilities was noted. At this age, some of the infants were standing with assistance, and others were not even beginning to sit with support. Their language development also showed marked variation, ranging from few sounds to free vocalization. These observations, and the fact that child development is the dependent variable in the Tomlinson study, demonstrated the need to measure broad aspects of child development at one

year of age and relate them to the home environment.

Purpose of the Study

The purpose of this study was to provide answers on the relationship of the environment to child development. Of particular interest were changes in the environment between 4 and 12 months of age, and their relationship to child development at 12 months of age. These questions were:

1. Will the environment improve as measured by increased HOME scores in this sample?
2. Can HOME scores in this sample be related to child development, as measured by the DSI, at 12 months of age?

Chapter II

METHODOLOGY

Subjects and Setting

The subjects for this study were selected from those of the longitudinal research project Feminine Role Congruence and Maternal Attachment (Tomlinson, 1976) who were still living in the greater Portland area. Twenty of the original 36 subjects participated. The women in these families were initially recruited prenatally, as non-random volunteers from University of Oregon Health Sciences Center prenatal clinic or from a satellite clinic, using the following criteria for selection:

1. middle socioeconomic class women, as defined by the Duncan-Reis SES Scale
2. 18-35 years of age, primiparous women
3. minimum of a 10th grade education; primary language is English
4. no marital changes in the past 3-4 months
5. have not been in a consciousness raising group, or in psychotherapy within the last 3-4 months
6. agreed to participate in the study, to deliver at UOHSC (a medical center teaching hospital), and to return to UOHSC clinic for a 28-day well-child check; her partner also agreed with her participation
7. not high risk; if any condition made mother or baby high risk, they were dropped from the study.

The families have been followed through the birth process. Observations have been made during the first 24-hours, at a 28-day well baby check, and at a four-month home visit with which this researcher assisted. Measurements made included data on maternal role conflict, maternal attachment, mother-child interactions, home environment assessment, infant temperament, marital satisfaction, etc. These families will continue to be followed by Patricia Tomlinson, Principal Investigator, until the children are four years of age.

At the time of the four-month interview the women indicated their willingness to be contacted for further follow-up. Additionally, a letter was sent to them, cosigned by the Principal Investigator and by this researcher, which explained the purpose of the 12-month home visit. Informed consent was obtained at the same time. (Appendix A)

Design

A descriptive correlation design was used to relate home environment and child development. The data were collected through the use of interview items, and direct observations. The variables were the home environment measured at 4 and 12 months, and child development measured at 12 months.

Instrumentation

Measurement of the Environmental Variable

The environmental variable in the study was the home environment which was evaluated using Caldwell's Inventory for Infants (Home

Observation for Measurement of the Environment, HOME, fourth revision). The term "home environment" has been defined by Caldwell in her Inventory for Infants (HOME) Manual as being "the quantity and quality of social, emotional, and cognitive support available to a young child (birth to three years) within his home" (p. 1). This definition was used in this study.

This 45-item inventory is composed of six subscales: 1) Emotional and Verbal Responsivity of Mother, 2) Avoidance of Restriction and Punishment, 3) Organization of Physical and Temporal Environment, 4) Provision of Appropriate Play Materials, 5) Maternal Involvement with Child, and 6) Opportunities for Variety in Daily Stimulation. All items are scored "yes" or "no", and refer to the situation at the time of the visit. A total score, and subscore for each of the six subscales can be obtained from the total number of items marked "yes". The highest score possible is 45 and indicates a stimulating home environment. Approximately one-third of the items are based on observations of the child in his environment, in interaction with his principal caregiver (in this study always the mother), and rest of the items are based on interview with the mother.

Data gathered on 176 families in central Arkansas by Elardo, et al (1975) indicated that the HOME could measure a wide range of scores for families designated as having identical social status. They also found that an interrater reliability of .90 was quickly obtained after training and joint scoring on a few home visits. This tool was used at the four-month home visit for the study Feminine Role Congruence

and Maternal Attachment (Tomlinson, 1976). Interrater reliability of over .90 was attained between this researcher and another rater in only 3 visits. An identical interrater reliability at 12 months was established in a similar manner.

Elardo, et al (1975) further found the internal consistency coefficient for the total HOME scale was .89, with the range between subscales .44 for subscale 6 to .89 for subscale 3. On their test-retest correlation for assessments done at 6, 12, and 24 months they found a "moderate degree of stability across the 18-month period" (p. 72).

Concurrent validity was obtained by correlation of HOME scores from 91 families with the 7 socioeconomic variables of welfare status, maternal education, maternal occupation, presence of father in the home, paternal education, paternal occupation, and crowding in the home. Correlations were found to be moderate and positive, ranging from .25 to .55 (Elardo, et al, 1975).

In a study with 77 families Elardo, et al (1975) reported a multiple correlation with the Stanford-Binet at 3 years to be .54 for the 6-month HOME, .59 for the 12-month HOME, and .72 with the 24-month HOME score. Early identification of developmentally detrimental environmental factors was thus shown to be possible using the HOME. When 49 of these families were examined at 54 months, the multiple correlation between the 54-month Binet and 6-month HOME was .50, while correlation with the 24-month HOME was .63 (Bradley and Caldwell, 1976).

This tool has also shown to have utility in screening for mental retardation. In a study of the home environment of 91 6-month olds, multiple discriminant functions composed of the 6 subscale scores of the HOME correctly predicted 71% of all children scoring below 70 IQ on the Stanford-Binet given at age 3 years (Bradley and Caldwell, 1977). The use of the HOME by a number of other researchers has developed its construct validity; item analysis indicated the reliability of the inventory (Bradley and Caldwell, 1978).

No criteria have been established to define "poor" or "good" HOME scores. Scores below 20 are related to IQ below 70 at age 3 years of age. Scores above 30 are believed to be adequate, indicating that the child will be functioning in the normal to superior IQ range at 3 years of age (Bradley, 1977). At the present time, a score in the 20-30 range is considered borderline, leading to less predictable conclusions.

Measurement of the Developmental Variable

The variable, development of the 12 month old child, was measured by the Developmental Screening Inventory for Infants (DSI). The DSI "consists of selected items from the Gesell Developmental Schedules in each of the five fields of adaptive, gross motor, fine motor, language, and personal-social behavior at 4-week intervals from the ages of 4 to 56 weeks and at 15 and 18 months" (Knobloch, et al, 1966, p. 1096). The DSI was chosen on the advice of Marie Scott Brown, R.N., PhD., a renowned Pediatric Nurse Practitioner, currently an Associate Professor at University of Colorado School of Nursing, Denver,

Colorado, and a Co-Investigator for the on-going longitudinal project.

DSI subscales measure behavior in these five fields. Adaptive behavior is reported to be the most important. It is the "forerunner of later 'intelligence' which utilizes previous experience in the solution of new problems." Gross motor includes sitting, standing, creeping, and walking. Fine motor includes the way in which the hands and fingers are used to grasp and manipulate objects. Language behavior includes "all visible and audible forms of communication." Finally, personal-social behavior "comprises the child's personal reactions to the culture in which he lives " (Knobloch and Pasamanick, 1974, p. 5).

The items are based both on questions to the caregiver and on observations to determine if the infant is acting at his/her age level. Questions in each of the 5 fields are asked starting with the chronological age level, as measured in weeks by the calendar, proceeding downwards if necessary to find the functional level, and then continuing upward until no more positive answers are obtained (Knobloch, et al, 1966). Then, the level of function (maturity level) in each of the 5 fields is compared to the child's chronological age in weeks, and a developmental quotient (DQ) obtained:

$$DQ = \frac{\text{Maturity age}}{\text{Chronological age}} \times 100$$

A DQ is obtained for each field of behavior, and for overall functioning. A child functioning at age level would have a DQ of 100.

Using the written instructions, administration of the DSI can be self-taught. In a study done to test reliability using untrained Junior medical students, "high levels of reliability, detection of all

abnormal infants and discrimination between neuromotor and intellectual abnormalities" was obtained with "careful and interested application" (Knobloch, et al, 1966, p. 1103).

By asking some questions of parents, observing the infant's behavior and recording this information systematically, an estimate of the level of function in various areas of behavior can be made which correlates very highly with the maturity age assigned on the basis of a complete Gesell Developmental and Neurological Examination, from which the items are adapted (Knobloch, et al, 1966, p. 1105).

All abnormal infants were identified, but some overscreening did occur. When the students had adequately used the inventory, the Pearsons product-moment correlations were .67 in adaptive, .88 in gross motor, and .70 in fine motor behavior (Knobloch, et al, 1966).

In a comparison of diagnostic categories assigned by staff examiners from a complete Gesell exam and by DSI completed from findings of the Gesell examination by one staff member, the Pearson's Product-moment and rank correlation range from .90 to .98 for all 5 areas of behavior ($p < .001$) (Knobloch, et al, 1966).

Data Collection

Letters were sent to the 28 subjects of the longitudinal research project Feminine Role Congruence and Maternal Attachment (Tomlinson, 1976) who, at the four-month visit, were living in the greater Portland area. Those not reached by letter were contacted by phone. An appointment for the home visit was made with those located and

willing to be seen. The visit was set for a time convenient for the mother when her child would be awake and ready to play.

The 4-month Home Observation for Measurement of the Environment tool was updated for the older child. This revised form was then tested on one 12 month old child. Reliability on this form was tested during this home visit. This investigator and another rater obtained 90% reliability. This researcher and the same rater had also obtained 90% agreement on the 4-month form.

A developmental psychologist, with knowledge of many developmental tools, served as consultant for the Developmental Screening Inventory. He assisted this investigator in learning how to administer the DSI and to score it.

Each visit was conducted in the same order. The HOME interview questions were asked first, followed by the developmental questions. Once the child became comfortable with the investigator the developmental inventory observation was conducted. Observations needed for the HOME instrument were made during the entire visit. Near the end of the visit, the mother was asked to fill out additional questionnaires for the larger on-going study, while the investigator checked for completeness of needed information. Plans for further follow-up by the Principal Investigator were explained to each mother. Each visit took approximately 1½ hours.

When all visits were completed and forms scored, the data were analyzed. The data were ordinal or nominal. A correlation matrix was run on the ordinal data. A t-test for independent measures was used to test for significance of the sex of the child.

Chapter III

RESULTS

Sample

The mean maternal age of the 20 subjects in this study was 22.2 years, with a range of 18-27 years. The mean years of maternal education was 12.9, with a range of 10-16 years. Information on family income was not available. One woman was currently separated from her husband. The rest were currently living with their partners.

The mean age of the children was 12.7 months. They all had been normal full term babies at birth. Two had been diagnosed as failure to thrive at four months. However, none had major known health problems at 12 months of age. There were 13 males and 7 females in the sample. All were first-born children. However, one family now included 2 older half-siblings, added to the family when the subject was 8 months of age.

This study posed two questions. These were:

1. Will the environment of this sample improve between 4 and 12 months of age as measured by increased HOME scores?
2. Can HOME scores be related to child development, as measured by the DSI, at 12 months of age?

The findings will be presented in relation to each question.

Relationship Between the HOME at 4 and 12 Months

The Home Observation for Measurement of the Environment (HOME) has 6 subscales and a total score. The possible range for the total score is 0-45. The range for this study was 19-41 at 4 months, and 28-43 at 12 months of age. As the 20 children in this study grew older their total HOME scores increased in all but two instances. Both of these scores decreased by one point. One of these scores was high at four months (41) and remained high (40). The other score was low at 4 months (29) and decreased one point to 28 by the 12-month HOME. The overall mean increase between the 4- and 12-month scores was 5.35 points. Data from the Caldwell and the Barnard Studies are presented in Table I for comparison with this study's data.

As can be seen in Table I, the overall mean increase in the HOME was accounted for by increases in the means of 5 out of the 6 subscales. The means for subscale I, emotional and verbal responsivity of mother, and subscale VI, opportunities for variety in daily stimulation, both increased more than $1\frac{1}{2}$ points between the 4- and 12-months assessments. Subscale III, organization of the physical and temporal environment, and subscale V, maternal involvement with child, increased only slightly (.7 and .2 points, respectively). Subscale IV, provision of appropriate play materials, had the greatest increase, just over 3 points. In contrast, subscale II, avoidance of restriction and punishment, decreased almost 2 points. These data correspond to that found by Barnard and Gortner (1977), but are higher than that reported by Bradley (1977) for the Caldwell data.

TABLE 1

Means and Standard Deviations for the HOME, Compared with Data from Two Other Studies

Scale		(Current study) N=20			(Caldwell study) N=174			(Barnard study) N=193		
		4 mo	12 mo	6 mo	12 mo	4 mo	12 mo	4 mo	12 mo	
I	Emotional and verbal responsivity of mother (range 0-11)	Mean	8.80	10.35	7.60	8.02	9.20	9.72		
	S.D.	1.58	1.31	2.40	2.18	1.86	1.56			
II	Avoidance of restriction and punishment (range 0-8)	Mean	6.75	4.80	5.91	5.29	6.70	5.40		
	S.D.	.97	1.36	1.37	1.62	1.14	1.74			
III	Organization of physical and temporal environment (range 0-6)	Mean	5.05	5.75	4.62	4.89	4.76	4.82		
	S.D.	.89	.44	1.14	1.17	1.10	1.01			
IV	Provision of appropriate play materials (range 0-9)	Mean	5.15	8.25	5.04	6.36	4.83	7.91		
	S.D.	1.87	.85	2.29	2.37	1.66	1.49			
V	Maternal involvement with child (range 0-6)	Mean	5.40	5.60	3.01	3.32	4.73	5.00		
	S.D.	.99	.68	1.60	1.59	1.46	1.23			
VI	Opportunities for variety in daily stimulation (range 0-5)	Mean	2.40	4.10	2.25	2.97	2.48	3.43		
	S.D.	.99	.85	1.06	1.14	.92	1.22			
Total	(range 0-45)	Mean	33.55	38.90	28.49	30.85	32.70	36.28		
		S.D.	5.18	3.23	6.59	7.59	5.06	5.60		

A correlation matrix was used to compare each subscale of the 4-month HOME to the same 12-month subscale. The data from this study were again compared to the Caldwell and Barnard data (see Table 2). The range for the current study was .08 for subscale II, avoidance of restriction and punishment, to .29 for subscale I, emotional and verbal responsivity of mother. The correlation between the total HOME scores at 4 and 12 months was .43.

The total HOME scores at 4 months did not correlate significantly with subscale II at 4 months. Similarly, the 12-month total HOME score did not have a significant correlation with subscale III. The other subscales did correlate significantly with their total score ($p < .05$ to $p < .01$).

A positive intercorrelation was found between all but two of the HOME subscales at 4 months (range .14 to .64). The negative correlations were between subscale II and subscales III and V (-.29 and -.11 respectively). At 12 months three intercorrelations were negative. These 12-month negative correlations were between subscale II and III (-.09), II and VI (-.06), and III and V (-.17). The positive intercorrelations between the subscales at 12 months ranged from .07 to .52. (See Table 3)

Table 3 shows the intercorrelations of HOME scales of the current study compared to these from the Caldwell study. As can be seen in the table, the Caldwell data shows no negative intercorrelations. Although not reported in tabular form, Barnard and Gortner (1977) report a few negative intercorrelations, with a range of -.01 to .43.

Table 2

Correlation Between HOME Scores
at 4 and 12 Months

Scale	(Current study) N=20	(Caldwell study) N=91	(Barnard study) N=156-164
	4 mo to 12 mo	6 mo to 12 mo	4 mo to 12 mo
I Emotional and verbal responsivity of mother	.29	.32	.29*
II Avoidance of restriction and punishment	.08	.29	.31*
III Organization of physical and temporal environment	.17	.45	.31*
IV Provision of appropriate play materials	.27	.40	.21*
V Maternal involvement with child	.17	.47	.16*
VI Opportunities for variety in daily stimulation	.14	.62	.27*
Total	.43	.62	.39*

*Kendall Correlation Coefficient $p < .01$

Table 3

Intercorrelations Between HOME Subscales
at 4 and 12 Months

Subscale	(Current study) N=20 4 Month HOME					(Caldwell study) N=174 6 Month HOME				
	II	III	IV	V	VI	II	III	IV	V	VI
I	.35	.31	.59**	.59**	.59**	.30	.23	.36	.29	.32
II	-	-.29	.14	-.11	.44*	-	.20	.28	.18	.10
III		-	.60**	.39	.21		-	.40	.23	.16
IV			-	.42	.64**			-	.62	.21
V				-	.20				-	.30

(* p < .05)
(**p < .01)

Subscale	(Current study) N=20 12 Month HOME					(Caldwell study) N=174 12 Month HOME				
	II	III	IV	V	VI	II	III	IV	V	VI
I	.34	.07	.25	.52*	.30	.21	.43	.52	.58	.48
II	-	-.09	.09	.19	-.16	-	.07	.24	.37	.17
III		-	.03	-.17	.07		-	.59	.46	.50
IV			-	.45*	.40			-	.68	.52
V				-	.25				-	.52

(* p < .05)
(**p < .01)

A t-test for independent measures was used to compare mean total HOME scores for boys and girls. Although not reaching significance, girls scored better than boys on both total HOME scores. The 4-month score for the boys was 33.23; for girls 34.14. The 12-month score was 38.23 for boys and 40.14 for girls.

The development of the child was assessed using the Developmental Screening Inventory (DSI) which is based on the Gesell Developmental Schedules. The DSI yields a developmental quotient (DQ) in 5 subscales and an overall score. The normal range is considered to be 85-115. The children in this sample were functioning in the normal range overall and on each subscale. The overall DQ ranged from a low of 95 to a high of 136. The greatest subscale range was found in gross motor scores (100 to 170). The other subscales ranged from 93 to 140, with a difference of 42 to 48 points. (See Table 4) The total DSI and all subscales correlated significantly with each other ($p < .01$).

The mean developmental scores were looked at by sex. Girls scored significantly higher in language ($p < .05$) and in personal-social development ($p < .025$). They also had higher scores on the DSI total score, and on the other subscales. (See Table 4)

Relationship Between the HOME and the DSI

Total HOME scores at both 4 and 12 months did not reach a significant correlation with the total DSI scores. However, the correlation moved from a $-.04$ at 4 months to a $.16$ at 12 months. Total HOME scores at 4 and 12 months also did not reach a significant correlation with

Table 4

Descriptive Statistics and Mean Developmental Scores for the DSI

Developmental Area	Descriptive Statistics for the DSI (N=20)			Mean Developmental Scores by Sex		t
	Mean	S.D.	Range (points)	Male (N=13)	Female (N=7)	
Adaptive	111.75	11.95	95-136 (42 points)	111.38	112.43	.18
Gross Motor	119.75	17.83	100-170 (71 points)	115.54	127.57	1.48
Fine Motor	111.95	11.63	99-133 (46 points)	111.31	113.14	.33
Language	116.20	13.70	93-140 (48 points)	112.15	123.71	1.92*
Personal-Social	111.40	11.47	95-136 (42 points)	107.31	119.00	2.44**
Overall	112.20	10.53	95-136 (42 points)	110.92	114.57	.73

df = 18

* p < .05

**p < .025

any of the DSI subscales. The total 4-month HOME had a negative correlation with gross motor, language and personal-social scores (-.05, -.10, -.14 respectively). Adaptive and fine motor scores had a small positive correlation (.12 and .14). By 12 months all the correlations, while not reaching significance, were positive and ranged from a low of .15 with gross motor to a high of .33 with language. (See Table 5)

The DSI total score was found to correlate significantly only with HOME subscale II, avoidance of restriction and punishment, at 4 months. This was a negative correlation ($p < .05$). Subscale II also had a significant negative correlation with the language and personal-social subscales ($p < .01$).

At least 3 and as many as 5 of the correlations between the DSI and the 4-month HOME subscales I, II, IV, and VI were negative. By 12 months, HOME subscales I, IV, and VI all had small positive correlation with all DSI scores. All correlations of subscale II with the DSI total and subscales remained negative at 12 months, but moved closer to zero. On the other hand, subscale III's correlation with DSI total, fine motor, language and personal-social scores moved from an entirely positive correlation at 4 months to a largely negative one at 12 months.

The demographic variables of maternal age and education had significant correlations with the 4-month HOME and the DSI. Maternal age had a positive correlation with HOME subscale II, avoidance of restriction and punishment, at 4 months ($p < .01$). Age also showed a positive correlation with HOME subscale VI, opportunities for variety

Table 5

Correlation of the HOME with the DSI
(N=20)

HOME Scores Developmental area	Subscale I		Subscale II		Subscale III		Subscale IV		Subscale V		Subscale VI		Total	
	4mo	12mo	4mo	12mo	4mo	12mo	4mo	12mo	4mo	12mo	4mo	12mo	4mo	12mo
Adaptive	-.03	.35	-.36	-.02	.42	.03	.14	.23	.25	.31	.15	.10	.12	.26
Gross Motor	-.17	.36	-.43	-.05	.25	.07	.02	-.07	.07	.16	-.07	.01	-.08	.15
Fine Motor	.01	.33	-.32	-.08	.37	-.13	.16	.20	.27	.42	.14	.19	.14	.25
Language	-.23	.40	-.58	-.02	.25	-.03	-.02	.04	.19	.40	.03	.40	-.10	.33
Personal-Social	-.30	.21	-.65	-.03	.43	-.09	-.03	.17	.19	.21	-.16	.31	-.14	.21
Overall	-.15	.28	-.46	-.12	.35	-.08	-.03	.16	.21	.28	-.01	.13	-.04	.16

* $p < .05$ ** $p < .01$

in daily stimulation at 4 months ($p < .05$).

In correlating maternal age with the subscales of the DSI a significant negative correlation was found with gross motor and personal-social ($p < .01$). As expected, maternal age showed a high positive correlation with maternal education.

Maternal education showed a significant positive correlation with the total HOME score at 4 months ($p < .05$). It also correlated positively with subscales I and II ($p < .05$) and with subscale VI ($p < .01$) of the 4-month HOME.

Chapter IV

DISCUSSION

The purpose of this study was to determine the consistency over time in this sample, using the Home Observation for Measurement of the Environment (HOME), to assess child development at 12 months of age, and to examine the relationship of this environment to child development. The first question asked was: Will the environment of this sample improve between 4 and 12 months of age as measured by increased HOME scores?

Relationship Between the HOME at 4 and 12 Months

The means of the HOME total and subscales at both 4 and 12 months in this study, were significantly higher than those reported by Bradley (1977) on the Caldwell data, and closer to Barnard's data. The sample of the current study is closer to Barnard's in demographic variables. Bradley and associates reported that greater than half of their subjects were black. . . The mean HOME scores for the blacks in their study was 28.2 (S.D. 7.2), while the whites in the study had a mean of 37.1 (S.D. 6.1). Barnard's sample was mostly caucasian. The current sample was entirely caucasian.

The total score for the HOME was expected to increase with the age of the child. The total HOME scores of these subjects did increase between 4 and 12 months of age. The mean total HOME scores increase was greater than in Caldwell's sample, and closer to Barnard's sample.

The author of the HOME has stated that the tool can be used with infants from birth to age 3 years, but was most appropriate for ages 1-3 years (Manual). The mean age in this sample was 12.7 years. Thus, the 12-month score may be more appropriate than the 4-month one. Caldwell explained in her manual (4th revision) that a child below 9 months would be penalized slightly in order to give the questions the needed flexibility. This fact needs to be remembered when interpreting total scores. Such would seem to be the case in this study population. Subscale IV, provision of appropriate play materials, showed the way a 4 month old was penalized over a 12 month old. Most of the toys—push and pull, fine motor items, books—were often not available to a 4 month old. A 12 month old would be more likely to have these items. The increase of 3 points, out of a total of 9 points, showed the increase in appropriateness for this sample.

On the other hand, HOME subscale II, avoidance of restriction and punishment, the only negatively stated scale, showed a decrease of 2 points between 4 and 12 months. This decrease showed that mothers were apt to be more restrictive, and discipline their 12 month old more than when they were 4 months old. Such would seem to be the case in this study population. This increased restriction seemed understandable when one realizes how mobile a 12 month old is compared to a 4 month old who is just learning to sit up without support. Caldwell and Barnard's data also showed a decrease in subscale II as the child became more mobile.

The data from this study supported the literature that HOME scores would increase. The current study's data were closer to Barnard's than

to Caldwell and Bradley's. This difference may reflect the potential population differences. Another variable which must be considered is the region of the country from which the data were collected. Barnard's study and the current study were done in the Northwest. Caldwell and Bradley's population was from the South.

Two intercorrelations between HOME subscales at 4 months and three at 12 months were found to be negative. Barnard reported a few exceptions to her positive intercorrelations, with a range of $-.01$ to $.43$. However, Bradley and Caldwell had no negative intercorrelations at either time. The difference was not conclusive, but may reflect the size and composition of the sample, or the region of the country.

The current study showed higher total mean HOME scores than either the Barnard or Caldwell data show. The increase from the 4- to the 12-month score was also greater than reported in either study. One reason for the difference would be that Caldwell's study compared 6- and 12-month scores, while Barnard and this study compared 4- and 12-month scores.

Yet, even with this greater mean increase in total HOME scores, the internal consistency for the current study was very low, much lower than either Caldwell or Barnard's data. This variation in the present sample was not as well accounted for in the present literature. Barnard does use Kendall Correlation Coefficient to explore the consistency over time of the subscales. The current study and the Caldwell study used the Pearson correlation coefficient. Eventhough the magnitude of the coefficient would differ between Kendall's T and Pearson's r, the test of significance applied to both would lead to similar conclus-

ions. For the current study, with $df = 18$, the Pearson's r must reach .44 before a significance of .05 is obtained. In Caldwell's data, with $df = 89$, the r must reach .21 for $p < .05$. Thus, all of Barnard and Caldwell's data were significant at $p < .05$ or higher. None of the subscales of the current study reach significance.

Relationship Between the HOME and the DSI

The second question of this study asked if the HOME scores in this sample could be related to child development, as measured by the Developmental Screening Inventory (DSI), at 12 months of age. The DSI and HOME total scores did not correlate significantly. One of the reasons for this could be that both scales are set up to recognize grossly inadequate home environments and grossly abnormal functioning of children. As Knobloch and Pasamanick (1963) stated, the main object of the DSI is "to identify the infant who has a significant neurologic or intellectual defect. It is not to identify the one who has function within the normal range and will later be superior on the basis of an enriched cultural environment" (p. 51).

Work with the HOME has led to recognition of which scores led to later abnormal functioning. A total HOME score below 20 is believed to lead to an IQ below 70 by age 3 years. A score above 30 is believed to lead to children scoring in the average to superior IQ at that age. Less well understood are scores in the 20-30 range (Bradley, 1977).

The 4-month HOME for this sample had only one score below 20 (19), and two in the 20-30 range (26 and 29). The mean score was 33.55. By

the 12-month HOME there were no scores below 20, and only one in the 20-30 range (28). The mean score was 38.95. Using Bradley's criteria one would expect these subjects to score average or above on the DSI. All did. Similarly, one would expect all of these children to continue to function in the average or above range at 3 years of age.

Another possible reason why no significant relationship was found between the HOME and the DSI could be because of sampling problems. The sample for this study is a small convenience sample. Thus, it is not a random sample and may not have enough variability to find significant correlations.

These sampling problems could be one reason for the negative correlation between the total HOME scores at 4 months and gross motor, language, and personal-social scores at 12 months. It is difficult to understand why a high 4-month HOME score, indicating an environment which provides quality stimulation for the child, should relate to slower progress at 12 months in these developmental areas.

One explanation may be found in the study by Elardo, et al (1975). They reported that their 6-month HOME scores did not correlate with IQ scores until the child was 36 months of age. There may be a problem in measuring the environment as early as 4 months. One reason for this statement is that by 12 months, the correlations in the current study had moved in a positive direction. Elardo, et al (1975) also found a stronger correlation between the 12-month HOME and the 12-month Bayley MDI.

Negative correlations occurred between DSI total, language, and personal-social scores and the 4-month HOME subscale II, avoidance

of restriction and punishment. The negative correlation with language and personal-social cannot be explained by the available literature. Beckwith, et al (1976) noted that higher Gesell DQs in their study were associated with "increased criticism and commands at 3 months of age" (p. 585). Similarities with subscale II of the HOME could lend some rationale for the negative correlation with the total DSI score. The sampling problems may also be a reason for these findings. Since by 12 months the negative correlations were no longer significant, these findings may also indicate problems with such early measurement of the home environment.

In summary, the findings were not conclusive. There were some similarity between the findings in this study and findings reported in the literature. The questions to ask now are whether the HOME can be related to all areas of development, or if the correlations, like those of Elardo, et al (1975) will just improve with the age of the child.

The mean scores on the HOME and the DSI were looked at in terms of the sex of the child. The literature supported the finding that girls scored better on developmental measures. Elardo, et al (1977) also reported that all 6 of the HOME subscales correlated significantly with language for females, while only 2 subscales, I and IV, correlated for males. The variable of sex does not appear to have been reported by the original developers of the HOME.

Two demographic variables of maternal age and education yielded findings of interest to this investigator. In this sample the older the mother the less restrictive she was at 4 months, and the more variety in daily stimulation she provided her child. Yet, these older

mothers also had children with lower mean scores in gross motor and personal-social skills. This result could be due to the sampling problems, especially the small size.

These results could also be artificial. The youngest mother (18 years) in this sample had the child who scored highest on the gross motor and personal-social subscales. Also, one of the oldest mothers (26 years) had the child who was lowest in gross motor skills. Gross motor was the scale with the greatest range of scores.

The significant positive correlation between maternal education and total HOME scores was to be expected in light of the current studies. Barnard and Gortner (1977) also found a positive correlation with their 8-month total HOME scores. Elardo, et al (1975) also reported a moderate positive correlation between the HOME subscales and maternal education.

Chapter V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

This study was part of an on-going longitudinal study (Tomlinson, 1976). The purpose of this study was to determine the consistency over time of the home environment, assess child development at 12 months of age, and relate the home environment to child development. Two questions were asked. The first question asked if the environment of this sample would improve between 4 and 12 months of age, as measured by increased HOME scores. The second question asked if these HOME scores could be related to child development, as measured by the DSI at 12 months of age.

The study subjects included 20 mother-infant pairs who have been followed by the Principal Investigator since before birth. The mean age of the mothers in the current study was 22.2 years. Their mean education was 12.9 years. All but one mother were living with their partners. The infants had been normal, full-term, and were without major known health problems. Their mean age was 12.7 months.

Data were obtained by questionnaire and observation in the subject's home environment. Two instruments were used. The Home Observation for Measurement of the Environment (HOME) was used to measure the child's home environment. This tool has 6 subscales: I. emotional and verbal responsiveness of mother; II. avoidance of restriction and punishment; III. organization of physical and temporal environment; IV. provision of appropriate play materials; V. maternal involvement with child; and VI. opportunities for variety in daily stimulation.

The second tool was the Development Screening Inventory (DSI). The DSI measured adaptive, gross and fine motor, language, and personal-social development in the young child.

Two home visits were made. At the first home visit when the children were 4 months of age, the home environment was assessed using the HOME. Other information was obtained for the Principal Investigator at the same time. The second visit was made when the children were around 12 months of age. The home environment was again assessed using the HOME, and the child's development was assessed using the DSI. Informed consent was obtained from each mother.

The data were then analyzed by means of Pearson's product moment correlations to test for relationships between the variables. The findings for the HOME showed higher mean scores than previous studies, but lower internal consistency. The DSI scores were average or above for all sample children. There were no significant correlations between the 12-month HOME and the DSI.

Demographic variables of maternal age, maternal education, and infant sex were significantly related to both the environmental and developmental variables. Most of these findings supported the current literature.

The findings of this study could be due to sample problems. The sample was small and without great variability. Also, the problem with tools or the age at which the tools were used to assess the environment could be a factor.

Conclusion

The mean HOME scores did increase between 4 and 12 months of age. These scores were high scores and should indicate a stimulating environment. All children scored in the normal development range on the DSI.

Recommendations

The following recommendations for further study were made:

- 1) that the children continue to be followed using the HOME, for the purpose of continuing to test for consistency over time of the HOME, and for it's relationship to child development.
- 2) that the development of the children continue to be assessed using a different developmental instrument. This instrument should also be able to measure many areas of the children's development. In addition, it should have greater standardization in scoring and in score interpretation. The Bayley Scales of Infant Development would be one instrument to investigate.
- 3) that the influence of out-of-home environments, such as day-care, on child development be explored. This would permit consideration of the influence of peers and other adults on child development.
- 4) that the influence of the sex of the child on the home environment and on child development be further explored. Specifically, the influence of the sex of the child on the subscales of the HOME would be of interest.
- 5) that the influence of maternal age and education on both the home environment and on child development be further explored.

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APPENDIX A

Consent Form for Human Research

Letter to Subjects

SUBJECT NO. _____

INFORMED CONSENT FOR MATERNAL ROLE PROJECT

I, _____ herewith agree to serve as a subject in follow up studies being conducted by the Maternal Role Project of the School of Nursing under the supervision of Patricia Tomlinson, R.N., M.N., Principal Investigator. This investigation aims to expand our knowledge of mother and child interactions, infant and child development and to assist in developing better health care for young families.

The procedures in which I will be asked to participate will include 2-4 home visits during which family assessments will be made and will include observations of parent/child interactions, an interview and questionnaires. I may also be asked to bring my child to the University of Oregon Health Sciences Center for an evaluation of his/her development. Videotaping may be used to gather some of the information. If so, I do not object. If any of the videotapes in which I appear are used to teach nurses or other health professionals I do not object to such use. I understand in that event my name will not be used in any showing of the tape.

I understand that the only risk to me may be the inconvenience caused by scheduling the procedures requested. Since the major purpose of this study is to contribute new knowledge which may benefit families in the future I understand that it may be of small benefit to me. However, my child may benefit from the developmental evaluation.

I understand that all records and videotapes will be confidential and stored during and after the study so that only the investigators on this project will have access to them and that anonymity will be protected.

I also understand the principal investigator or her delegate agrees, whenever possible, to answer any questions I may have. I understand I am free not to participate or to withdraw from participation in this study at any time and it will in no way affect my relationship with the University of Oregon Health Sciences Center.

I have read the foregoing and agree to participate in this study.

Date _____ Time _____

SUBJECT _____

Witness _____

UNIVERSITY OF OREGON
HEALTH SCIENCES CENTER

Dear

Now that your child is approaching 10 months of age we would like to arrange another home visit to see how he/she is progressing, and to talk further about how things are going with you. This visit is the one we spoke of at the conclusion of our visit when your child was 4 months old.

An assessment of your child's development will be done at this visit. You will be asked to fill out questionnaires as you have done before.

The enclosed consent form describes in more detail what we will do. If you are willing, please sign this form and return it to us in the enclosed stamped envelope. You will then be contacted by phone to set up an appointment convenient for you, when your child is going to be awake.

If you have any questions, or if you have a new address or phone number, please call Patricia Tomlinson at 225-7725 during the day, and Rolaine Grandey at 253-5088 evenings.

Thank you for allowing us to continue to follow you and your child. We enjoy watching the children grow and appreciate your sharing that with us.

Sincerely,

Patricia Tomlinson, R.N., M.N.
Principal Investigator

Rolaine Grandey, R.N., B.S.N.
Graduate Student, Research Assistant

APPENDIX B

Interview Guide for the
Home Observation for Measurement of the Environment
Inventory for Infants
(Caldwell, 4th revision)

Interview Guide for
Home Observation for Measurement of the Environment

Follow-up Interview I

CALDWELL

I have some questions about you and the baby I would like to ask.

I will be writing while we talk so I won't miss anything.

Praise of baby

positive response
from mother. 11__

1. Typical day - You will remember that we are interested in knowing the kinds of things you and your child are doing here at home. Could you describe a typical day of her/his for me? (Get most recent normal day.) Was yesterday usual? Could just describe that then - starting with when s/he woke up.

Time up

Eating times - how long do you feed each time?

- ever at table with you and partner?

1 meal/day 43__

Bath time

Play times - doing what

Nap times

Bed times

2. Who besides you gives care to baby?
(May know from previous questions.)

father \bar{q} day 41__

- Mo initiates vocalization to baby, 2X
Mo responds to baby vocalizations with sound, 1X
Mo teaches vocally, 1X
Mo initiates verbal exchanges and/or is wordy, 3X
Mo praises baby, 2X
Mo caresses baby, 1X
Mo responds positively when baby praised
Mo does not interfere with baby's actions >3X
(Protection not counted.)

1__
2__
3__
5__
3__
10__
11__
17__

3. How often in a usual week do you go out and take the baby with you? 4 per week 22
- If < 4/week ask if baby has been out any other time.
- ___ times where go? stimulating public place 1/week 21
4. Do you get out without the baby any? Tell me about the last week since (date)
- How often? (approx.) Time gone (approx.)
5. Who sits when you leave the baby? Do you try to get the same person each time you leave the baby? < 3 regular substitutes 20
6. Babies learn so fast in these early months. What kinds of things do you do with your baby to help him/her learn new skills? i.e., vocalize, social interaction increased mobility helps learn new skill 37
- (May observe this.)
7. Some babies really like to be messy, like splashing water, and messing in their food - Does yours? How often does s/he do that kind of play? no allows occasionally 3X/1 week 7
8. Does your child do anything yet that you object to and that you feel you need to use discipline for? What is that? How do you handle that? physical punishment 0-1 X in last week 15
- Mother's time with baby.
9. Do you ever find yourself talking with the baby while you work? Like telling her/him what you're doing - asking how they like that, etc. yes 36
- Play things and time.
10. I have several questions about things your baby plays with. Most people feel that toys and play things have something to do with helping a baby grow and mature. What kind of things do you have for your baby which s/he now uses or plays with?
- has muscle activity toy - ball, rocking horse, stroller, scooter 26
-
- Mo initiates vocalization to baby, 2X 1
- Mo responds to baby vocalizations with sound, 1X 2
- Mo teaches vocally, 1X 3
- Mo initiates verbal exchanges and/or is wordy, 3X 5
- Mo praises baby, 2X 8
- Mo caresses baby, 1X 10
- Mo responds positively when baby praised 11
- Mo does not interfere with baby's actions >3X 17
- (Protection not counted.)

child must be allowed to work with toys

- has push or pull toy 27
- has stroller, walker, scooter, wheels that child can ride on 28
- learning equipment appropriate to age - cuddly toy 30
- for learning
 - to increase stimulation, i.e., high chair, play pen, learning equipment 31
 - hand-eye coordination toys, busy box in-and-out toys, fit-together toys, beads (snap), sm. items 32
 - stacking or nesting toys, blocks, circles on a stick 33
 - toys for literature and music
 - books 3 books 45
 - musical rattle and books both 34

- 11. What kind of toys has the baby gotten recently? toys that ↑ development, ↑ new skills 40
- 12. Does s/he play with them? How does s/he get to know the new toy? no plays with toy with baby 1st time 38
- 13. Do you give her/him things to play with? i.e., hand him/her things, suggests toys to play with no structures time 39
- 14. Where do you keep her/his toys? consistent place that baby can get to 24
- 15. Do you have any pets? to play with or look at 19
- 16. Do you ever find time to read to her/him? Does anyone else? How often? 3X/week 42
- 17. Have you taken baby for any other well baby visits since the 4 month one? Has had 1 or 2 visits since 4 mo. visit. (Immunizations- current?) 23
- 18. Do you have any relatives (or close friends that you would turn to like a relative) that you see with the baby on a regular basis? How often is that? 1/month 44

- Mo initiates vocalization to baby, 2X 1
- Mo responds to baby vocalizations with sound, 1X 2
- Mo teaches vocally, 1X 3
- Mo initiates verbal exchanges and/or is wordy, 3X 5
- Mo praises baby, 2X 8
- Mo caresses baby, 1X 10
- Mo responds positively when baby praised 11
- Mo does not interfere with baby's actions >3X (Protection not counted.) 17

OBSERVATIONS TO MAKE DURING INTERVIEW

58

- Mother initiates vocalization to baby 2X - (not in response to baby - may be words or sounds).
- Mother responds to baby's vocalizations with vocal sound once.
- Mother tells the name of an object during visit or says the name of a person or object in a teaching manner.
- * Mother's speech is clear and audible. (Interviewer can understand and communicate with mother.)
- Mother initiates verbal exchanges with interviewer - asks questions spontaneously or gives more than asked for. (Does either 3X.)
- * Mother generally talks freely and gives more than brief answers to questions.
- Mother spontaneously praises baby 2X. Can count a negative statement about a remarkable achievement, i.e., "It's terrible how that kid rolls, she/he almost rolled off the changing table this morning!" said with pride, or some positive feeling.
- * When speaking of or to baby, mother's voice conveys positive feeling - not generally querulous.
- Mother caresses or kisses baby 1X. Blowing kisses count. Caressing includes stroking and patting.
- Mother shows some positive response to praise of child.
- * Mother does not shout at baby - does not raise voice above that required for distance.
- * Mother does not express overt annoyance with or hostility toward baby. Give an 0 if mother says baby is hard to care for, says the kid is driving her up the wall or wearing her out.
- * Mother neither slaps nor spansks baby.
- * Mother does not scold, criticize, or run down the baby. (Directly to the baby.)
- Mother does not interfere with baby's actions or restrict movement more than 3X, i.e., taking toy away from baby, putting baby into playpen from floor, stopping baby when s/he starts to grab visitor's purse. Restrictions can be verbal. (Interference is not coded if action is to prevent harm to baby.)
- * 10 books are present and visible in home. (May ask about this.)
- * Baby's play environment appears safe.
- * Mother provides toys or stimulation to baby.
- * Mother keeps baby in view.

1	_____
2	_____
3	_____
*4	_____
5	_____
*6	_____
8	_____
*9	_____
10	_____
11	_____
*12	_____
*13	_____
*14	_____
*16	_____
17	_____
*18	_____
*25	_____
*29	_____
*35	_____
I.	(5,6)
II.	(7)
III.	(8)
IV.	(9)
V.	(10)
VI.	(11)
TOTAL	(12,13)


ABSTRACT OF THE THESIS OF
ROLAINE M. GRANDEY

For the MASTER OF NURSING

Date of Receiving this Degree: June 8, 1979

Title: THE EFFECT OF THE HOME ENVIRONMENT ON THE DEVELOPMENT OF THE
CHILD AT 12 MONTHS OF AGE

Approved:


Barbara C. Barnes, D.G.N., Thesis Advisor

The influence of the home environment in accelerating or depressing developmental progress has long been recognized. Identifying which aspects are crucial to full development has been more difficult. The Tomlinson study on Feminine Role Congruence and Maternal Attachment, of which this study is a part, has been concerned with the effect of feminine role congruence on child development. For her on-going, longitudinal study Tomlinson contacted women prenatally, followed them through birth and for four months, and plans to continue to follow them until the children are four years old. In the early phase of the Tomlinson study no attempt was made to assess the infant's development. The current study was a follow-up of the Tomlinson study sample when the children were 12 months old. This study was designed to measure the relationship between the home environment provided for those infants and their consequent development.

Of the 36 subjects currently in the Tomlinson study, 20 were interviewed for this study. The mothers were 18-27 years of age, and had a

minimum of 10 years of education. The children ranged in age from 11-1/2 to 14-3/4 months of age, with a mean age of 12.7 months.

Data were obtained by interview and observation in the subjects homes. The Home Observation for Measurement of the Environment (HOME) was used to assess the home environment when the children were 4 and 12 months of age. The child's development at 12 months of age was assessed using the Developmental Screening Inventory (DSI). Correlations were made between the HOME data and the DSI data.

The data regarding the home environment showed that the HOME mean scores increased with the age of the child, except for subscale II, avoidance of restriction and punishment. Most of the HOME scores were high, indicating an appropriate environment for optimal development. The developmental data indicated that all children were functioning in the normal range or above in all developmental areas.

The demographic variables of maternal age, maternal education, and child's sex were significantly related to both the environmental and developmental variable. The better educated mothers provided better home environments, as measured by the HOME. The older mothers proved to be less restrictive of their 4 month old children. Girls scored higher in all developmental areas, and on the HOME.

Additional environmental and developmental assessments on this sample are suggested using the HOME and a different developmental tool. The influence of peers and other adults on child development would be an area of interest to explore.