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ABSTRACT

Two aspects of a 9-year research study initiated in July 1983 by the Singapore Institute of Education are described. The first part describes the initial 3-year phase of a longitudinal study aimed at investigating some important cognitive and social developmental processes of preschool children at different ages and relating them to certain intervention strategies that attempt to enhance their cognitive and social competencies. Cognitive growth, social behavior, home and school environments, and the relationships among these factors were studied for 2,418 3- to 6.5-year-old children (1,211 males and 1,207 females) who completed all of the study measures. The second aspect is a recent follow-up pilot investigation of how these cognitive and social developmental processes are related to gender differences across 4 age groups from age 3 to 6 years. Subjects were 171 Chinese preschoolers (84 males and 87 females) from a private kindergarten in Singapore. Developmental trends that the children exhibited in both studies are discussed. In all age groups, females performed better than did males at language and social skills, and males were more successful in the mathematics tests than were females. Nine tables and seven figures present study details. (SLD)

COGNITIVE AND SOCIAL DEVELOPMENT OF PRESCHOOLERS: GENDER DIFFERENCES

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This paper focusses on two aspects of a nine year research study, initiated in July 1983 by the Institute of Education, Singapore and funded by the Bernard van Leer Foundation of the Netherlands. The first part describes the initial three-year phase of a longitudinal study which is aimed at investigating some important cognitive and social developmental processes of preschool children at different ages and relating them to certain intervention strategies that attempt to enhance their cognitive and social competencies regarded as important in Singapore. The second part will be a recent follow up pilot investigation of how these cognitive and social developmental processes are related to gender differences, across four age groups (3 to 6). Specifically, the follow up study is based on 171 Chinese preschoolers from a private kindergarten center.

Background of the research project

The Bernard van Leer Project is divided into three phases. (Figure 1).

TIME FRAME OF LONGITUDINAL STUDY

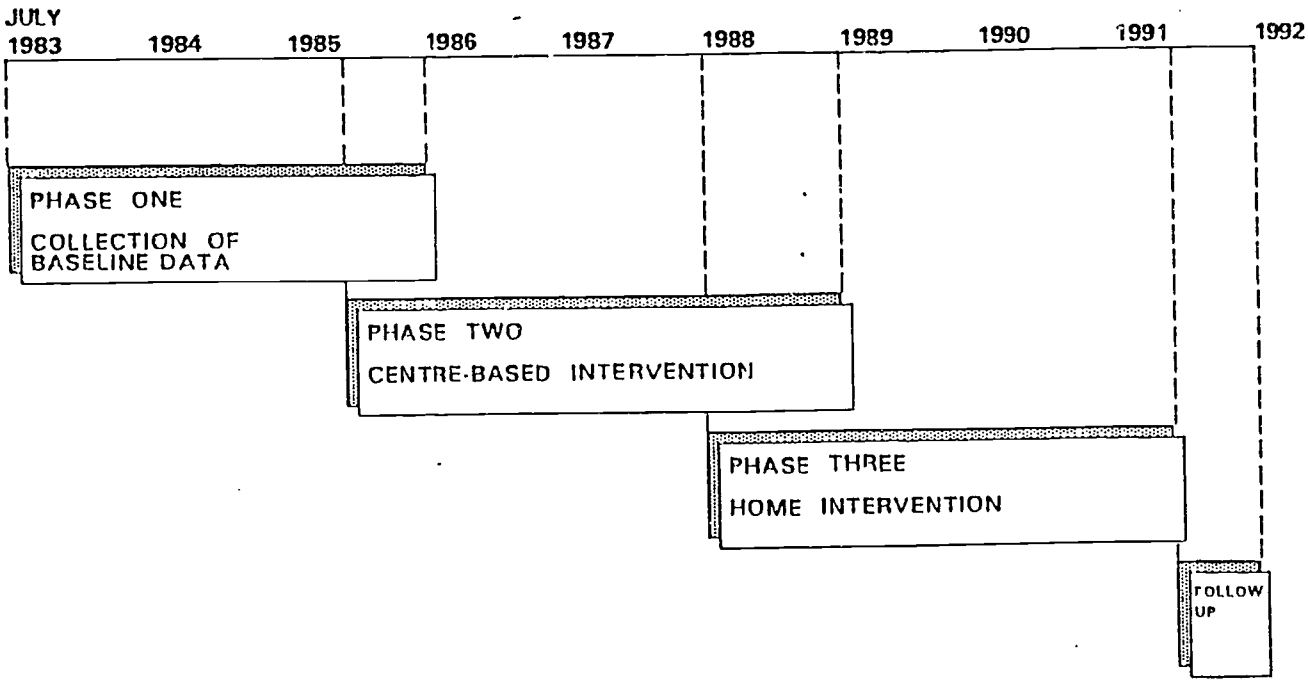


Figure 1

Phase One (July 1983 to June 1986) covers a three year period during which not only normative-descriptive baseline data have been collected but also data relevant to possible subsequent intervention, such as existing school practices and small scale feasibility studies of plausible instructional approaches. Underlying the objectives of this phase is the belief that these baseline data will provide indications on whether Singapore preschool children need help in their cognitive and social growth and if so, in what way can help be given.

Phase Two (July 1986 to June 1989) marks the beginning of an action phase by focussing on initiating certain actions to see whether they can help achieve our final aim, i.e. to enhance children's cognitive and social growth. The feasibility studies conducted earlier in order to assess the usefulness of some language teaching approaches, and the special training workshops organised for preschool teachers and supervisors, reflect this experimenting-experiential process.

Phase Three (July 1989 to Dec 1992) the last of the three phases, will see the implementation of ideas and measures learned through the experience of the two previous phases. It is also a time for reaching out to people who share the same interests and concerns, in particular, parents of young children. Through the collaborative efforts of teachers, supervisors, parents, interested people in the community and teacher educators, plans can be drawn up and implemented and in the process of implementation, new ideas will be generated.

Dissemination of the study's research findings and experience has always been considered an important component of the research study. In phase three, it will be extended beyond seminars and workshops as this is the time for informing the public what the study has achieved over the past years, and the time for sharing of ideas with a wider audience. When this phase ends in December 1992, it is hoped that the final outcome will provide:

1 the much needed local data concerning the cognitive and social development of preschool children in Singapore.

2 data on the relative effects of different intervention strategies in different contexts.

3 a strategic plan for the improvement of preschool education and early childhood teacher training in Singapore.

The research team has by now completed two of the study's three phases, and is at the moment working on the completion of the third phase. (Table 1)

Rationale underlying the design of the IE-BvLF Study

	Phase 1 — 1983	Phase 2 — 1986	Phase 3 — 1990 — 1992
Focus of the Study	Research	Experiment	Action Research Experiment
	Knowledge	Experience	Application Knowledge Experience
Related Activities	Collection of Baseline Data	Training and Experiment	Public Awareness Parent Participation Community Involvement
Dissemination Procedure	Micro		Macro
Target Audience	Pre-service and In-service Teachers	Pre-school Teachers and Supervisors	Parents Members of Community
	Personnel from Related Organizations	Personnel from Related Organizations	Policy Makers Professionals Teachers
Ways to Reach Target Audience	IE Courses In-house Seminars	IE and Centre-based Workshops	Talks Public Seminars Mass Media Publication Other Planned Activities

Table 1 Research Design of Longitudinal Study

Phase One of the Study

Phase One of the Study was planned with the following specific aims:

1 to measure children's cognitive growth in terms of their ability to master basic language skills, to understand simple mathematical concepts, and to perform tasks that require them to distinguish, to compare, to reason, and to perceive relations;

2 to study, through observation, children's social behavior in a structured environment such as that of their classrooms;

3 to investigate some selected aspects of the children's home and their school environment;

4 to see whether children's cognitive and social development is in any way related to their specific home and school environment.

These baseline data, we believe, would provide indications as to whether Singapore pre-school children would need help in maximizing their cognitive and social growth and if so, the type of help they would need.

Variables for Investigation

The focus of Singapore's education, as reflected in the major educational policies, is very much competency-oriented. In this study, therefore, our choice of variables and instruments is guided by reference to a competency model to ensure that what we look for is in line with the pragmatic nature of Singapore's educational thrusts and its pre-occupation with developing human resources. (Figure 2)

Competency in this case is defined as a skill or set of skills which are developmental, hierarchical and necessary for survival and for the mental and social well being of children. At the school level, we conceive competency as falling into two categories: prescribed competency and non-prescribed competency.

Prescribed competencies, cognitive, social and psychomotor, are those areas stressed by the Ministry of Education. They are thought to provide as essential basis for the education of primary school children in Singapore. Non-prescribed competencies are mainly cognitive and social which chiefly for reasons of time are not included in the primary curriculum and the first year of the primary schooling.

In schools, the teaching of prescribed competencies are done through subjects such as mathematics and languages. While non-prescribed competencies are not taught directly, they are embedded in all types of learning activities.

DESCRIPTIVE MODEL OF POSSIBLE RELATIONSHIPS BETWEEN VARIABLES

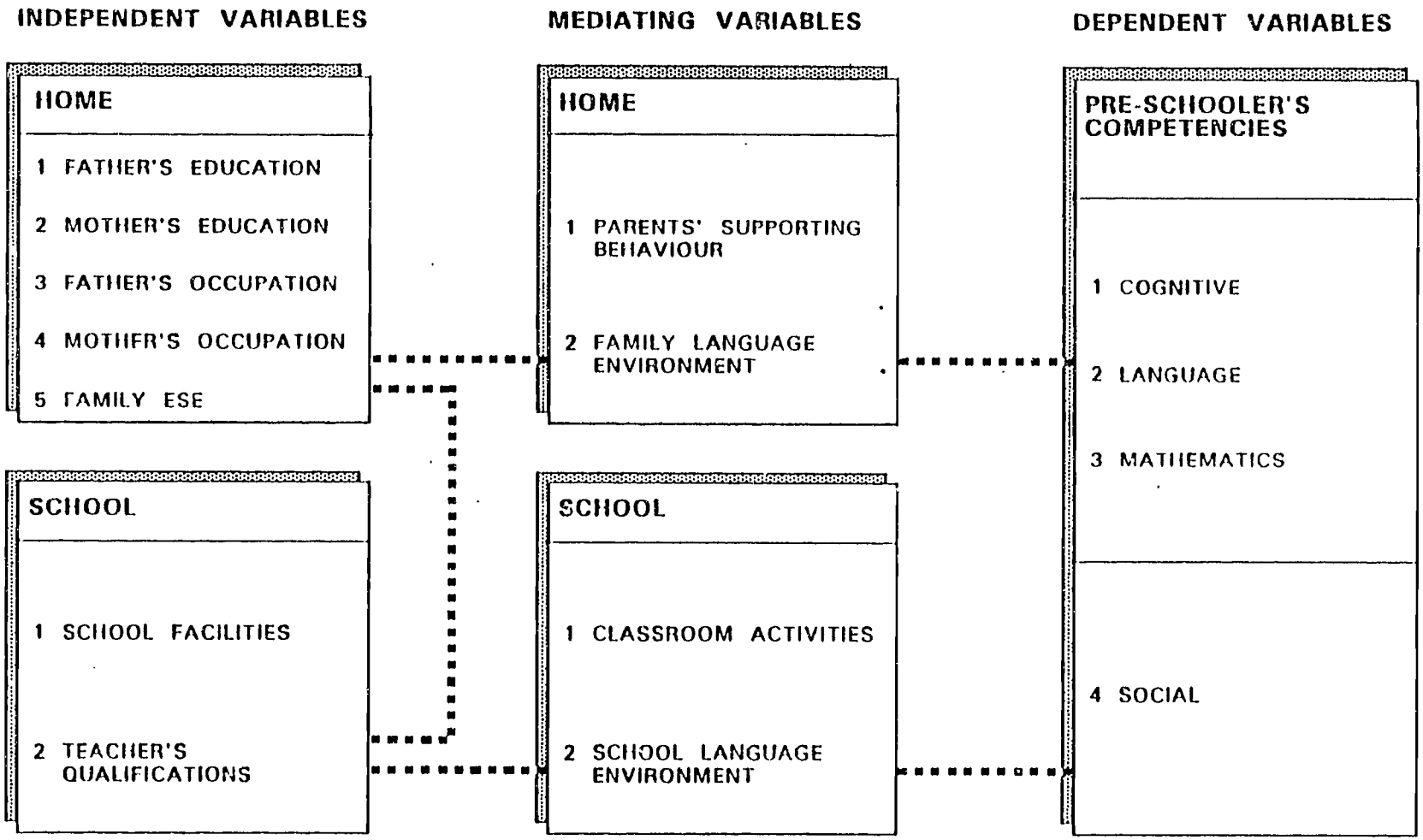
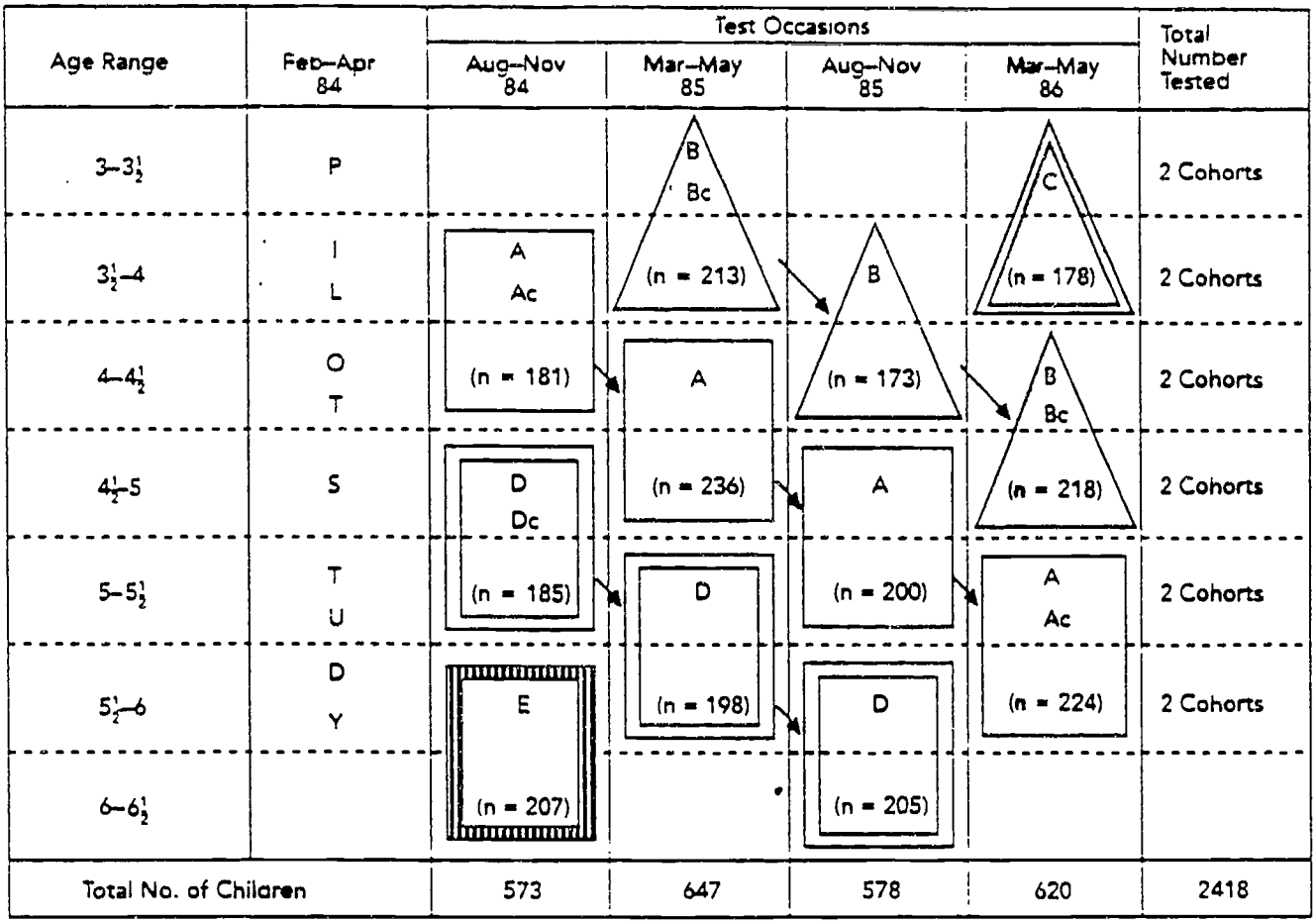


Figure 2

Design

Data collection in Phase One adopted a cohort sequential design. This design was chosen because it allowed the same groups of children to be tested with the same tests on a number of test occasions, at an interval pre-determined by the research design. As the testing involves children of different ages, the design also provided data for cross-sectional analysis.



Note: Ac, Bc and Dc are the 'control' groups, i.e. children who will not be tested on all occasions. They are only tested twice, on the first and the last test occasion of their own cohorts.

Figure 3 Cohort Sequential Design of Phase One Study

Figure 3 shows the detail of the design as well as the time frame for the period July 1983 to June 1986. Included in the time frame are:

1 Time needed in planning and conceptualising the study, the development of tasks and measuring instruments, and in planning and carrying out the pilot study; all of which took place between July 1983 and April 1984.

2 Actual time spent on data collection, which took place on four test occasions, each occasion being six months apart from the other. The testing was done between August 1984 and May 1986.

According to this arrangement, three cohorts of children were involved on each test occasion. Between the period August-November 1984, for example, three cohorts of children were tested. The youngest of these children, Cohort A, were subsequently tested on three other test occasions, while the oldest group, Cohort E, was tested only once as they were no longer in the kindergartens when the second testing was conducted at the beginning of the following year. Both Cohort B and Cohort D were tested three times each, and Cohort C, only once as the data collection ended in May. For each cohort, there is a control group of children who were tested only twice, i.e. on the first and last test occasion of their respective cohorts.

Sample (Table 2)

In Singapore, pre-schools are operated by a number of organisations. Among them are kindergartens and nursery classes operated by the PAP (People's Action Party), PA (People's Association) and NTUC (National Trades Union Congress). There are also full-scale kindergartens operated by private organisations (eg. Young Men's Christian Association and Young Women's Christian Association) and church affiliated kindergartens, and pre-primary classes attached to some of our primary schools. For convenience, these two categories of kindergarten classes are classified as belonging to PTE (Private Organisations) and MOE (Ministry of Education).

Sampling was done in two stages. First, a 10% random sample of pre-school centres was drawn from each of the five categories of kindergartens, namely PAP, PA, NTUC, PTE and MOE, based on Ac, Bc and Dc which are the 'control' groups, ie. children who will not be tested on all occasions. They are only tested twice, on the first and the last test occasion of their own cohorts. A sample of 40 centers was thus drawn from the 1983 population of pre-school centres.

The second stage of sampling involved the random selection of children from each of these 40 centers. Children were selected on the basis of age and sex at six-month intervals between ages three and six and a half, with the number of males and females for each cohort being approximately equal. The

number of children selected from each center numbered 8-24, depending on the size of enrolment.

Altogether, 2877 children were tested over the four test occasions. If we include the 214 children who participated in a pilot study prior to the major data collection, the total number would be 3091. Of the 2877 children tested, only 2418 had completed the whole series of tasks. The extremely high rate of attrition occurred on all the four test occasions (20%).

Category	Age of Children							
	3;0–3;5	3;6–3;11	4;0–4;5	4;6–4;11	5;0–5;5	5;6–5;11	6;0–6;5	Total
Girls	92	190	210	225	190	219	81	1207
Boys	93	201	193	214	192	235	83	1211
Total by Gender and Age	185	391	403	439	382	454	164	2418
NP	97	221	268	332	289	348	129	1684
PTE	88	170	135	107	93	106	35	734
Total by Centre, Type and Age	185	391	403	439	382	454	164	2418

Note: NP = Non-private
PTE = Private
Centres were classified as belonging to the NP or PTE type based on their organization and sources of funding.

Table 2 Sample in Phase One Study

Instrument (Table 3)

Language Task

(1) Visual discrimination

(2) Auditory discrimination

Part 1: Discrimination of sounds of words that are the same or different

Part 2: Reproduction of words and sentences

(3) Concept of print

Part 1: Book orientation

Part 2: Listening comprehension

Part 3: Knowledge of letters of the alphabet

Part 4: Word matching

(4) Word knowledge

(5) Verbal fluency

Cognitive Task

(1) Conservation of length

(2) Conservation of liquid substance

(3) Causal thinking

(4) Concept of space: Geometric shape

(5) Concept of time: Age notions
Time sequence

(6) Relationship: Class inclusion

(7) Seriation

(8) Spatial reasoning: Object Distance

Mathematics Task

(1) Number concept

(2) Counting: Verbal counting
Rational counting

(3) Recognition of numerals

(4) Matching objects to numerals

(5) Number relation

(6) Conservation of number

(7) Conceptual grouping

(8) Basic operation
- Addition : Pictures Symbols
Subtraction: Pictures Symbols

Social Task

(1) Real life sharing

(2) Hypothetical dilemmas

(3) Social interaction: Cooperation
Communication

Table 3 Tasks used in the Phase One Study

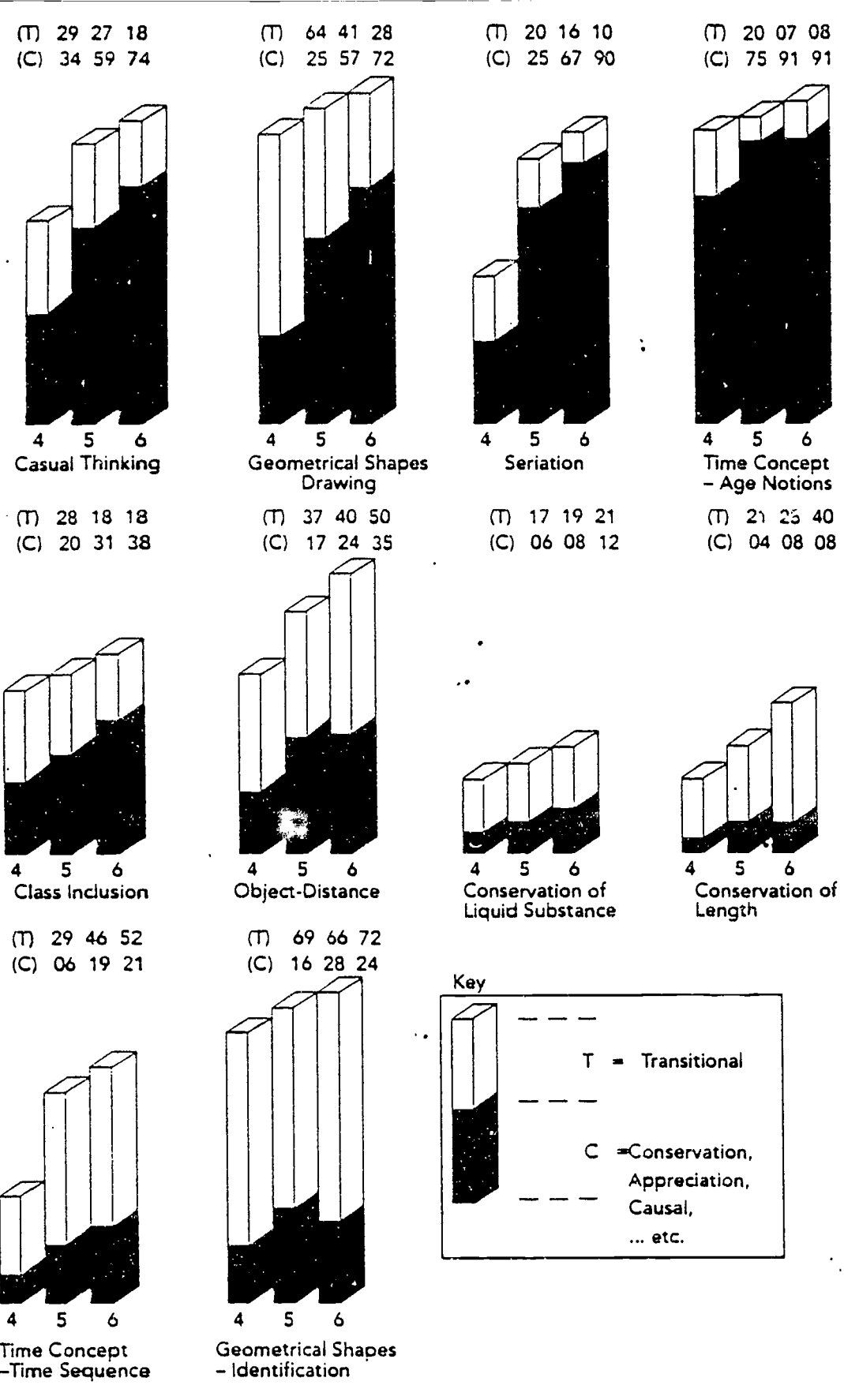
Twenty six tasks, each measuring one aspect of the abilities and behaviors identified, were developed by the Research team. Some of the tasks were adapted from established tests but some were original. In many cases, familiar objects, such as HDB flats, and scenes such as the Chinese New Year celebration, supermarket, and public playground were used as a stimuli. A total of three hours was required to complete the whole series of tasks. Each child was expected to participate in 8-10 test sessions.

To ensure that all children understand what they were required to do, all tasks, with the exception of language tasks, were written in four languages. Children were free to respond in the language they preferred. Testing was conducted at the child's pre-school centers, usually in a quiet corner, or in a room specially set aside for this purpose. Except for the sharing and cooperative tasks which required the presence of a small group of children, all other tasks were administered on a one-to-one basis.

The tasks were pilot tested on a sample of 214 children of ages three and a half to six and half drawn from 18 pre-school centers. To minimize possible instrumentation effect, the field testers were divided into five teams in the main study, each following a different sequence of testing.

Findings from Phase One (A Summary)

In the main, the findings support the claim in most cross-cultural studies of the universality of certain characteristics in children. Singapore pre-schoolers are not much different from children elsewhere with respect to their thoughts and behavior. A few pertinent observations have been made from the results of this research study concerning the cognitive and social development of pre-school children in Singapore. Their performance and response patterns in the following groups of tasks are summarised here. (Taken from Ko and Ho, 1992, pages 34 to 50).



* The number of children in each age group who succeeded, who could give the correct answer but could not explain or who could not respond, are given in percentages.

Figure 4 Percentage Success on Cognitive Tasks

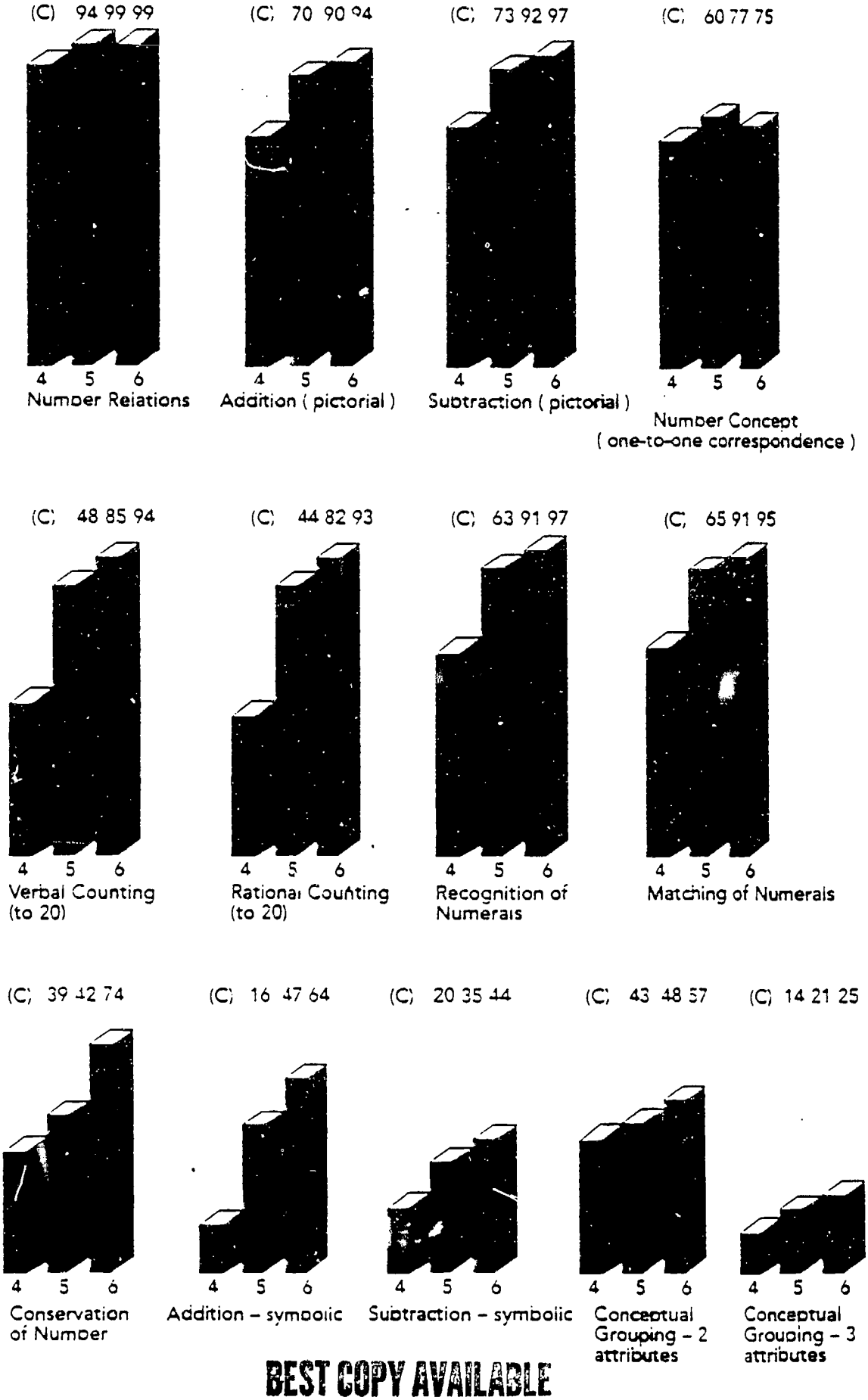


Figure 5 Percentage Success on Mathematical Tasks

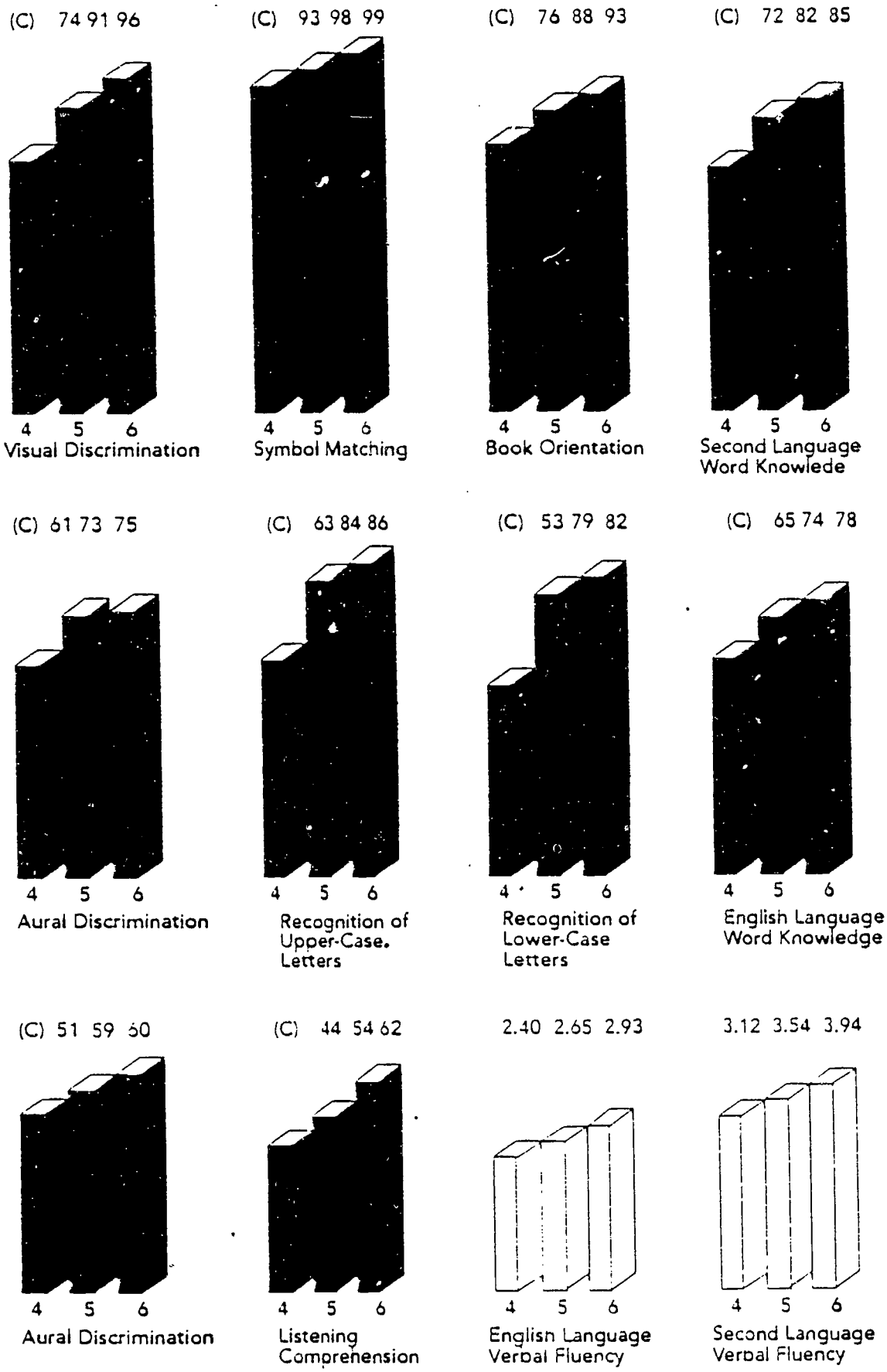


Figure 6 Percentage Success on Language Tasks

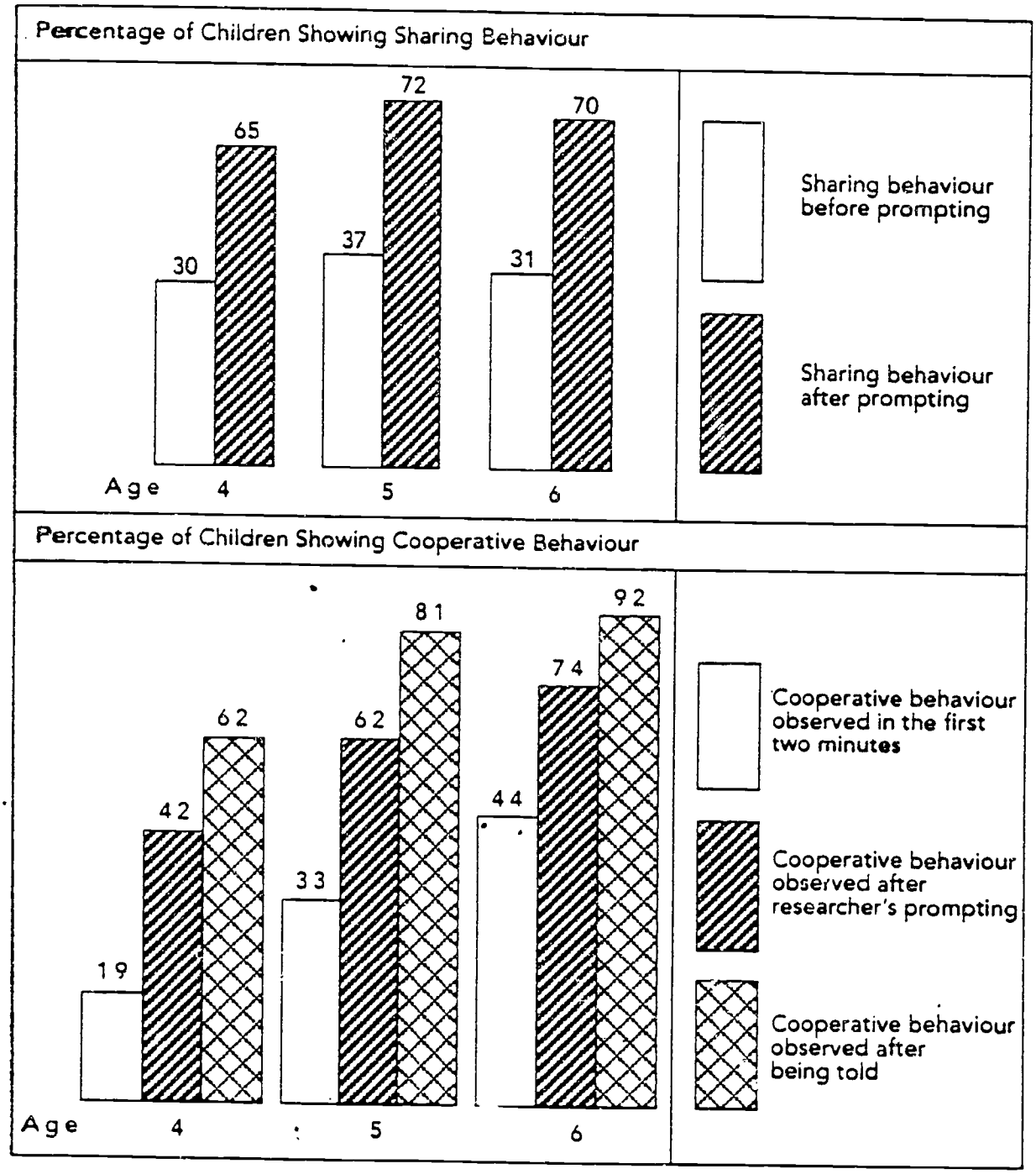


Figure 7 Percentage Success on Social Tasks

Cognitive and Mathematics Tasks (Figures 4 & 5)

1 Children's performance on conservation supports Piaget's statement that young children between the ages of four and six years generally do not conserve. A very small number of our four year olds succeeded, about 4% managed the conservation of length while 6& succeeded in the conservation of liquid substance. At six years old, only 6% and 4% more children were successful respectively. In the conservation of numbers, i.e. the cognitive task of one-to-one correspondence our children had done very well.

2 35% of the six years olds succeeded in giving the right responses in the object-distance task indicating their understanding of perspectives. Most of them have a practical understanding of what others see but they have difficulty representing those views.

3 In the classification tasks there is a difference in the children's performance on the cognitive task of class inclusion and the mathematical task of conceptual grouping. Only 20% of the four year olds could do the class inclusion tasks compared to the 43% of the four year olds who could conceptually group according to two attributes and 14% of them also managed the classification by three attributes. Of the six year olds, 38% succeeded in the class inclusion task, 57% classified in terms of two attributes and 25% classified in terms of three attributes. Evidently a fair number of the children succeeded in the two attribute classification. Although the thought process involved is one of discrimination and classification, the two tasks of class inclusion and three attribute classification are different.

4 By the time the children start elementary school, (6 years old) they are generally ready to handle all kinds of mathematical tasks expected of them. A moderate percentage of children were able to carry out symbolic addition and subtraction using picture which are skills likely to be helpful in basic symbolic computation subsequently.

Language Tasks (Figure 6)

1 The language tasks reveal two interesting developments that are perhaps peculiar only to the Singapore society. At the pre-school age, our children are made aware of the importance of the English Language and they seem to express an emerging bilingual behavior.

2 From the ages of four and six, i.e. the two years spent on the pre-school centers, a majority of children (61% - 81%) seem ready to learn English as their test performance shows that they have learned the preliminary linguistic tools. For example about 82% of the six year olds know the letters of the alphabet. 78% of them succeeded in word knowledge,

suggesting that they have a growing vocabulary. 90% could discriminate visually, 99% can match symbols correctly and 93% can hold the book in the right position for reading. The other skills like auditory discrimination and listening comprehension were performed successfully by about 60% of the six year olds.

3 The Singapore children are non-native speakers of English. Some of them use English as the preferred home language but it is described as a variety of Singapore English. The majority of the children come from second language speaking homes. So the children who succeeded on the verbal fluency task in English maybe the children whose preferred home language is English.

4 Our children indicate that they know two languages. About 65% of our four year olds know the English words given and about 78% of the six year olds answered correctly. In comparison, more children seem to know the words given in the second language which is as expected as the majority of them probably grow up in the second language and are encouraged to name things by their parents. Some of the fluent speakers of English are found to be fluent in the second language too and there is evidence to suggest that this is due to the home environment.

Social Task (Figure 7)

1 The sharing and cooperative disposition of our children is shown in Figure 7. Improvement in such behavior is noticeable, which gives cause for encouragement. It suggests that teachers in the pre-school centers could have progressively engaged the children in team work to full advantage. 70% of the six year olds and 72% of the five year olds showed a sharing behavior. About 92% of them behaved in a cooperative manner after being told to do so compared to the 44% who behaved cooperatively at the beginning.

2 Many of the children come either from a one-child or two-child family set up. Hence at the point of entry into pre-school, they may experience for the first time the experience of sharing and cooperating with others. The children's performance on the social tasks shows that young children learn through imitation and direct instruction. The pre-school centers have much to teach and socialize the children.

Influence of School and Home

Item	Response Category	NP (%)	PTE (%)
No. of people at home	3	9.0	10.2
	4	32.7	22.7
	5	26.6	32.0
	6	15.4	16.0
	7	6.8	8.5
Education: Father	Tertiary	3.3	21.8
	Secondary	51.7	71.4
	Primary	31.2	5.0
Education: Mother	Tertiary	10.5	48.4
	Secondary	55.2	48.4
	Primary	26.1	2.8
Type of housing	HDB	86.7	51.3
	Private	8.1	44.0
	Others	5.2	4.7
Home language	English	15.8	52.8
	Malay	10.1	0.6
	Chinese/ Mandarin	56.4	30.1
	Tamil	1.2	0.6
	Dialect	10.0	5.4
Watching TV?	Yes	98.2	97.1
Favourite TV programme	Cartoon	64.4	67.1
	Serial/ Entertainment	28.0	21.5
	Documentary/ Education	4.9	8.1
Read books?	Yes	79.1	85.7
What books?	Comics	17.8	7.6
	Story	40.6	55.7
	Educational	14.0	8.7
	Others	10.0	10.8
Private tuition?	Yes	0.7	0.6

Note: The above items are selected from children's biodata and pupil questionnaire. The percentages do not add up to 100% because the above are selected items.

Table 4 Influence of School and Home

1 The research sample of children come from pre-schools run by different organisations. In Singapore in 1984, although pre-schools are not included in the educational system, the Ministry of Education is monitoring the work and quality of all kindergartens. There are a number of organisations operating kindergartens. Among them, the PAP (People's Action Party) Community Foundation is the largest. More than 70% of Singapore's kindergarten population are attending classes in PAP educational centers. Other larger organisations are PA (Peoples Association) and the NTUC (National Trades Union Congress) the latter is well known for its day care centers but it also runs kindergarten classes. Individual organisations such as the YMCA and YWCA, have their own kindergartens. A very large number of children, however, are attending kindergarten classes operated by private organisations. These pre-schools and their kindergarten classes are different in many ways, e.g. location, physical environment, number of sessions and time for each session.

2 In order to examine the possible influence of pre-schools on children's development, the research study classified the participating centers into two groups: a non-private (NP) group consisting of PAP, PA, NTUC and MOE kindergartens and a private (PTE) group consisting of all kindergartens run by private organisations.

3 A consistent pattern is observed. The PTE group is found to perform better than the NP group on all English Language tasks, whether the comparison is made among four, five or six year olds. The NP group, on the other hand, obtained higher scores for second language, but not for English. Again the pattern is the same, regardless of children's age. These patterns, compared to what we observe earlier, i.e. children who performed well on English tasks tend to perform less well on second language tasks, whereas the opposite is true for those with good performance on second language, suggests that the differences in language performance could have been due to the type of preschool centers a child attends. English is the main language in private kindergartens but not in most non-private kindergartens especially those with a strong tradition in using Mandarin.

4 Children from PTE centers perform better on all mathematics tasks except one-to-one correspondence, number relations and the conservation of number. This applies across all age groups.

5 There is no clear indication as to who did better in the cognitive tasks between the children in the PTE and NP centers. The curriculum in both centers are not cognitively based. A developmental trend is observed but there is no significant difference between the types of centers.

6 There is no consistent pattern in terms of social behavior in the different centers but the children do come from very different home backgrounds which influence the differences in performance from the two types of centers. (Table 4)

7 Significant differences between the two center types come from differences in the educational level of parents, housing and home language. The PTE kindergarten children, in addition, to being exposed more to English and an English learning environment, also have other advantages, inclusive of having highly educated parents and better home conditions. Other than the lack of opportunity to converse in English, the NP kindergarten children also have a number of disadvantages, which include having less well educated parents and living in a crowded and noisy home environment. The analysis indicated that a facilitative language learning environment at home is as important as the language curriculum in the kindergarten. The type of language spoken, the type of books read, and the type of television programs watched, all contribute to a child's learning of languages.

Even though the research study is quite massive by any standard, what the research team has been able to uncover about Singapore's pre-schoolers is but a 'tip of the iceberg.' Ideally we should also be interested in other types of analysis such as gender, racial or socio-economic issues or in the long term educational benefits of pre-school education. These were omitted due to a number of financial and administrative constraints. However, a modest but important start has been made to provide some insights into the social and cognitive development of Singapore's pre-schoolers.

Gender Issues - A Pilot Study

The Bernard van Leer research project was not conducted as a cross cultural or a multi-ethnic study. It is essentially a longitudinal study of preschool children and over three quarters of the sample are children from Chinese homes. Although the sample is made of equal numbers of boys and girls, there is little attention paid to gender differences in the overall study.

Gender differences in school achievement have been a well investigated but unresolved issue in research on child development. This is especially so in research on social and cognitive abilities (e.g. in mathematics and reading). 'Underlying possible gender differences in achievement maybe cultural differences in beliefs about the abilities of boys and girls.' (Lummis & Stevenson, 1990). Parents in Singapore especially among the Chinese do place greater emphasis on the education of their sons than of their daughters. It is expected that gender differences in social and cognitive abilities may vary among the different cultural groups. Unfortunately, the van Leer research study does not include information on gender and racial differences in the cognitive and social aspects of the preschool child.

During the initial stage of the study, data from a small sample of three to six year olds was analysed and small and inconsistent differences between boys and girls were found in their performance across all tasks.

In the present pilot study, the gender difference is brought back into focus. The major question pursued is whether boys differ from girls in their cognitive and social abilities as early as three years old and whether such differences are found throughout the preschool period.

The sample is made up of 171 Chinese preschoolers ages 3 to 7 attending a private kindergarten in Singapore. (Table 5). A total of 17 cognitive and social tasks were administered individually to the preschoolers. The tasks were the same as taken from the Phase One research study.

Findings and Discussion

1 Mathematics Tasks (Table 6)

PERCENTAGE SUCCESS ON MATHEMATICS TASKS FOR BOYS AND GIRLS BY AGE GROUPS

MATHEMATICS	3 to 4 yrs		4 to 5 yrs		5 to 6 yrs		6 to 7 yrs	
	BOYS	GIRLS	BOYS	GIRLS	BOYS	GIRLS	BOYS	GIRLS
1. Number Concept	85.6	76.5	94.8	85	83.4	76.2	84.6	82.7
2. counting (Verbal & Rational)	85.8	88.3	94.7	85	83.3	80.9	90	86.2
3. Addition/Subtraction (Symbolic & Pictorial)	71.3	70.6	67.4	75	66.7	61.9	61.5	79.3
(Total = 171) N	21	17	19	20	18	21	26	29

Table 6

Six selected tasks were given to the children and it is seen that on the whole, more boys and girls have a higher percentage of correct responses in number concept and counting (which combines both verbal and rational counting), e.g. 85.6% of three to four year old boys are able to understand number concept compared to 76.5% of three to four year old girls. The four to five year olds, both boys and girls, have higher percentages of successful responses than the other age groups.

2 Language Tasks (Table 7)

PERCENTAGE SUCCESS ON LANGUAGE TASKS FOR BOYS AND GIRLS BY AGE GROUPS

Language	3 to 4 yrs		4 to 5 yrs		5 to 6 yrs		6 to 7 yrs	
	BOYS	GIRLS	BOYS	GIRLS	BOYS	GIRLS	BOYS	GIRLS
1. Visual Discrimination	88	76.5	89.5	80	83.3	90.5	96.2	89.6
2. Auditory Discrimination	76.2	76.4	84.3	70	83.3	90.4	90	96.6
3. Word Knowledge (English)	57	70.6	57.9	75	77.8	95.2	50	65.5
4. Recognition of Letters	80.9	88.3	94.7	85	88.9	90	90	96
5. Listening Comprehension	66.7	76.5	78.9	75	83.3	95.3	88.5	96.6
6. Second Language Fluency	61.8	64.7	68.4	65	70.0	71.4	73.1	79.3
(Total = 171) N	21	17	19	20	18	21	26	29

Table 7

As indicated in the Phase One study, many preschoolers seem to possess rather high pre-literacy skills. The language tasks also show that over 50% of them were successful in their second language fluency. The differences between the boys and girls are small in all age groups. However, there is a higher successful response rate for girls in the three age groups (three to four, five to six and six to seven) in listening comprehension. All girls in all age groups are more successful than boys in word knowledge (English).

3 Cognitive Tasks (Table 8)

PERCENTAGE SUCCESS ON COGNITIVE TASKS FOR BOYS AND GIRLS BY AGE GROUPS

COGNITIVE	3 to 4 yrs		4 to 5 yrs		5 to 6 yrs		6 to 7 yrs	
	BOYS	GIRLS	BOYS	GIRLS	BOYS	GIRLS	BOYS	GIRLS
1. Concept of Time	23.8	23.5	30.5	28.1	33.3	38.1	46.2	48.3
2. Drawing and Identification of Geometric Shapes	33.3	17.6	68.4	55	50	66.7	92.3	79.3
3. Seriation	28.6	17.6	36.8	40	55.6	85.7	92.3	92
4. Conceptual Grouping (3 Attributes)	33.3	35.3	36.8	40	55.6	85.7	92.3	96.6
5. Object Distance	28.6	23.5	26.3	45	50	66.7	84.6	65.5
6. Causal Thinking	23.8	35.3	21.1	40	55.6	90.5	77	93.1
(Total = 171) N	21	17	19	20	18	21	26	29

Table 8

This group of tasks has the lowest overall percentage of successful responses compared with the other groups of tasks. Out of the six cognitive tasks given, the five to six year old girls have very high percentage of success than the boys in four tasks (e.g. shapes, seriation, conceptual grouping and causal thinking). The concept of time appear to be the most difficult task for both boys and girls in all age groups.

4 Social Tasks (Table 9)

PERCENTAGE SUCCESS ON SOCIAL TASKS FOR BOYS AND GIRLS BY AGE GROUPS

SOCIAL	3 to 4 yrs		4 to 5 yrs		5 to 6 yrs		6 to 7 yrs	
	BOYS	GIRLS	BOYS	GIRLS	BOYS	GIRLS	BOYS	GIRLS
1. Sharing things with another	80.9	88.2	68.4	90	94.4	92	80.8	89.7
2. Cooperating in groups	71.3	88.2	57.9	75	94.4	92	65.4	72.4
(Total = 171) N	21	17	19	20	18	21	26	29

Table 9

One observation noted in the two social tasks given show that all girls are 'better' than boys in their sharing and cooperative behavior except the five to six year old group where the percentage difference is small. Girls in their preschool years are more 'sociable' than boys and tend to share and mix more with their peers.

A few findings have emerged from this pilot study. First, all boys and girls show developmental trends in their performance across all tasks. Like the Phase One study, there is a high percentage of success in the bi-lingual ability of these preschoolers. There is no gender differences in their second language verbal fluency. As expected, many Chinese preschoolers (both boys and girls) especially in a private kindergarten are bi-lingual in both Chinese (Mandarin) and English. This is related to a large extent to their home and social background.

It is discerned from the Pilot study that the five to six year olds stand out as more competent in their language and social performance. However, the girls did better than the boys in the language tasks (in all age groups). The boys on the other hand are more successful in the mathematics tasks.

According to Maccoby (1988) the significance of gender in childhood is noted especially clearly in children's social groupings. From the Pilot study, the boys tend to share and cooperate less than the girls especially the three to five year olds. One interesting follow up to this observation is to investigate if there is a tendency towards same-sex sharing or cooperation. The sex composition of social groupings maybe a salient fact to which young children respond to.

Both boys and girls found the cognitive tasks most difficult and this is supported by the same finding in the Phase One study. One possible explanation is the emphasis that preschools in Singapore have given to the teaching of school subjects rather than to thinking or to the development of cognition in the curriculum.

On the whole, the results of this small Pilot Study have supported in the main, a few major conclusion from the Phase One Study and it has also highlighted some gender differences in a few of the tasks. Whether they are also applicable to children from other racial groups can be evaluated only through additional research.

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