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IE-BvLF Project Seminar, 23 October, 1988

SINGAPORE PRE-SCHOOLERS: HOW MUCH DO WE KNOW ABOUT THEM?

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As Alice fell down the rabbit-hole, she went on saying to herself, in a dreamy sort of way, "Do cats eat bats? Do cats eat bats?" and sometimes, "Do bats eat cats?" for, you see, as she couldn't answer either question, it didn't matter which way she put it.

"I don't think they play at all fairly," Alice began, in a rather complaining tone, "and they all quarrel so dreadfully one can't hear oneself speak and they don't seem to have any rules in particular: at least, if there are, nobody attends to them and you've no idea how confusing it is all the things being alive!"

"There ought to be a book written about me, that there ought! And when I grow up I'll write one but I'm grown up now," she added in a sorrowful tone, "at least there's no room to grow up any more here."

"But then," thought Alice, "shall I never get any older than I am now?"

Carroll, Lewis.
Alice in Wonderland

Introduction

As parents, teachers or researchers, our knowledge of how pre-school children think, learn or behave is often inadequate, or even inaccurate. Parents are in a unique position to observe their children at close quarters, virtually from the time the umbilical cord is cut to the time when the apron string is untied. But, with an extremely small sample size and the problem of not being entirely objective, their observations can hardly be generalisable, certainly not to Singapore pre-schoolers as a whole. It is, for example, quite

apparent that their use of language undergoes several characteristic changes at different stages of development. Sometimes, they tend to be rather loose, as in the case of Alice who does not bother to differentiate between "Do cats eat bats?" and "Do bats eat cats?" But, at other times, they can be very well-meaning, even though their parents may not detect their intentions. For instance, at a very early age, my daughter was responding to questions which required a simple YES or NO response with a varying series such as "YES, YES, NO, NO, NO, YES, NO, YES, YES, NO." My wife and I were of course quite baffled and, unfortunately, required her each time to conform to answering only YES or NO. It was much later when she explained that she was playing a game with us and was rather disappointed that we could not decipher her simple code, in which only the first word was relevant.

Teachers have the advantage of dealing with more children. But, they seldom have each group of children for more than a year and, having often to handle 40 or more children at a time, they are seldom able to monitor each child closely and systematically. When I first began teaching in 1951, one of the first classes I was assigned to teach was a Primary One class. But, having taught an equivalent of a Secondary Four class immediately prior to that, I was virtually at a complete loss in trying to cope with what seemed to me at that time to be an unruly bunch of defiant children who tended to ignore all the rules and regulations which I had so carefully formulated and explained to them. The experience then was as exasperating as that of Alice who observed the chaotic way in which the players played the croquet game, with the Queen shouting, "Off with his head!" every now and then. Needless to say, I managed to resolve the problems; otherwise, I probably would not have remained with the teaching profession.

Researchers are usually able to study, using fairly objective methods and measures, an even larger sample of children. However, their contact with each child is often limited to the short period of time available for testing or observing the child. It is therefore difficult to ascertain if the child's response is representative of his/her normal behaviour. When Alice began to grow inside the White Rabbit's house, her confusion of age with height is understandable, but she nevertheless senses that her logic is faulty. In the mid-sixties when I was conducting research on changing children's level of thinking for my doctoral studies, one feature was very evident. The more I probed into children's reasons for their

answers and tested for retention and transfer, the fewer were the children who satisfied these criteria for success. In my dissertation, I had in fact devoted a large section on what I termed the "Criteria of criteria," for the extent of success depended invariably on how rigorous the criteria we want to use.

It should be manifestly clear that in order to understand and assist our pre-schoolers maximally, parents, teachers and researchers should try to pool their resources together and collaborate as much as possible. This paper, or for that matter this seminar, is therefore an initial, albeit modest, attempt to share some of the findings of an extensive study of the cognitive and social development of pre-school children in Singapore with others who are equally concerned with helping our children grow more effectively and efficiently.

With generous funding from the Bernard van Leer Foundation, the Institute of Education embarked on a long-term study of children aged 3 to 6 years who were tested between 1984 and 1986 on a number of tasks related to their language (English, Chinese, Malay and Tamil), mathematics, and general cognitive abilities, as well as their social behaviour. 2418 children completed all the tasks which took approximately 3 1/2 hours for each child who was tested on a one-to-one basis. This constituted 84% of the 2877 children from MOE Pre-primary classes, PAP, PA and NTUC Pre-school Centres, as well as various private kindergartens, who were tested on 4 occasions (August-November 1984, March-May 1985, August-November 1985, and March-May 1986). If we included 214 children who were involved in a pilot study preceding the main study, the total number of children tested was 3091.

The number of children in each age group who completed all tasks on each test occasion is shown in Fig. 1. As can be seen, certain cohorts of children are tested sequentially on 3 or 4 test occasions, while for each test occasion 3 different age groups of children are tested. For convenience in subsequent discussions, the results are combined to show only 3 age groups (4, 5 and 6 years) for each task.

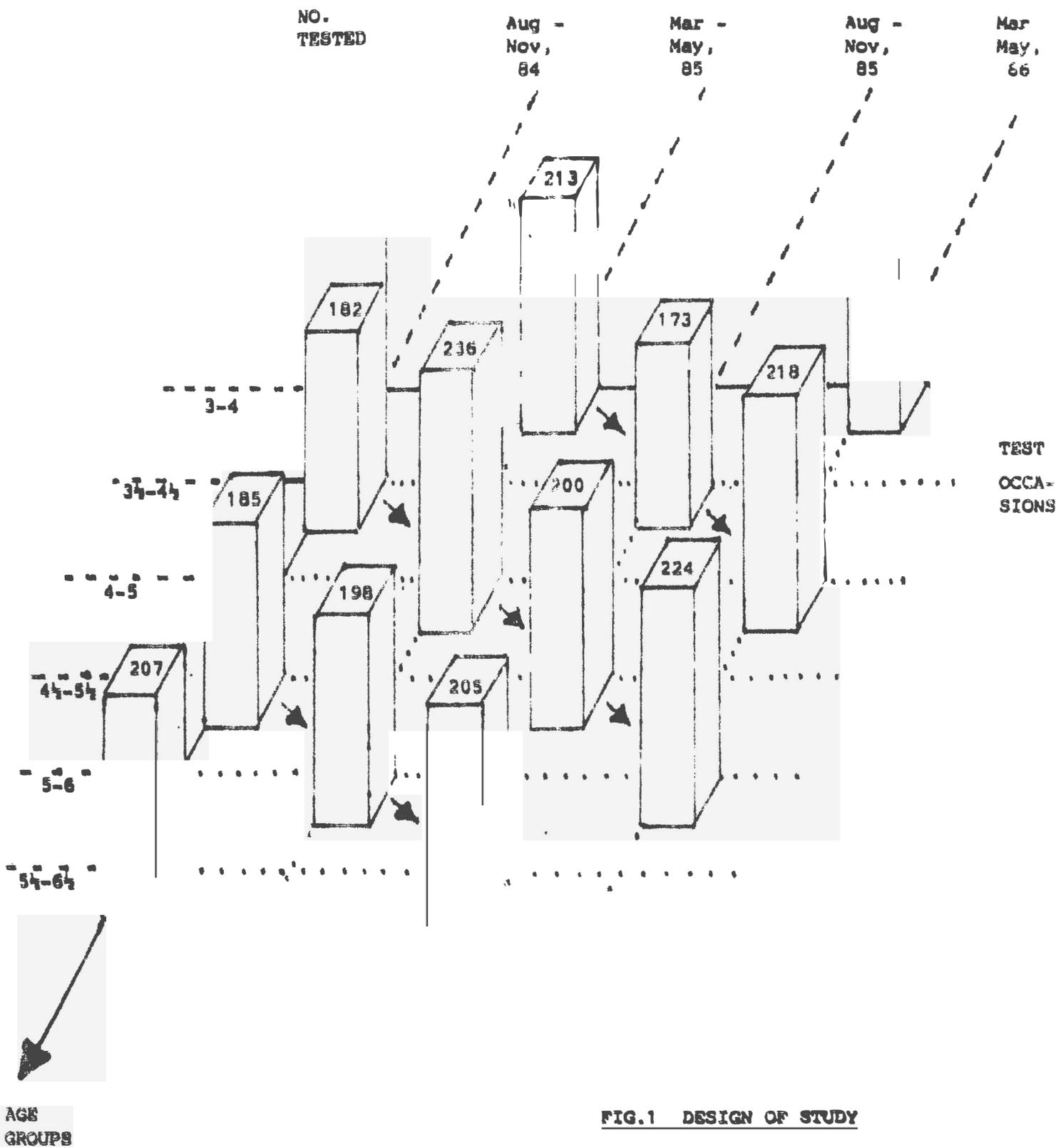


FIG.1 DESIGN OF STUDY

(Showing Number Tested on ALL TASKS by Age Groups and Test Occasions)

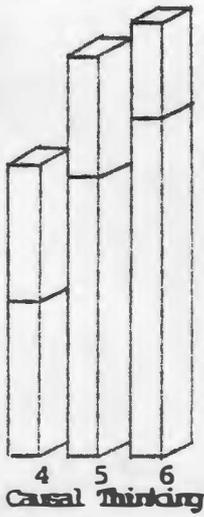
An Initial Illustration

In order to provide a preliminary glimpse of how some of the tests were conducted, a segment of a video-taped testing session will now be shown. What is shown is only a part of a task on Object Distance, or Spatial Perspective, which is part of a set of cognitive, or intellectual reasoning, tasks, which in turn is one of four sets of tasks.

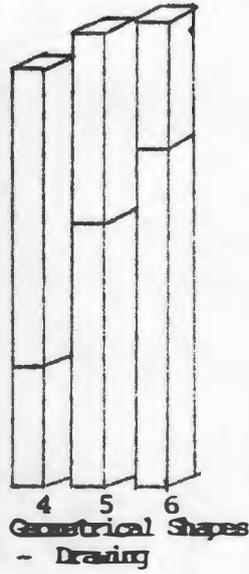
It is perhaps useful to mention a number of facts or observations which might not be so apparent. In the first place, the test is an adaptation of Piaget's well-known three-mountain test where a pre-school child, when asked to choose a picture that represents the view of a group of three mountains seen by someone or a doll opposite him/her, would typically select the representation that matches what he/she sees. (Piaget and Inhelder, 1956). Little An An in the video-taped session is 6 years old and one of 35% of 6-year olds in our sample who succeeded, even though with some prompting, in getting the correct spatial perspective. There is in fact a progression from 17% of 4-year olds to 34% of 5-year olds who were successful in the task. In comparison with the performance of children tested by Piaget and many others, the children in our study did quite well. According to Piaget (1959), a pre-school child is typically egocentric, in the sense that he/she is not only unable to take the perspective of another person but also inclined to attribute his/her own perspective to all others. Attempts to modify the task by bringing in situations that are more real to the child have tended to result in greater success (eg Donaldson, 1979). Since mountains are rarely encountered by Singapore children, we substituted with an HDB flat plus two other objects which have turned out to be very familiar to them. It is interesting to note that all the children tested were not only regular TV watchers but also familiar with cartoon characters like the smurfs.

While we compare the performance of children on this task with their performance on all other cognitive tasks, it is apparent that there are different patterns of response, as shown in Fig.2. Children have relatively no difficulty in identifying the younger/youngest or the older/oldest among photographs of people who are very different in age. But they have a great deal of difficulty with time sequence, although there was considerable progress by the time they reach 6 years old. In particular, as with children in many western

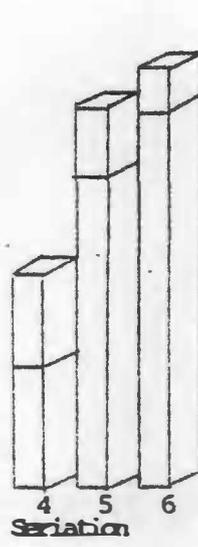
(T) .29 .27 .18
(C) .34 .59 .74



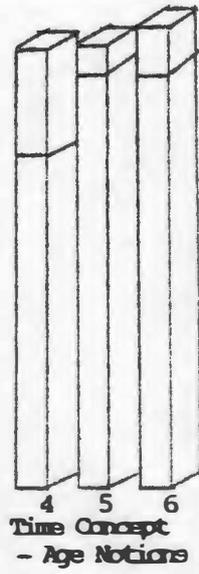
(T) .64 .41 .28
(C) .25 .57 .72



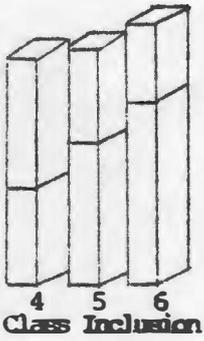
(T) .20 .16 .10
(C) .25 .67 .80



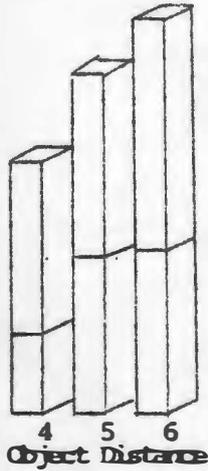
(T) .20 .07 .08
(C) .75 .91 .91



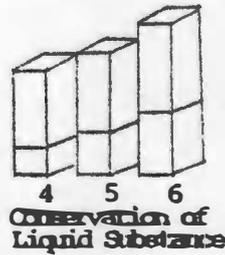
(T) .28 .18 .18
(C) .20 .31 .38



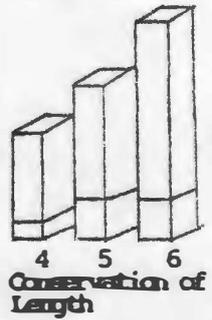
(T) .37 .49 .50
(C) .17 .34 .35



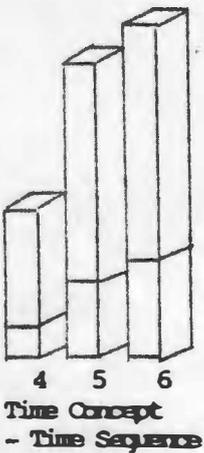
(T) .17 .19 .21
(C) .06 .08 .12



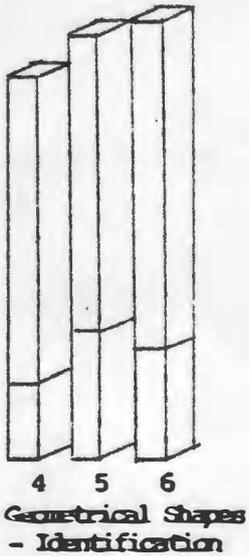
(T) .21 .25 .40
(C) .04 .08 .08



(T) .29 .46 .52
(C) .06 .19 .21



(T) .69 .66 .72
(C) .16 .28 .24



Note

T = Transitional
C = Conservation
Appreciation
Causal
... etc

Figure 2. Percentage Success on Cognitive Tasks

countries, they find the conservation tasks most difficult because of their tendency to centre or concentrate on one dimension at a time and failing to realise that other dimension(s) have also changed. Thus they tend to think that the amount of liquid has changed when it is poured from one container to another of different size.

The most dramatic change occurred in two tasks: one involves the drawing of geometrical shapes, while the other required the child to seriate or put in ascending or descending order a set of sticks of varying lengths. It is quite likely that the pre-school centre and/or the home have made the greatest impact in these tasks, which are probably related to performance in some areas of mathematics.

General Response Patterns

For convenience, the patterns of responses to these cognitive and other tasks may be classified into a number of categories by dividing the percentage success into 3 groups -

High being 67-100%, Medium being 34-66%, and Low being 1-33% and comparing the performance at age 4 with that at age 6, as shown in Table 1. Six main categories emerge and they have certain implications, such as following:-

- HH: These tasks are easy even for 4-year olds, suggesting that children have been well prepared even before they begin pre-school, which need not devote too much time on such tasks. However, only one task, namely "verbal counting from 1 to 10," is in this category.
- MH: For these tasks, a moderate number of children are competent to begin with but, by the time they are ready for primary school, a large proportion have mastered these tasks.
- LH: Very few children are able to perform these tasks when they start pre-school, but at the end of pre-school, a large majority are able to do so. Such a dramatic change is probably brought about mostly by the efforts of the pre-school centres, suggesting that helping children in these tasks is their forte.
- MM: A moderate percentage of children at age 4 are able to carry out these tasks but when they are 6 years old, not many more have succeeded. Although only one item is represented here, namely "English language word

TABLE I: TYPES OF RESPONSE PATTERNS

<u>Categories*</u>	<u>Cognitive Tasks</u>	<u>Language Tasks</u>	<u>Mathematics Tasks</u>	<u>Social Tasks</u>
HH	o Time concept - age notions	o Visual discrimination o Book orientation o Symbol matching o 2nd language word knowledge	o Number relations o Verbal Count. 1-10 o Addition & Subtraction (pictorial)	
MH	o Causality	o Auditory Discrim. I o English word know. o Recog. of U-C Letters o Recog. of L-C Letters	o Cons. of number o Matching of numerals o Recognition of numerals o Verbal counting 11-20 o Rational counting o Number Concept	o Sharing
LH	o Geom. Shapes - Drawing o Seriation			
MM		o Listening comprehension o 2nd language Verbal fluency o Auditory discrimination 2	o Conceptual grouping - 2 attributes	
LM	o Object Distance o Class Inclusion		o Addition - Symbolic o Subtraction - Symbolic	o Cooperation
LL	o Geom. Shapes - Identification o Time Concepts - time sequence o Conservation of liquid Substance o Conservation of Length	o Eng. Lang. Verb. Fluency	o Concept. Group. - 3 Attributes	

* Legend: H = 67-100%, M = 34-66%, L = 1-33%

knowledge," more can be done by pre-school centres to help children in performing this task.

LM: Although very few children at age 4 are able to handle these tasks, a moderate number have been able to do so by age 6, suggesting that the pre-school centres are in a good position to help children in these tasks.

LL: Children are particularly weak in these tasks and pre-school centres do not seem to be able to help them much. If any of these tasks are considered critical for primary school readiness, a major intervention is required.

While it would be beyond the scope of this paper to discuss in detail the children's performance in each of the tasks --in any case, more specific aspects will be taken up in the ensuing papers --, some general comments regarding each set of tasks might be in order. For this purpose, the broad categories of response patterns as shown in Table I should be kept constantly in mind.

For the language tasks, as shown in Fig.3, the pre-reading skills are reasonably well taken care of, as illustrated by performance on tasks, whose response patterns fall into the MH category. In the case of "English Language word knowledge," perhaps some extra effort needs to be taken to raise the percentage of children who are successful before they enter primary school. It is however patently clear that children are weak in oral communication. In terms of listening, some progress through the pre-school years seems to be made, as shown by the MM items, but the level of speech, especially in terms of "English Language verbal fluency" leaves much to be desired. Since English is going to be the medium of instruction in school, some drastic and perhaps innovative intervention is probably necessary.

By the time children commence primary school, they are generally ready to tackle the kinds of mathematical tasks expected to them. As shown in Fig. 4, the only task where they show considerable weakness is in grouping objects according to 3 attributes (colour, shape and size); but since there are hardly any activity in primary mathematics that require such a prerequisite ability, this is not a major weakness. In any case, grouping of objects according to only two attributes appears to be a relatively easy task for the sample of children. Likewise, although a moderate percent of

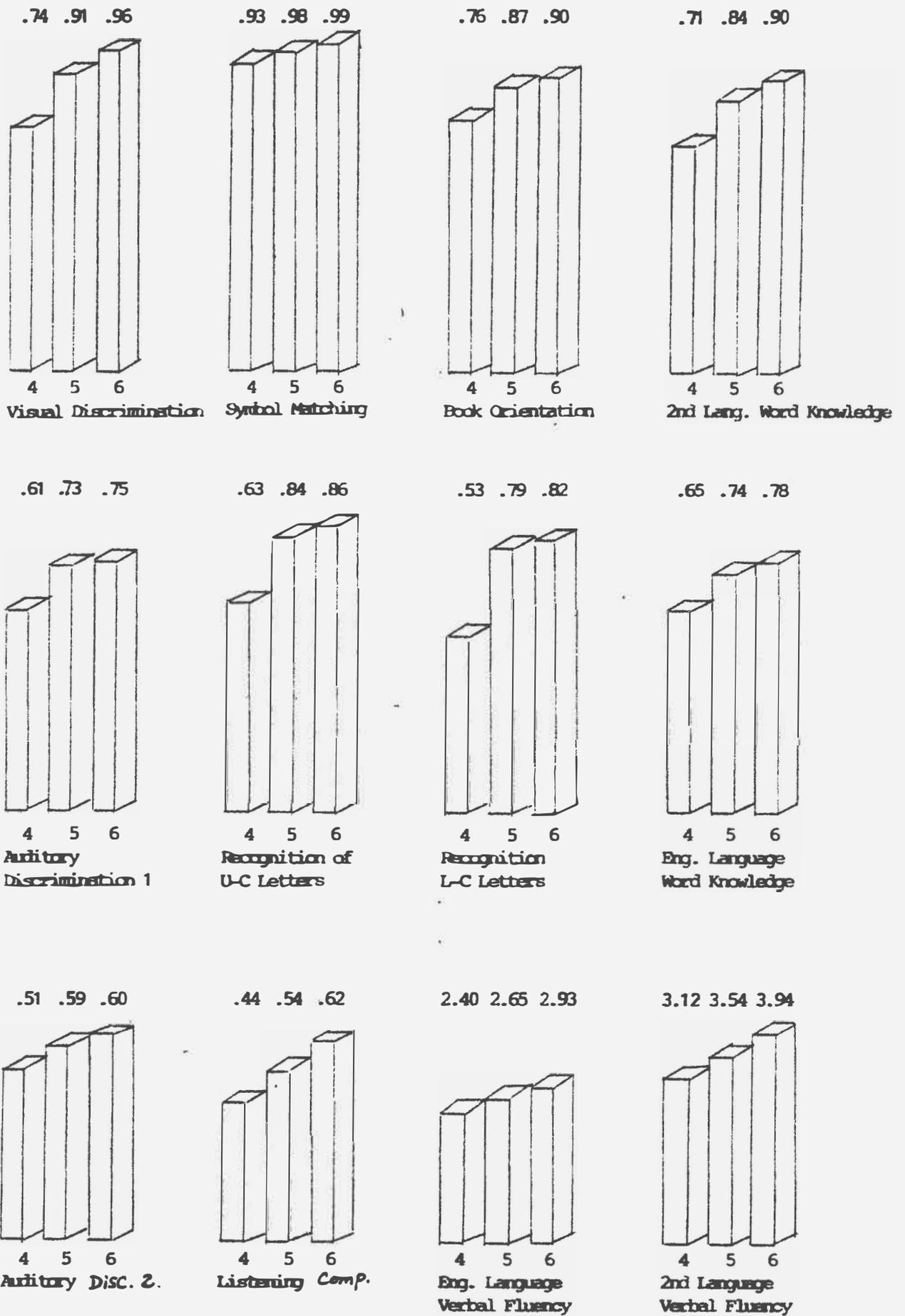


Figure 3. Percentage Success on Language Tasks

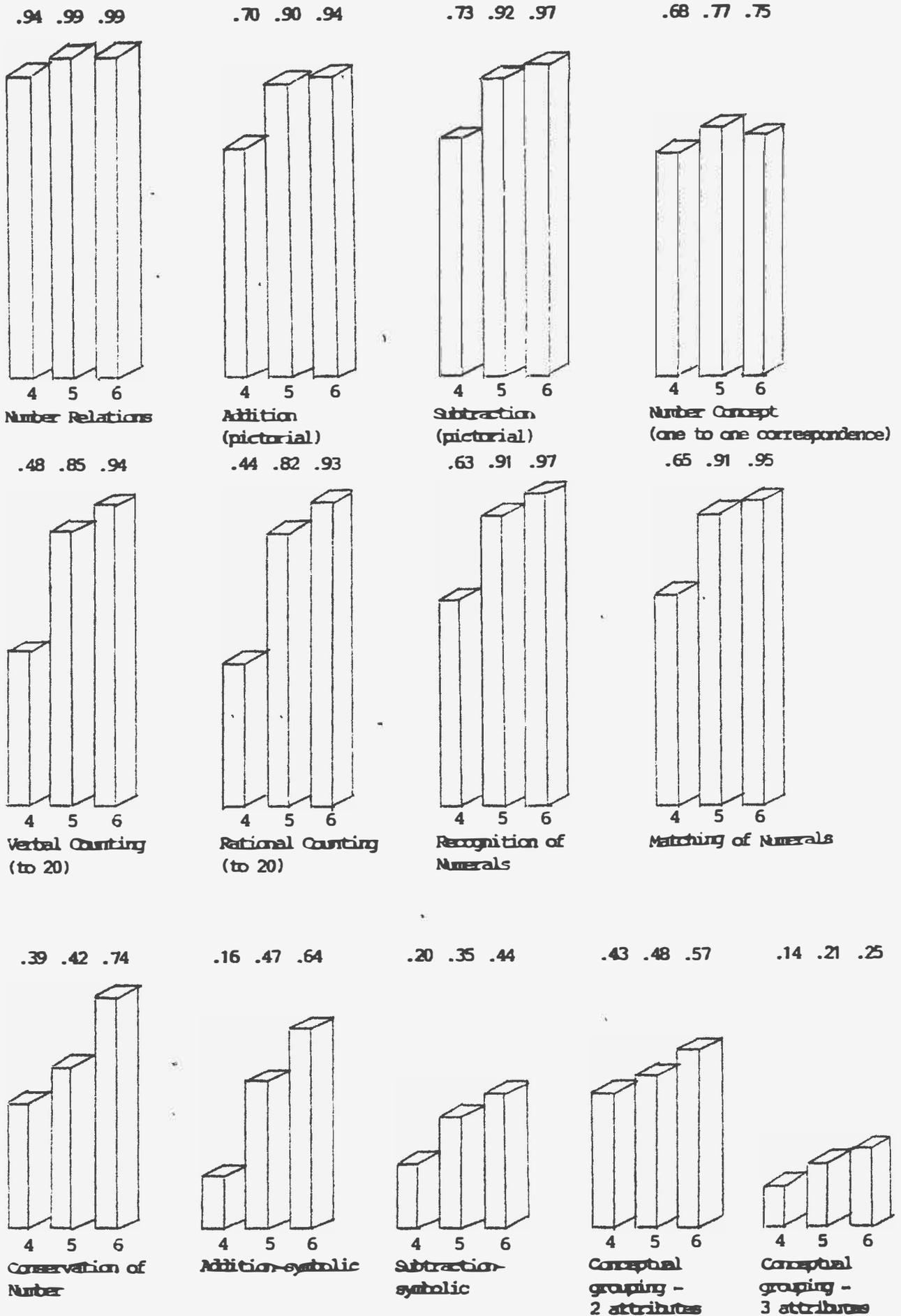


Figure 4. Percentage Success on Mathematics Tasks

children were able to carry out symbolic addition and subtraction by the end of pre-school, these are not prerequisite tasks but are actually taught in lower primary classes. They similarly have no difficulty with addition and subtraction using pictures, skills that are likely to be helpful in basic symbolic computation subsequently.

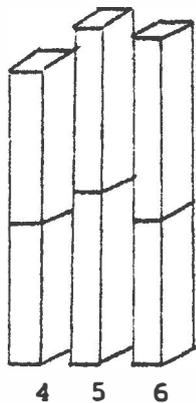
The final set of tasks attempts to gauge children's stage of development in relating to others. The relatively low level of cooperative behaviour, as shown in Fig. 5, need not be a cause of concern, for it is reflective of the egocentric nature of pre-school children, as found by researchers everywhere else. As a matter of fact, the progressive improvement and moderate success of the children in this task on cooperative behaviour gives cause for encouragement, for it suggests that teachers could engage them meaningfully in team work. Perhaps, with greater exposure to cooperative work, children would learn to care and share more spontaneously.

Some Caveats

As indicated earlier, a detailed discussion of results pertaining to each task will not be attempted in this paper. By the same token, other types of analysis, such as the comparative analysis of performance by type of pre-school centre, gender or socio-economic status will have to be omitted, even though some of these comparisons are quite interesting. For example, if we compare non-private pre-school centres, which include PAP, PA and NTUC centres as well as MOE Pre-primary classes, with private pre-school centres, a most interesting contrast is found in respect of some critical language tasks. As shown in Fig. 6, the private centres are far superior to non-private centres in "English Language word knowledge" and "English Language verbal fluency," whereas the situation is reversed for "Second Language word knowledge" and "Second Language verbal fluency."

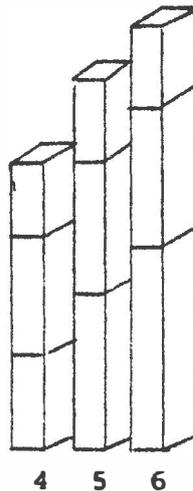
Specific implications for developing strategies for helping children could similarly be drawn from the findings for each task, but they would be outside the scope of this paper. It suffices to mention that the collection of baseline data between 1984 and 1986 constituted only the first phase of the long-term project. We are in the midst of the second phase, which involves centre-based interventions based on some of the findings from the first phase. The second phase, which is also being funded by the Bernard van Leer Foundation, is currently focussed on fostering effective oral communication in English

.65 .72 .70
 --- after prompting
 .30 .37 .31
 --- before prompting



Sharing

.62 .81 .92 --- cooperative behaviour observed after being told
 .42 .62 .74 --- cooperative behaviour observed after researcher's prompting
 .19 .33 .44 --- cooperative behaviour observed in the first two minutes



Cooperation

Note. Tasks involving qualitative analysis are not shown here.

Figure 5. Percentage success on Social Tasks

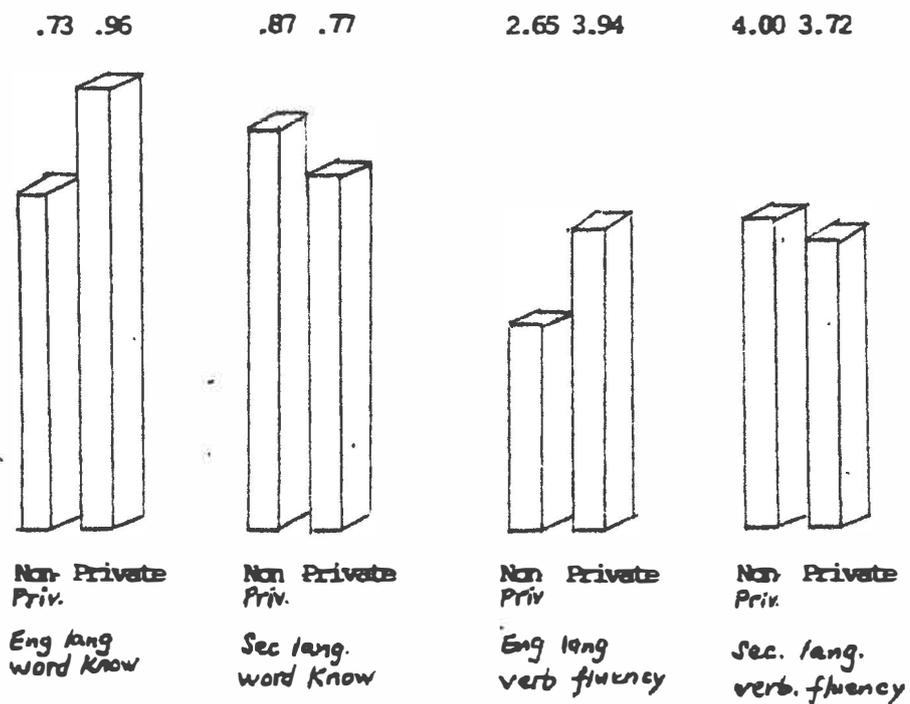


Figure 6. Percentage Successes on Language Tasks

(Non-private vs Private)

among children in non-private centres. Through team-work in situational language activities, cooperative behaviour is being further enhanced. However, since the children are relatively more successful in performing mathematics tasks and would need more drastic interventions to help them to perform many of the cognitive tasks which are not so critical in terms of primary school readiness, these tasks are not the central focus but, where appropriate, attempts to foster cognitive, mathematical or social reasoning are made in the interactive language lessons. It is hoped that some parents could be involved in this phase of centre-based interventions, for it is envisaged that a third phase, involving home-based interventions could be mounted when the present phase is completed at the end of next year.

In adopting a developmental perspective, it is important to avoid concentrating only on what children can do and hence avoid challenging them with tasks which emerge at a later stage, or else to focus on what they cannot do and hence characterise them as being deficient in certain abilities. Intervention strategies should therefore adopt a balanced stance, for as Gelman (1974) suggested, "The time has come for us to turn our attention to what young children can do as well as to what they cannot do." For example, the pre-school child is characterised as egocentric in failing to differentiate between points of view, but this inability is far from total. For instance, on tasks requiring the child to choose a picture showing another observer's view, even 3 1/2-year-olds can do well if only a single object such as a toy fire engine is used. (Loshbein et al., 1972). At the same time, egocentrism illustrates the pre-schooler's approach in making sense of the world, rather than a selfish predisposition, which adults are more prone to manifest.

Even though the IE-BVLF project is already quite massive by any standards, what we have been able to uncover about Singapore pre-schoolers is but a tip of the ice-berg. Ideally, we should also be interested in the long-term educational benefits of pre-school education by following up on the children perhaps at the end of primary and/or secondary school, as has been carried out in the U.S.A. (Lazar and Darlington, 1982) and the U.K. (Osborn and Milbank, 1987). Alternative approaches, such as the studies on how the growing child comes to understand the world, makes sense of experience and becomes a competent social individual in naturalistic, social situations (Bruner and Haste, 1987) could also be used to complement and supplement the information we have so far accumulated. Nevertheless, we do believe that we have made a

modest but important start in developing an empirical base which would be useful for teachers and parents in helping Singapore pre-schoolers.

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