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Sosio-Economic Status, Home Environment and Preschool Children's Mental Abilities

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ABSTRAK

Kajian ini telah dijalankan untuk menentukan perkaitan di antara status sosioekonomi, persekitaran rumah dan prestasi mental kanak-kanak prasekolah. Responden terdiri daripada 34 (17 Cina, 17 Melayu) kanak-kanak yang berumur 6 tahun, daripada sebuah Tadika Cina dan sebuah Tadika Melayu di Kampung Parit Haji Ismail, Bagan Serai, Perak. Kualiti persekitaran rumah telah diukur menggunakan Inventori HOME oleh Caldwell dan Bradley (1984). 'Wechsler Intelligence Scale for Children' dan 'Goodenough Draw-a-Man Test' telah digunakan untuk mengukur prestasi mental kanak-kanak. Kajian ini mendapati pada tahap analisis 'bivariate', pendidikan bapa dan ibu, pendapatan keluarga dan saiz keluarga mempunyai perkaitan yang signifikan dengan skor HOME. Pendapatan keluarga juga didapati mempunyai perkaitan positif dengan skor mental kanak-kanak, manakala saiz keluarga menunjukkan perkaitan yang negatif. Korelasi yang signifikan telah juga didapati di antara kualiti persekitaran rumah dan skor mental kanak-kanak.

ABSTRACT

This study was conducted to determine the relationship between sosio-economic status, home environment and mental abilities of preschool children. Respondents were 34 (17 Chinese, 17 Malays) six year-old children from a Chinese and a Malay kindergarten in Parit Haji Ismail Village, Bagan Serai, Perak. The quality of the home environment was measured using Caldwell and Bradley (1984) HOME Inventory. Wechsler Intelligence Scale for Children and Goodenough Draw-a-Man Test were used to assess the children's mental performance. The study found that at the bivariate level of analyses, father's and mother's education, family income and family size were significantly related to the HOME scores. In addition, family income showed positive correlation to children's mental scores, and family size showed inversed relationship. Significant correlation was also found between the quality of the home environment and mental scores of the children.

INTRODUCTION

Previous studies of IQ had consistently found that children from poor or working-class families have lower average IQs than children from middle-class families (Bee 1985; Gottfried 1984). One of the early investigations of the effects of socio-economic status (SES) and IQ was conducted by Kennedy, Van de Riet, and White 1963, (cf: Caldwell & Bradley 1984). The study focused on 1800 first to sixth grade black children from southeastern region of the United States. Results of the study showed that children from higher SES scored higher on Stanford-Binet than children from lower SES. The effect of SES on the children's IQ remained significant even when racial factor was controlled.

Findings by Broman, Nichols and Kennedy (1975) were consistent with much earlier studies. Broman et al. noted the effects of SES (i.e., parents' occupation, income and education) on children's IQ in their national study on 11,800 children born in the United States. The study found that as social class and mother's education increases, the children's average IQ also increases.

Recent studies of IQ investigated not only the influence of global aspects of the family environment, but also specific aspects, such as the quality of the home environment family provide for their children. Numerous studies in Western countries have documented the associations between characteristics of the home environment and children's mental development. For example, Sigman, Neumann, Carter, Cattle, D'Souza and Bwido (1988) found that children between 15 to 30 months of age who lived in an environment where they were talked to frequently, whose vocalizations were responded to, and who engaged in sustained social interactions scored higher on Bayley Mental Scale and showed more positive affect than children who had been less involved in verbal and social interactions.

Bradley, Caldwell, Rock, Ramey et al. (1989) also reported the importance of the quality of the home environment on children's cognitive development. They found that specific aspects of the home environment such as parental responsivity and availability of stimulating play materials were positively related to children's cognitive competence. A total of 931 children from different ethnic groups and cities in North America were involved in the study conducted longitudinally. In an earlier study on 174 preschool children, Bradley and Caldwell (1984) found that both SES variables (mother's education and occupation; father's education and occupation; father's presence; and household size) and home environment were significantly related to children's cognitive test performance.

Barnard, Bee and Hammond (1984) found similar evidence in their study. The study examined the effects of the quality of the home environment on the cognitive development of 80 healthy, low-risk Caucasian children. Moderate to strong correlations were found between aspects of the children's home environment and their performance on IQ test. Barnard et al. observed that the correlations remained significant when the effects of maternal education and SES were statistically controlled.

In summary, past and present research have shown that both socio-economic status and home environment are related to children's intellectual abilities. The present study was conducted with the purpose of investigating the relationship between SES (i.e., father's education, mother's education, family income and family size), and mental abilities of preschool children; and the relationship between home environment and mental abilities of preschool children.

METHODOLOGY

Respondents

Thirty four six-year-olds were selected from a name list available at a Chinese and a Malay kindergarten in Parit Haji Ismail Village, Bagai Serai, Perak. Only children whose parents agreed to be observed in their homes were chosen as respondents. They comprised 17 Chinese and 17 Malay children. The respondents' family background is described in Table 1. As shown in Table 1, children in the study generally come from middle and low income families.

Measures

Home Environment : The quality of the home environment was assessed by means of the Preschool Version of the HOME Inventory (Caldwell & Bradley 1984) during the home visit made by the researchers. The Preschool HOME Inventory is an observation/interview technique that measures the quality of physical, cognitive, social and emotional stimulation available to a child within the home environment. It is composed of eight subscales: (1) Toys, games and materials, (2) Language stimulation, (3) Physical environment, (4) Pride, affection and warmth, (5) Stimulation of academic behavior, (6) Modeling social maturity, (7) Variety of stimulation, and (8) Acceptance/physical punishment. Examples of items assessed by each subscale are as follow:

TABLE 1. Family background of the respondents

Variables	N	%
Father's education		
No formal education	4	11.8
Primary education	9	26.5
9 years of formal education (SRP/LCE)	13	38.2
11 years of formal education (SPM/MCE)	7	20.6
Diploma	1	2.9
Mother's education		
No formal education	4	12.1
Primary education	16	48.5
9 years of formal education (SRP/LCE)	10	30.3
11 years of formal education (SPM/MCE)	3	9.1
Family income		
Less than RM500	16	47.0
RM500 - RM999	9	26.5
Above RM999	9	26.5
Family size		
1-2 children	10	29.4
3-4 children	12	35.3
5-6 children	8	23.5
Above 6 children	4	11.8
Father's occupation		
Farmers	5	14.7
Labourers	8	23.4
Public services	9	26.5
Teacher	2	5.9
Businessmen	10	29.4

(1) *Toys, games and materials*: Child has toys which teach color, sizes and shapes; child has three or more puzzles; and child has at least 10 children's books.

(2) *Language stimulation*: Child is encouraged to learn the alphabet; parent teaches child simple verbal manners (please, thank you); and parent encourages child to talk and takes time to listen.

(3) *Physical environment*: Interior of house not dark or perceptually monotonous; rooms are not overcrowded with furniture; and house is reasonably clean and minimally cluttered.
(4) *Warmth and acceptance*: Parent converses with child at least twice during visit; parent answers child's questions or request verbally; and parent praises child's qualities twice during visit.
(5) *Academic stimulation*: Child is encouraged to learn spatial relationships; child is encouraged to learn numbers; and child is encouraged to learn to read a few words.
(6) *Modeling*: TV is used judiciously; parent introduces visitor to child; and child can express negative feelings without reprisal.
(7) *Variety in Experience*: Child is taken on outing by family member at least every other week; parent encourages child to put away toys without help; and child's art work is displayed some place in the house.
(8) *Acceptance*: Parent does not scold or derogate child more than once; parent does not use physical restraint during visit; and no more than one instance of physical punishment during past week.

A reliability test conducted on the Preschool HOME Inventory obtained an alpha level of .82. Table 2 indicates the changes in the alpha level with the deletion of each subscale of the Preschool HOME Inventory.

Mental Abilities: Weschler Intelligence Scale for Children (WISC) (Weschler 1949) and Goodenough Draw-A-Man Test (Goodenough 1926) were used to measure the children's mental abilities. Only the performance scale of the WISC was used in this study. Goodenough Draw-A-Man was administered at the children's preschool a month before the home visit was made and WISC-performance conducted. T-test showed no significant difference between the scores of the two tests used.

TABLE 2. Reliability analysis for HOME inventory

HOME Inventory Items	Corrected item-total correlation	Alpha of item deleted
1. Toys, games and materials	.77	.76
2. Language stimulation	.67	.78
3. Physical environment	.44	.81
4. Pride, affection and warmth	.58	.79
5. Stimulation of academic behaviour	.36	.82
6. Modeling social maturity	.57	.80
7. Variety of stimulation	.68	.78
8. Acceptance	.26	.83
Overall alpha = .82		

An average between the scores obtained for the two tests was used to indicate the children's mental abilities.

Procedure: The name lists were obtained from the Chinese and Malay preschools in which the children attended. Letters were sent to the parents through their children. These letters explained the nature of the research and requested permission to conduct home observations on the children. On obtaining permissions from the parents, initial contact was made to establish rapport with the family and arrange a time for the home observation. The home observation was arranged at a time convenient for both the mother and the target child. During the arrangement, it was also indicated that both the mother and the child's presence were necessary for the home observation.

During the home observation, after the initial 15-minute conversation with the parents, the WISC-performance test was conducted on the children. The WISC-performance test took an average of 45 minutes to complete. On completion of the test, the researchers assessed the home environment through observation and interview with the mother, with reference to the HOME Inventory. The HOME Inventory lasted about an hour.

RESULTS AND DISCUSSION

Home Environment

The home environment, assessed by means of the Preschool Inventory generally received lower scores than the ones reported in the manual (Bradley & Caldwell 1984). Based on the mean scores in relation to the highest scores attainable, the respondents received higher percent scores for acceptance, physical environment and language stimulation (Table 3). However, acceptance and physical environment was not found to be effective measures of the home environment since these measures were not found to vary much between respondents (Table 2). Most of the respondents refrained from scolding or punishing the children in the presence of the researcher. Most of them gave favourable answers when asked about their techniques of disciplining their children. The physical environment was found to be identical in the sense that most of the village houses were found to be spacious, bright and clean, with enough outdoor space for the children to play in.

As such, despite the high mean scores obtained for subscales acceptance and physical environment, reliability analysis detected low

TABLE 3. Means and standard deviations for HOME inventory and mental ability

Variables	Mean	Sd	% Scores
HOME Inventory			
1. Toys, games and materials	3.71	2.41	.34
2. Language stimulation	5.09	1.58	.73
3. Physical environment	4.68	1.58	.78
4. Pride, effection and warmth	4.224	1.60	.61
5. Stimulation of academic behaviour	3.26	1.60	.65
6. Modeling social maturity	3.26	1.37	.48
7. Variety of stimulation	4.82	1.70	.54
8. Acceptance	3.74	0.51	.94
Total HOME	31.94	18.57	.59
Mental Ability			
1. WISC performance	98.5	20.5	
2. Draw-A-Man	95.6	19.4	
3. WISC/Draw-A-Man Average	95.1	18.6	

contribution of these two subscales to the total alpha score (see Table 2). Of the subscales measured, subscale toys, games and materials was found to contribute more to the total alpha score, followed by variety of stimulation, language stimulation, and pride, affection and warmth. The score on subscale toys, games and materials ranged from 1 to 11, with a mode of 2. Most families have audio-visuals, especially audios such as radios in their homes. Although such audios were not bought specifically for the children, they would still have received exposure or indirect stimulation from them, thus receiving opportunities for increasing their knowledge. Otherwise, as many as 14.7% of the respondents did not have any forms of toys or materials for knowledge attainment. This, however, does not mean they are totally deprived of stimulation since the village environment in itself is rich in other forms of intellectual stimulation. Their exposure to tree-climbing, running (e.g. catch game) and swimmimg gives them excellent experience of the space. Such experience offers opportunities for understanding conservation and geometric concepts as well as improvement of motor coordination.

Mental Abilities

To give a fair evaluation of the children's abilities, an average was calculated from their scores on the WISC-performance and Goodenough

Draw-A-Man test. T-test calculated showed no significant difference between the scores of the two tests. Table 4 indicates a mean average score of mental abilities of 95.1. The average score range from 62 to 129, with a mode of forty-one percent of the respondents scored below 90, 35.3% between 90 to 109 and 23.4% scored above 110 (see Table 4). This result reveals that a large proportion of the children (41%) may potentially face learning problem in their later school years, should the children's environment be left consistent over their years of growing up. From our home visit, we found two outstanding characteristic that might explain the respondents' low intellectual abilities scores: (1) the child's personality, and (2) the home environment. Although no scientific attempt was made to measure the respondents personality, it was observed that the low scorers were found to be less active, more easily frustrated, higher tendency to give up when problems were encountered during the test administration and were less interested in completing the tests given. The level of activity, determination and motivation is a strong force that encourages a child to expore his environment and learn from his experience, thus increasing his intellectual capacity and knowledge about the environment he live in. A child who easily succumbs to failure or dare not venture will eventually lag behind.

TABLE 4. Mental ability scores of the children

Mental ability score	Number of children	Percentage
Less than 70	2	5.9
70 - 89	12	35.3
90 - 109	12	35.3
110 - 129	8	23.4
Above 130	0	0
Mean: 95.1		

The home environment of these group of low scorers was also found to be different from the average or high scorers. Their homes were located in shabby areas. The furniture in their home was less organized with little or no space for the child to play, move around, let alone run in. There was no separation between the bedroom, sitting room and kitchen, i.e. all the activities were conducted in the same one room. Hardly any toys or play materials were available for the children. Pearsons-Product-Moment Correlation computed supports these observation (Table 5). The mental ability scores was found to positively correlate with subcales

TABLE 5. Correlations between the HOME inventory and mental ability scores

HOME Inventory Variables	Mental Ability
1. Toys, games and materials	.48**
2. Language stimulation	.44**
3. Physical environment	.45**
4. Pride, affection and warmth	.17
5. Stimulation of academic behaviour	.38*
6. Modeling social maturity	.14
7. Variety of stimulation	.56***
8. Acceptance	− .26
Total HOME Inventory	.56***

* $p < .05$
** $p < .01$
*** $p < .001$

toy, games and materials ($r = .48$, $p < .01$), language stimulation ($r = .44$, $p < .01$), physical environment ($r = .45$, $p < .01$), stimulation of academic behavior ($r = .38$, $p < .05$) and variety of stimulation ($r = .56$, $p < .001$). These findings seemed to suggest that children who obtained higher mental scores come from families who provide them with cognitively-stimulating home environment.

SES, HOME Inventory and Mental Ability Variables

Table 6 indicates that the home inventory relates positively to father's education ($r = .42$, $p < .05$) and mother's education ($r = .56$, $p < .001$). Parents' education tend to relate to factors that will assist children in their intellectual growth. The parents' choice of the environment will be influenced by the broadness of their knowledge and experience. Parents

TABLE 6. Correlations between SES, HOME inventory and mental ability scores

SES variables	Total HOME inventory	Mental ability
1. Father's education	.42**	.19
2. Mother's education	.56***	.20
3. Family's income	.42**	.41**
4. Family size	− .41**	.30*

* $p < .05$
** $p < .01$
*** $p < .001$

who are aware of the children's need will be better able to provide appropriate play materials and be more responsive to their children. They would participate more readily in their children's play activities, encouraging their exploratory behavior, thus increasing their deductive thinking and intellectual development (Bradley, Cardwell & Rock 1988; Crockenberg 1983; Mills & Funnel 1983).

Family income was found to correlate positively to HOME inventory ($r = .42$, $p < .05$) and mental ability ($r = .41$, $p < .05$). Family income tend to influence the family's ability to purchase varied toys and materials for academic stimulation as well as provide better physical environment. Families with higher income will be able to provide more variety of toys and other stimulating materials and vice versa. Family size, on the other hand correlates negatively to HOME Inventory ($r = -.41$, $p < .05$) and the children's mental ability ($r = -.30$, $p < .05$).

Family size may reduce family ability to purchase such toys and materials. Families with more children will have to spend more on meeting the basic needs of these children such as food, clothing and shelter. Higher needs such as academic stimulation will therefore be ignored. Family size may also influence the parents' availability to each children. In other words, children in large families may have a smaller share of the parent's free time than those in smaller families. Earlier studies have also provided evidence that the quality of the home environment parents provide is affected by the number of children in the family (Blake 1989; Luster & Dubow 1990; Menaghan & Parcel 1991).

CONCLUSION

Results of the HOME Inventory suggest that the mental ability of the children is related to the quality of their home rearing environments. As such, the home environment may serve as an indicator for assessing the children's early learning environment, even long before they enter formal schools.

The results also tended to suggest that sosio-economic status variables relate directly to the HOME Inventory, and perhaps indirectly to the mental abilities of the children. The fact that parents' education and income relate positively to the HOME Inventory suggests that parents role as contributors to the children's mental development should be considered seriously.

Parents are their children's first teachers. They select toys, games and materials their children may play, explore and experiment with and learn from. Their provision of language and academic stimulation and other variety of stimulation differ based on their knowledge and experience.

Parents who are aware of their children's needs will be better able to provide appropriate and varied play materials, more responsive to their children's cues, and more ready to participate in their children's play activities. They are also more likely to encourage exploratory behaviour, thus increasing their children's deductive thinking capability. Parents' educational background therefore tend to relate to factors that will assist children in their mental growth (Bradley, Caldwell & Rock 1988; Gottfried 1984; Mills & Funnel 1983). Hence, parenting education should be given to parents to enhance parents' knowledge on their children developmental needs. This will create awareness among parents to prepare a home environment that will encourage their children's mental development.

Although the present study found evidence that suggest possible linkage between SES and home environment and children's mental abilities, the findings should be viewed cautiously. The study was correlational in nature, and the sample was small and purposively selected. Future studies may utilize a qualitive research design so that processes within the family that are important for child development could be identified. Such approach is consistent with Bronfenbrenner's (1979, 1989) ecological viewpoint that suggest the importance of looking beyond the 'social address' of a child in order to understand the child's developmental outcome.

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