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ABSTRACT

A process-oriented research strategy was employed to examine relations among various aspects of the early home environment and children's language development. The home environments of 65 infants were assessed when the infants were 12 and/or 24 months old with the Home Observation for Measurement of the Environment (HOME). HOME includes six subscales: Emotional and Verbal Responsivity of the Motor, Avoidance of Restriction and Punishment, Organization of the Environment, Provision of Appropriate Play Materials, Maternal Involvement with the Child, and Opportunities for Variety in the Daily Routine. At 3 years of age each infant was administered the Illinois Test of Psycholinguistic Abilities. Results demonstrated that it is possible to specify some of the parameters of early experience which are related to language development. HOME subscales "Emotional and Verbal Responsivity of Mother" and "Provision of Appropriate Play Materials" appear particulary important for language growth throughout the first two years of life, where as other environmental factors vary in their degree of relation to language development. Among the 10 psycholinguistic abilities measured, Auditory Reception, Auditory Association, and Grammatical Closure showed the strongest associations with the quality of stimulation found in the early environment. (Author/BRT)

A longitudinal study of the relation of infants' home environments to language development at age three

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Running head: Home Environments and Language Development

Abstract

A process-oriented research strategy was employed to examine relations among various aspects of the early home environment and children's language development. Infants' home environments were assessed when they were 12 and 24 months old with the 6-subscale Home Observation for Measurement of the Environment (HOME). At 3 years each infant was administered the Illinois Test of Psycholinguistic Abilities. Results demonstrated that it is possible to specify some of the parameters of early experience which are related to language development. HOME subscales "Emotional and Verbal Responsivity of Mother" and "Provision of Appropriate Play Materials" appear particularly important for language growth throughout the first two years of life, whereas other environmental factors vary in their degree of relation. Among the 10 psycholinguistic abilities measured, Auditory Reception, Auditory Association and Grammatical Closure showed the strongest associations with the quality of stimulation found in the early environment.

A longitudinal study of the relation of infants' home environments to language development at age three

During the past decade, significant methodological advances have been made in research studies of early experience and development. Among the most important of these advances are research strategies involving process variables such as response contingencies in the home, nature of parental discipline, or complexity of parental language. Consequently, more variance in cognitive performance has been accounted for than has been the case with studies employing structural or status measures such as social class or parental income.

Illustrative of a process-oriented research strategy is the work of Wachs, Uzgiris, and Hunt (1971). These researchers examined the home environment of infants using an observational procedure designed to assess several kinds of stimulation. They related each kind of stimulation to cognitive development measured on a Piagetian scale. Another example of this methodological approach is the work of Walberg and Marjoribanks (1973). They employed a home environment measure to interview the parents of 185 eleven year old boys, and found that the score on the home interview was a better predictor of the boys' verbal and numerical abilities than SES variables. A third example of process research is found in the work of Elardo, Bradley, and Caldwell (1975). In their study, the correlations obtained between infants' home environments and later mental test performances were as much as twice the magnitude of those derived from several social status measures.

In the present study, a process-oriented research strategy was employed to explore in detail the relationship of certain types of

experiences in infancy to the later development of specific language abilities. The major question addressed was whether certain patterns of early environmental stimuli are associated with the developmental of various psycholinguistic abilities. To obtain this information, home environment data were obtained from a group of infants at 12 and again at 24 months of age. When these infants reached the age of three, their language performance was assessed with the Illinois Test of Psycholinguistic Abilities (Kirk, McCarthy, and Kirk, 1968).

Method

Subjects

A total of 65 normal children living in an urban setting participated in the study. Descriptive information about the children and their families is contained in Table 1.

Insert Table 1 about here

Instrumentation

The Home Observation for Measurement of the Environment (Caldwell, Heider, & Kaplan, Note 1) was administered to each family participating in the study. Fifty-four of the 65 families were tested with this inventory when the infant was 12 months old, 61 of the 65 when the child was 24 months old. This instrument, called HOME, is designed to be an easy to administer, observationally based Inventory which provides an index of the quality and quantity of social, emotional, and cognitive support available to a young child (from birth to three years of age) within the home setting.

Table 1

Characteristics of the Sample

(N = 65)

Family Data
Welfare, 21; nonwelfare, 44
Father absent, 24; Father present, 41
Maternal education (average no. of years), 12.1
Paternal occupation: wide range of employment, but on the average, skilled labor to sales

Child Data	
Black males.	.N = 23
White males.	.N = 14
Black families. . . .	.N = 18
White families. . . .	.N = 10

HOME was developed after a search of empirical data, developmental theory, and expert opinion was conducted for clues to home characteristics likely to be associated with favorable development during the early years of life. It contains 45 items representing the following six types of environmental forces as arrayed through a factor analysis procedure: Emotional and Verbal Responsivity of the Mother, Avoidance of Restriction and Punishment, Organization of the Environment, Provision of Appropriate Play Materials, Maternal Involvement with the Child, and Opportunities for Variety in the Daily Routine.

Standardization data on 176 families in Central Arkansas indicate that HOME is sensitive enough to register a wide range of scores for families with identical social status designations. In terms of reliability, raters can be quickly trained to achieve a 90 percent level of agreement. Internal consistency (KR-20) coefficients for the different subscales range from .44-.89 with an internal consistency coefficient for the total scale of .89.

With regard to concurrent validity, HOME scores for 91 families were correlated with seven socioeconomic-status variables (welfare status, maternal education, maternal occupation, paternal presence, paternal education, paternal occupation, and crowding in the home). Correlations between subscales and maternal education, paternal presence, paternal education, paternal occupation, and crowding were moderate (.25 to .55). Correlations between subscales and welfare status and maternal occupation were smaller in magnitude, but still positive. The empirical validity of the Inventory has been explored in several studies (see Cravioto and DeLicardie, 1972; Wulbert, Inglis,

Kriegsman, & Mills, 1975; Elardo, Bradley, & Caldwell, 1975 and Bradley & Caldwell, in press) with results consistently supporting the ability of the Inventory to distinguish among environments varying in terms of several indices of quality.

The Illinois Test of Psycholinguistic Abilities (Kirk, McCarthy, & Kirk, 1968) was administered to the 65 participating children when they were between 35 and 39 months old (mean age = 37 months). The ITPA is a diagnostic tool useful in delineating specific language-related abilities in children. Over the past decade many studies have described its psychometric characteristics and also its clinical applications. (Kirk, 1967, 1968; McCarthy & Olsen, 1964). The ITPA is composed of ten primary and two supplementary subtests. Dale (1972) recently cited evidence from experimental and factor-analytic studies which raise questions about the independence of the ITPA subscales. However, for purposes of the present study, it is not necessary to accept the entire ITPA model as being completely accurate in order to explore the relationship of certain home environment characteristics to ITPA subtest scores.

Results

12-month HOME Scores and ITPA Performance

The Pearson product moment and multiple correlation coefficients for 12-month HOME scores and 37-month ITPA scores are displayed in Table 2. An examination of these coefficients reveals a substantial

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Insert Table 2 about here

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relationship between the two sets of variables. Emotional and Verbal

Table 2

Intercorrelations Among 12-month HOME Scores and 37-month ITPA Scores[a]

	HOME						Total HOME Score	Multiple R
	I	II	III	IV	V	VI[b]		
Auditory Reception	.484**	.209	.472**	.435**	.495**	.285*	.549**	.593**
Visual Reception	.196	.269*	.232	.250	.156	.094	.275*	.384**
Visual Memory	.088	.101	.173	.115	.020	-.010	.112	.258
Auditory Association	.456**	.279*	.467**	.533**	.534**	.290*	.593**	.619**
Auditory Memory	.112	-.061	.043	-.029	-.080	-.248	-.043	.398**
Visual Association	.200	.086	.299*	.221	.119	.014	.219	.372**
Visual Closure	.145	.035	.202	.191	.187	.081	.195	.239
Verbal Expression	.214	.188	.187	.202	.090	-.152	.183	.473**
Grammatical Closure	.379**	.356**	.299*	.404*	.431**	.170	.475**	.531**
Manual Expression	.273**	.169	.226	.275	.172	-.054	.261	.444**
Total ITPA Score	.411**	.174	.376**	.390**	.265	.093	.409**	.538**

Note. [a]n = 54.

[b]I = Emotional and Verbal Responsitivity 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
VI = Opportunities for Variety in Daily Routine

[c]Multiple R values represent the multiple correlation coefficient between the six HOME subscales and each ITPA score.

*p < .05
**p < .01

Responsitivity of Mother, Organization of the Environment, and Provision of Appropriate Play Materials appear particularly salient for the early growth of language. Maternal Involvement with Child also showed a strong relationship to several aspects of language, although its correlation with the ITPA total score was not significant. The types of stimulation assessed by HOME demonstrated an especially strong association with Auditory Reception, Auditory Association, and Grammatical Closure. The multiple correlation coefficients indicate that HOME subscale scores share between 28% and 38% common variance with these three psycholinguistic abilities. The multiple correlation for HOME subscales and the ITPA total score was R. = .538.

24-month HOME Scores and ITPA Performance

The Pearson product-moment and multiple correlation coefficients for 24-month HOME scores and 37-month ITPA scores are displayed in Table 3. As expected, 24-month HOME scores show an even stronger association

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Insert Table 3 about here

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with 37-month ITPA scores than do 12-month HOME scores. In fact, all six HOME subscales and each of the ITPA subtests was significant. Emotional and Verbal Responsivity of Mother, Provision of Appropriate Play Materials, Maternal Involvement with Child, and Opportunities for Variety in Daily Stimulation revealed the highest degree of relation to language growth. Emotional and Verbal Responsivity of Mother had the highest overall correlation to total language development (r. = .519), whereas the other three subscales showed highest relations with Auditory Reception, Auditory Association and Grammatical

Table 3

Intercorrclations Among 24-month HOME Scores and 37-month ITPA Scores[a]

	HOME[b]						Total HOME Score	Multiple R
	I	II	III	IV	V	VI		
Auditory Reception	.415**	.310*	.358**	.589**	.507**	.414**	.591**	.623**
Visual Reception	.309*	.251	.243	.343**	.313*	.301*	.396**	.407**
Visual Memory	.150	.309	.094	-.029	.009	.098	.077	.269*
Auditory Association	.422**	.289*	.322*	.602**	.490**	.500**	.594**	.659**
Auditory Memory	.320**	.044	-.088	.058	.101	.261*	.176	.461**
Visual Association	.265*	.265*	.285*	.350**	.364**	.275*	.402**	.417**
Visual Closure	.393**	.176	.185	.207	.335**	.201	.347**	.416**
Verbal Expression	.414**	.190	.183	.246	.288*	.356**	.388**	.470**
Grammatical Closure	.366**	.416**	.235	.490**	.442**	.385**	.532**	.573**
Manual Expression	.450**	.169	.176	.275*	.250	.397**	.418**	.510**
Total ITPA Score	.519**	.280*	.295*	.443**	.469**	.446**	.561**	.593**

Note. [a]n = 61.

[b]I = Emotional and Verbal Responsivity 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
VI = Opportunities for Variety in Daily Routine

[c]Multiple R values represent the multiple correlation coefficient between the six HOME subscales and each ITPA score.

*p < .05
**p < .01

Closure (coefficients ranged from .385 to .602).

Discussion

The present findings relating early home environment to auditory language capabilities are consistent with earlier findings relating early home environment to 36-month Binet IQ Scores (Elardo, Bradley, & Caldwell, 1975). Specifically, 36-month Binet performance showed important relationships to Emotional and Verbal Responsivity of Mother, Organization of the Environment, Provision of Appropriate Play Materials, and Maternal Involvement with the Child subscales at 12 months of age. The relationship between 36-month Binet performance on all six of the HOME subscales at 24 months was significant, the greatest increase being that between 36-month Binet performance and Opportunity for Variety in Daily Routine. The same kind of relationship appears between HOME scores at 12 and 24 months and 37-month scores on Auditory Reception, Auditory Association, and Grammatical Closure subtests of the ITPA. Such findings might be expected, since previous investigators have found that Auditory Association subscale to be highly correlated with IQ (McCarthy & Kirk, 1963).

Other findings regarding mother-child interaction and language development corroborate and expand upon the general findings of the Wulbert, Inglis, Kriegsman, and Mills (1975) study. These researchers reported that the greatest difference in scores between mothers of normal and language-delayed children occurred on those items of the Home Observation for Measurement of the Environment which measured mother-child interaction, especially the items comprising the Maternal Involvement with Child subscale. Our results, contained in Tables 2 and 3, represent evidence that in the present study the most salient

subscale of the HOME is Emotional and Verbal Responsivity of the Mother. Scores on this subscale were most frequently positively associated with scores on the ITPA and its subscales. Interestingly, 10 of the 11 items on the Emotional and Verbal Responsivity subscale require scoring by direct observation, rather than interview.

The current analysis represents evidence of a substantial relationship between early environmental stimulation and later language performance. There is generally a stronger relationship between 24-month HOME scores and 37-month ITPA scores that between 12-month HOME scores and 37-month ITPA scores. Such a pattern would be expected both on the basis of the time proximity of the measurements and on the basis that environmental stimulation has some cumulative effect on language development.

In this study, all six aspects of home environment measured by the HOME Inventory showed a significant relationship to language development; however, the nature of these relationships appear to be somewhat complex. At both 12 and 24 months, scores on the Emotional and Verbal Responsivity of the Mother subscale of HOME show a very high correlation with overall language facility. When measured at 24 months, scores on that HOME subscale were correlated with every aspect of language measured except Visual Memory. The 12 and 24 month scores on Provision of Appropriate Play Materials were also highly correlated with total language development, particularly with Auditory Association, Auditory Reception, and Grammatical Closure. When measured at 12 months, Maternal Involvement with Child was highly related with children's performance on the Auditory Reception,

Auditory Association, and Grammatical Closure subtests of the ITPA. At 24 months, Maternal Involvement with Child showed significant correlations with these same subtests plus Visual Reception, Visual Association, Visual Closure, Verbal Expression, and the ITPA total score. The 12-month scores on Opportunities for Variety in Daily Stimulation demonstrated negligible correlations with psycholinguistic abilities; but the 24-month scores on this subscale were strongly related to several ITPA subtests in addition to the ITPA total score. By contrast, 12-month scores on Organization of the Environment demonstrated a stronger relation to language that did the 24-month scores on that subscale. In general, our results indicate that the salience of certain aspects of the environment increases and decreases throughout the first two years of life. Such findings are similar to those obtained by Wachs, et al. (1971) using a Piagetian type meausre of cognitive development. Wachs and his colleagues found that some environmental factors tended to wax and wane in terms of importance during the early years.

Patterns of relationships among home environment variables and psycholinguistic abilities appear to vary from one type of ability to another. For example, Auditory Reception, Auditory Association, and Grammatical Closure seem strongly related to environmental stimulation as measured at both 12 and 24 months. The general amount and variety of stimulation seems less important at 24 months than at 12 months while the converse appears to be true in the case of providing toys and focusing attention on them. Such findings may indicate that the general amount of stimulation becomes less critical to the development

of these language capabilities whereas the purposeful structuring and direction of certain kinds of stimulation takes on added importance. In this connection, it is interesting to note that while auditory capabilities are more strongly related to specific aspects of the environment at 24 months than at 12 months, the multiple correlations between 24-month HOME scores and scores on auditory subtests are only slightly higher than the multiple correlations between 12-month HOME scores and scores on auditory subtests. Other capabilities such as Visual Closure and Manual Expression appear related only to early home environment at certain points of time, specifically at 24 months. They also appear related only to certain aspects of the environment, particularly to the mothers encouragement of achievement and, in the case of Visual Closure, to the opportunity to express one's skill both with appropriate toys and in the company of adult human beings. The 24-month score on Emotional and Verbal Responsivity of the Mother and Opportunities for Variety in Daily Stimulation were strongly related to Manual Expression. These results may suggest that encouragement and opportunity for expression during this period of development is particularly important for the later development of expressive ability.

Obviously, from a correlational study such as this causal inferences which imply that certain types of environmental stimulation produce certain patterns of language performance should not necessarily be drawn. For, as Kogan and Wallach (1966) observed, different types of children may elicit different types of stimulation from their environment. Also, no inferences regarding sex differences can be

made from this study. This is an area which should be explored further, since the Fels and Berkeley longitudinal studies (Bayley & Schaefer, 1964; Honsik, 1967; Moss & Kagan, 1958) have provided evidence that, especially for the language development of male children, various dimensions of early mother-child interaction are important.

Perhaps the most important contribution this study may contain is methodological in nature. As noted in the introduction, a process-oriented research strategy was employed. The primary aim of this was to make possible a greater specification of early experience parameters which are related to language development. Using this strategy we found that certain aspects of the early environment were more important for language development than others. Furthermore, we found that all aspects of languages are not affected equally by early experiences, but rather that certain abilities appear to be more sensitive to certain carefully specified classes of experience than other abilities. Future studies, employing similar process-oriented methodologies, can further our knowledge of the varied effects of early experiences.

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