
Title	A development project for the scoping of the Singapore early years longitudinal study
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EDUCATION RESEARCH FUNDING PROGRAMME

FINAL WRITTEN REPORT



**A Development Project for the Scoping of the Singapore
Early Years Longitudinal Study**

By

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EXECUTIVE SUMMARY

Purpose / Research Question

This was a pilot study designed to inform the possible design of a large scale longitudinal study of a nationally representative sample of preschoolers in Singapore –

- Objective 1: To identify the most compelling issues in developmental outcomes for children in relation to the impact of the family/home environment, as well as early care and education experiences. This objective shaped the direction for addressing objectives 2-4:
- Objective 2: To identify and validate instruments to measure children's developmental outcomes
- Objective 3: To identify scales and design/pilot a survey instrument to measure family/home factors
- Objective 4: To design and pilot survey instruments to measure characteristics of early care and education institutions

Background

Much of early childhood care and education policies and practices worldwide have been informed by a knowledge base derived from longitudinal studies of child outcomes in the United States, United Kingdom and other countries in the Northern hemisphere. There is an urgent need to acknowledge that research on young children in Singapore (as much as in other Asian contexts) needs to be supported by indigenous research to validate measures developed and normed elsewhere, and to verify and ascertain the factors that influence children's developmental pathways across culturally diverse contexts. This pilot study, thus, set out to trial a selection of child measures, as well as design and pilot a parent survey that aims to yield useful baseline data on how families in Singapore are raising their 4-to-5-year-olds in this particular climate of academic pursuit and educational competition.

Participants

140 K1 children (4-to-5-year-olds) were sampled from 12 purposefully selected preschools (i.e., 10-20 from each preschool, randomly selected from the schools' role of student names). The preschools included kindergartens and child care centres. The preschools are stratified by type of preschool provision (commercial, community or religious), ethnic group and socioeconomic status of the school population. As the child is the sampling unit, the other participants in this research included the children's parents, the children's teachers, and principals of the kindergarten/childcare centres. By the end of the fieldwork period, 112 parents were interviewed although all 140 had granted consent for their child to participate in the study and had agreed initially to be interviewed.

Research Methodology / Design

In order to meet the objectives set out in this pilot study, we conducted child assessments, designed and trialled a parent survey that was administered as a structured individual interview, and designed and trialled a teacher and a principal questionnaire. The sample (n=140) of 4-to-5-year-olds was recruited from purposefully selected preschools (i.e., kindergarten and child care) so that we would obtain a range in terms of family economics, ethnicity, use of domestic helper, grandparent care, and home language.

We selected a range of widely used child measures: a) Raven's Coloured Progressive Matrices (CPM), b) Bracken's School Readiness (BSRA), c) Torrance Test of Creativity, as well as an instrument that is still being developed in Singapore: d) Bilingual Language

Assessment Battery (BLAB, Rickard Liow & colleagues, in preparation). Child behaviour was measured through parent and teacher observations using the SDQ, administered as part of the surveys.

To measure home variables, we designed a parent survey modelled initially on that created for the Longitudinal Study of Australian Children (LSAC) to include:

Part A – focusing on demographic information: child’s family details, parental background, primary language spoken, family finance, housing type and parental health.

Part B – child’s health, parent observations of child’s behaviour (SDQ, Goodman, 1997), Parenting Styles and Dimensions Questionnaire (PSDQ, Robinson, Mandleco, Frost Olsen & Hart, 2001), education and activities, domestic help (optional), grandparent care (optional), divorced parent (optional), and sibling relationship (Stocker, 1989).

To measure preschool variables, we designed a teacher survey and a principal survey to generate information on school philosophy, programme structure, curricular practices, and other structural variables such as teacher-child ratio, teacher qualifications, timetables. The teachers were also asked to complete an SDQ for each participant child so that we could compare their perspectives against those of parents.

Findings / Results

This report presents psychometric properties of child measures as well as the PSDQ, most of which has good factorability. The PSDQ would need to be further examined, we recommend using the original 63-item PSDQ rather than a shortened version, or trialling a different parenting styles measure. Pearson correlation coefficients were computed to assess the relationship between child outcomes: CPM, BSRA, BLAB English, BLAB Mother Tongue and TTCT scores; we found positive correlations between the variables. We also began to analyse predictors of child outcomes based on demographic information generated from the survey. Child’s age and SES were found to be strong predictors of CPM, BSRA, and BLAB(EL) scores, while age predicted BLAB(mother tongue) and TTCT scores. Teachers’ SDQ scores were found to be associated with child age and gender. As for descriptive data, we found that about 60% of children with parents earning more than \$6000 were enrolled in a range of enrichment programmes (categories: language, visual and performing arts, sports). This seems to confirm common assumptions about higher-income parents’ perceptions of early learning to be broad-based (i.e., greater exposure at a younger age). Majority of parents seem to also provide their children with educational and entertainment activities (e.g., TV viewing) on a weekly basis rather than engage children in household activities and outdoor activities.

Conclusion

Given the limits of the length of this report, we have been selective in what we present in the main text. However, we have attached an Appendix of all the statistical tables generated in this pilot study. We believe that there is still much data to be mined from the data generated in order to inform a future design of a large scale longitudinal study which would still be beneficial for policymakers and practitioners in Singapore and the Asia-Pacific region.

Keywords

Early childhood longitudinal study; child measures; parent survey

A DEVELOPMENT PROJECT FOR THE SCOPING OF THE SINGAPORE EARLY YEARS LONGITUDINAL STUDY

National Institute of Education

INTRODUCTION

Several well-known early childhood longitudinal studies in the United States (since the 1960s) and the United Kingdom (1990s) have had and continue to impact on policies and practices in the Northern hemisphere. These have inevitably become the dominant discourse and knowledge base for early years education and care policies and practices around the world (e.g., High/Scope Perry Preschool, Carolina Abecedarian Study, Chicago Longitudinal Study, NICHD Study of Early Child Care, Early Head Start, ECLS-Birth/Kindergarten, EPPE study in England). Since the late 1990s and the turn of the new millennium, several national longitudinal studies of a multidisciplinary nature have been initiated (e.g., Growing up in Ireland, Danish Longitudinal Survey of Children, Growing up in New Zealand, Growing up in Australia, Growing up in France, Growing up in Scotland). Such large scale longitudinal studies have been rare in Asian nations. Notably, there was the IEA Pre-Primary Study conducted in the 1990s across 10 countries (including Hong Kong, Indonesia, Thailand) exploring the quality of life of preschool children in various care and education environments (such as preschools, child care centres, or family day care centres), and to assess how these environments affect their cognitive and language development. There was also the Hat Yai Childhood Obesity Study and The Nanjing Survey analysing the development among single and non-single children in Nanjing, China.

We recognise that large scale longitudinal studies are expensive to fund and challenging both to design and to sustain depending on the participants' voluntary spirit and the longevity of team members' participation. Hence, we had proposed to utilise this pilot study phase to inform future recommendations about whether a large scale (i.e., n=2000 or more) longitudinal study (utilising either a survey methodology or a combination of survey and child assessments) would be beneficial to policy makers, practitioners, and cross-

cultural researchers in multiple disciplines of psychology, education, economics, health, and sociology.

METHODOLOGY

Since none of the team members in this project had conducted a large scale longitudinal study before, it was equally important for us to trial selected instruments, as well as the entire recruitment and data collection process beginning with purposive sampling.

Sampling

Purposive sampling was employed since this was a pilot study. We also took into consideration the workload of individual teacher participants since they had to fill out a Strengths and Difficulties Questionnaire (Goodman, 1997) for each participating child in their classroom. We approached a selected group of kindergartens and child care centres to ensure that we had children and families from a range of social economic and ethnic backgrounds that would resemble that of the Singapore population. These preschool principals were asked to volunteer one or two teachers with classes catering to 4-to-5-year-olds. We recruited parents through these classrooms.

Eventually, we managed to have written parent consent from 140 children attending Kindergarten 1 in preschools and childcare centres in Singapore (see Table 1). The sample was evenly distributed in terms of gender. Reflecting the national population, majority were mainly Chinese, had one sibling, and lived with their parents. At the end of the field work period, the parents of 112 of these children agreed to be interviewed (see Table 2). These parents were mainly married, self-reported to speak English at home, and were representative of the income range in Singapore.

Table 1: *Demographic Characteristics of the Child Sample (n=140)*

Characteristic	%
Gender	
Male	48.2
Female	51.8
Ethnicity	
Chinese	51.8
Malay	17.9
Indian	25.0
Other	5.4
Siblings	
None	24.1
One	48.2
Two	17.9
Three or More	9.8
Living Arrangement	
With Parent	15.2
With Parent's Spouse	.9
With both Parent and Spouse	78.6
With Grandparents	4.5
With Nanny	.9

Table 2: *Characteristics of the Parent Sample* (n = 112)

Characteristic	%	Level of English Proficiency	%
Marital Status		Not Well at All	3.6
Married	92.0	Not Very Well	11.6
Divorced	4.5	Pretty Well	50.0
Remarried	3.6	Very Well	34.8
Relationship with Child		Family Income	
Biological Parent	99.1	\$1,999 and below	22.5
Grandparent	.9	\$2,000 – \$3,999	21.6
Primary Home Language		\$4,000 – \$5,999	19.8
English	41.1	\$6,000 – \$7,999	11.7
Mandarin	28.6	\$8,000 – \$9,999	5.4
Malay	13.4	\$10,000 and over	18.9
Tamil	9.8		
Other	5.4		
Language Background			
English	53.6		
Mandarin	37.5		
Malay	23.2		
Tamil	19.6		
Chinese Dialect	29.5		
Other Indian Languages	6.3		
Other	5.4		

Note. Secondary = GCE 'O' and 'N' levels; Post-Secondary = GCE 'A' levels, ITE diploma or Polytechnic diploma; Advanced Qualification = Postgraduate diploma, Masters degree or PhD degree.

Child and Family Measures

An aim of this study was to pilot a number of child assessments, a parent survey questionnaire as the family measure, and two school measures comprising a principal questionnaire as well as a teacher questionnaire. Due to the very small sample size for the

principal and teacher questionnaires (both less than 20), we report in this document only on the child and family measures and discuss the school measures in the Limitations section.

A few well-established child assessment instruments, Coloured Progressive Matrices (CPM), Torrance Test of Creativity (TTCT), Bilingual Language Assessment Battery (BLAB) and Bracken School Readiness Assessment (BSRA), were piloted in this study. The team implemented Split-half reliability tests to ascertain suitability of the instruments for Singaporean sample. The split-half reliability coefficient is appropriate when an instrument is intended to assess more than one factor. Stated differently, split half reliability is appropriate when an instrument is not unidimensional. Moreover, split-half reliability analysis is useful when impractical or undesirable to assess reliability with two tests or to have two test administrations (because of resource limitations).

Coloured Progressive Matrices (CPM). The CPM is a standardized non-verbal cognitive test which assesses children's ability to reason by analogy (Ravens, 2003). It is designed for young children aged 5 to 11 years and older adults. The test consists of 36 items which are graded for difficulty, and it takes between 15 and 20 minutes to administer.

Torrance Test of Creativity (TTCT). The TTCT is a standardized test which is used to assess children's creativity (Torrance, 1996). It is appropriate at levels, kindergarten through adult. The test, which is individually administered, uses three picture-based exercises to assess children's mental characteristics (e.g., fluency, elaboration, originality, abstractness, resistance to premature closure) and creative strengths (e.g., articulateness, expressiveness, fantasy). It takes about 30 minutes to administer.

Split-half reliability was unable to be estimated for the whole scale of Torrance Test of Creative Thinking as well as the originality and elaboration subtests, because of too few cases (i.e., too many 'zero' values). Nonetheless, the split-half reliability for the fluency

subtest was .888. The Cronbach's alpha values for part 1 (n = 20) and part 2 (n = 17) were .932 and .79, respectively. Low split-half reliability value was found in the title subtest (4.441E-17). However, the Cronbach's alpha value for part 1 (n = 6) and part 2 (n = 2) were high (.912 for part 1 and .667 for part 2). Adequate split-half reliability (.764) was found in the closure subtest. However, the Cronbach's alpha value for part 1 (n = 5) and part 2 (n = 5) were low: -.114 for part 1 and .407 for part 2.

Bilingual Language Assessment Battery (BLAB). The BLAB-II is a standardized picture-naming vocabulary task which assesses bilingual children's receptive vocabulary (Rickard Liow, Sze & et al, 2007). It is administered in both English and Mother Tongue (Chinese or Malay), and provides an index of each child's competence in each language and indicates the degree of balance between the two languages. In BLAB-2, children are presented with four pictures on a computer screen and asked to select the picture which best matches the word that he/she heard over headphones. The full test comprises 200 trials (100 per language) with forced picture choice (1 out of 4) in response to a spoken word. It is fully computerized and graded for difficulty. Each version (English and Mother Tongue) takes between 15 and 20 minutes to administer.

Split-half reliability was also conducted to examine how reliable the English and mother tongue subtest of BLAB are. Specifically, the split-half reliability (i.e., Spearman-Brown coefficient) for the English subtest was .618. The Cronbach's alpha values for part 1 (n = 50) and part 2 (n = 50) were .749 and .399, respectively. On the other hand, the split-half reliability for the mother tongue subtest was .93. Both part 1 and part 2, which has equal length, has been found to have high Cronbach's alpha value (i.e., .943 and .851).

Bracken School Readiness Assessment (BSRA). The BSRA-3 is a standardized test which assesses children's concept knowledge and receptive language skills for school readiness (Bracken, 2007). It is designed for young children aged 3 to 7 years. The

instrument is individually administered and consists of five subtests (colour, letters/sounds, numbers, sizes/comparisons, shapes). It takes about 15 minutes to administer.

The split-half reliability, Spearman-Brown coefficient, for the whole BSRA was .505. The Cronbach's alpha values for part 1 (n = 36) and part 2 (n = 41) were .627 and .758, respectively. The split-half reliability for the color subtest was .645 and the Cronbach's alpha values for part 1 (n = 4) and part 2 (n = 4) were .228 and .515, respectively. For the letter subtest, the split-half reliability was .397 (in unequal length condition) and was found to have Cronbach's alpha value .147 for part 1 (n = 6) and .493 for part 2 (n = 7). Split-half reliability for number subtest which also has unequal length was .606. The part 1 which has 7 items had Cronbach's alpha .293 whereas the second part with 9 items reported .727. The split-half reliability for the size/comparison subtest was .572. The Cronbach's alpha values for part 1 (n = 11) and part 2 (n = 11) were .63 and .437, respectively. The unequal-length-split-half reliability for the shape subtest was .649. The Cronbach's alpha values for part 1 (n = 9) and part 2 (n = 10) were .585 and .543, respectively.

Parent survey. We decided to design and pilot a parent survey, anticipating the task to be more complex since there have not been any locally published surveys that we could rely on for our purposes. We reviewed scales and questions within the Longitudinal Study of Australian Children (LSAC), NICHD parent surveys.

The quality of relationships between the child and his or her primary caregivers is viewed as central for all forms of development, especially socio-emotional skills (Bornstein and Sawyer, in McCartney and Phillips, 2006, pp. 381-398). And the quality of cognitive stimulation clearly plays a critical role for cognitive, language, and social development (Bradley et al., 2001; Fuligni, Han, and Brooks-Gunn, 2004). In the local context, there have been published studies on the expectations and aspirations of Singaporean families for their children's future, and on the types of preschools they look for to support their children's formal education (Sharpe, 1993; Hoon, 1994; Raban & Ure, 1999; Fan-Eng & Sharpe, 2000;

Retas & Kwan, 2000). Generally, families in Singapore place high priority on the education of their children, albeit focusing on the academics. There has also been a recent investigation of how the relationship between parent physical punishment (specifically, caning & slapping) and child aggression may be moderated by parent authoritative control & perceived parental rejection (Sim & Ong, 2005).

However, many questions still remain about how children are being raised in contemporary Singapore, an urban and generally affluent city and how the family environment influences children's developmental pathways and academic learning. There is a need to grow a body of literature that documents aspects of socio-cultural influences on child rearing in Singapore due to the city-state's increasingly widening income gaps, influx of foreigners, a competitive school education system, and rapid changes in the diversity of the Singapore population as well as other influences of globalisation.

Hence, this parent survey was designed largely to obtain descriptive information on parenting practices, education and activities which significant adults (i.e., parents, domestic helpers and/or grandparents) engage with their preschoolers. The two parts of the survey are:

Part A – focusing on demographic information: child's family details, parental background, primary language spoken, family finance, housing type and parental health.

Part B – child's health, parent observations of child's behaviour (SDQ, Goodman, 1997), Parenting Styles and Dimensions Questionnaire (PSDQ, Robinson, Mandlco, Frost Olsen & Hart, 2001), education and activities, domestic help (optional), grandparent care (optional), divorced parent (optional), and sibling relationship (Stocker, 1989).

Within the limits of this report, we discuss factorability of the Strengths and Difficulties Questionnaire (SDQ) and the Parenting Styles and Dimensions Questionnaire (PSDQ).

Strengths and Difficulties Questionnaire (SDQ). We understand that socio-emotional competencies and self regulation along with the absence of behaviour problems in the early

years is associated with participation in learning activities and predicts academic outcomes (National Research Council, 2008). Hence, we included the SDQ in both the parent survey and teacher survey since it has been widely used around the world and is time efficient to use. Each child in the sample (n=140) received two responses for SDQ (i.e., parent and teacher).

The factorability of the 25 Parent SDQ items was examined. Several well-recognised criteria for the factorability of a correlation were used. Firstly, 17 of the 25 items correlated at least .3 with at least one other item, suggesting reasonable factorability. Secondly, the Kaiser-Meyer-Olkin measure of sampling adequacy was .648, above the recommended value of .6, and Bartlett's test of sphericity was significant ($\chi^2(300) = 819.09, p < .001$). Most of the diagonals of the anti-image correlation matrix were over .5, with exception of one score (.491) slightly below .5, supporting the inclusion of each item in the factor analysis. Finally, the communalities were all above .3, further confirming that each item shared some common variance with other items. Given these overall indicators, factor analysis was conducted with all 25 items. The limited-to-five factor solution explained 49.81% of the variance. In particular, the initial eigen values showed that the first factor explained 17.05% of the variance, the second factor 11.84% of the variance, and a third factor 9.4% of the variance. The fourth and fifth factors each explaining 6% or below of the variance. During several steps, a total of nine items were eliminated mainly because they did not load on corresponding factor in terms of theoretical construct of the scale, for example, items "Rather solitary, prefers to play alone" and "Often has temperament tantrums". Another reason items eliminated was due to having factor loadings on two factors. The item "Can stop and think things out before acting", for instance, had factor loadings between -.3 and -.4 on both factor 1 and factor 2. A principle-components factor analysis of the remaining 16 items, using varimax rotations was conducted, with the five factors explaining 59.3% of the variance. All items had factor loadings over .5 but four items had a cross-loading above .3, however these

items had a strong primary loading of, at least, .523. The factor loading matrix for this final solution is presented in Table 1.4.

The factorability of the 25 Teacher-completed SDQ items was examined. Several well-recognised criteria for the factorability of a correlation were used. Firstly, 22 of the 25 items correlated at least .3 with at least one other item, suggesting reasonable factorability. Secondly, the Kaiser-Meyer-Olkin measure of sampling adequacy was .752, above the recommended value of .6, and Bartlett's test of sphericity was significant ($\chi^2(300) = 1220.57$, $p < .001$). The diagonals of the anti-image correlation matrix were all over .5, supporting the inclusion of each item in the factor analysis. Finally, the communalities were all above .3, further confirming that each item shared some common variance with other items. Given these overall indicators, factor analysis was conducted with all 25 items. The limited-to-five factor solution explained 55% of the variance. In particular, the initial eigen values showed that the first factor explained 22.9% of the variance, the second factor 10.8% of the variance, and a third factor 9.4% of the variance. The fourth and fifth factors each explained 6.6% and 5.4 %, respectively, of the variance. During several steps, a total of seven items were eliminated mainly because they did not load on corresponding factor in terms of theoretical construct of the scale and loaded on more than one factor. The item "Often complains of headaches, stomachaches or sickness", for instance, had similar factor loadings on both factor 2 and factor 4. A principle-components factor analysis of the remaining 18 items, using varimax rotations was conducted, with the five factors explaining 63.1% of the variance. All items had factor loadings over .5 but six items had a cross-loading above .3. These items, however, had a strong primary loading of, at least, .68. The factor loading matrix for this final solution is presented in Table 1.5. The SDQ could be considered in future studies, especially since it has been widely used across countries and translated into 60 languages, all downloadable from <http://www.sdqinfo.com>

Parenting Styles and Dimensions Questionnaire. Baumrind's (1971) descriptions of authoritative, authoritarian, and permissive parenting styles continue to be useful constructs

in family and child research. In this pilot study, we chose the Parenting Styles and Dimensions Questionnaire (PSDQ, Robinson et al, 2001) as it is based on Baumrind's typology and was utilised to investigate parenting dimensions' associations with child behavioural outcomes (Hart, Newell, & Olsen, 2003). As we were concerned with keeping the parent interview within an hour of respondents' time, we trialled a shorter 22-item version instead of the full 63-item scale. We found this version not to be suitably valid and reliable for future studies.

Initially, the factorability of the 22 PSDQ items was examined. Several well-recognised criteria for the factorability of a correlation were used. Firstly, 19 of the 22 items correlated at least .3 with at least one other item, suggesting reasonable factorability. Secondly, the Kaiser-Meyer-Olkin measure of sampling adequacy was .801, above the recommended value of .6, and Bartlett's test of sphericity was significant ($\chi^2(231) = 937.84$, $p < .001$). The diagonals of the anti-image correlation matrix were all over .5, supporting the inclusion of each item in the factor analysis. Finally, except the item "I take into account child's preferences when I make plans for the family (e.g., holidays)" (i.e., Autonomy 4), the communalities were all above .3, further confirming that each item shared some common variance with other items. Given these overall indicators, factor analysis was conducted with all 22 items. The three factor solution explained 48.3% of the variance. In particular, the initial eigen values showed that the first factor explained 26.6% of the variance, the second factor 14.61% of the variance, and a third factor 7.1% of the variance. A total of three items were eliminated mainly because they did not load on corresponding factor in terms of theoretical construct of the scale. For example, the item "Threaten child with punishments more often than actually giving it", which suppose to load on Permissive, was loaded on Authoritarian. In addition, the item "Find it difficult to discipline child" and "When child asks why s/he has to do something, I tell her/him it is because I said so, or I am your parent and I want you to" had factor loadings between .3 and .5 and between .3 and .6, respectively, on both Authoritarian and Permissive. A principle-components factor analysis of the remaining 19 items, using varimax rotations was conducted, with the three factors explaining 51% of

the variance. All items had factor loadings over .5 except the item “Punish by taking privileges (e.g. games, TV) away from child with little explanations” (.492). The factor loading matrix for this final solution is presented in Table 1.1.

FINDINGS AND DISCUSSION

The main focus of child study was to trial the procedures and assess suitability of the child measures and parenting scales that are widely used in the field of early childhood and cognitive development. It was also the interest of this pilot study to examine the developmental variation of children who are from different social economic backgrounds, language spoken at home and home/ school environmental settings in Singapore.

Preliminary analyses

The means of the study variables are presented in Tables 2.1 to 2.7.

In Table 2.5, Pearson correlation coefficients were computed to assess the relationship between child outcomes; CPM, BSRA, BLAB English, BLAM Mother Tongue and TTCT scores. Overall, there were positive correlations between the variables. Significant positive correlation was found between variables CPM and BSRA, $r = .474$, $p < .01$, CPM and BLAB English, $r = .296$, $p < .01$, CPM and TTCT, $r = .309$, $p < .01$, BSRA and BLAB English, $r = .617$, $p < .01$, BSRA and TTCT, $r = .421$, $p < .01$, BLAB English and TTCT, $r = .297$, $p < .01$ and BLAB Mother Tongue and TTCT, $r = .234$, $p < .05$. Scores of CPM, BSRA, BLAB English and BLAB Mother Tongue are positively correlated with TTCT scores. There were no significant correlation between scores of BLAB Mother Tongue and CPM, $r = .143$, $p > .05$, BLAB Mother Tongue and BSRA, $r = .176$, $p > .05$ and BLAB Mother Tongue and BLAB English, $r = .066$, $p > .05$.

Predictors of academic (BSRA) outcomes

Table 4.2 showed Child's age and socioeconomic status (SES) were good predictors of the child's academic outcome (BSRA). Child's age and SES explained a significant proportion of variance in BSRA scores, adjusted $R^2 = .397$, $F(3, 107) = 25.190$, $p < .01$. After taking into account of the child's age, gender and SES, it was found in Model 2 that BLAB English and

CPM significantly predicted the BSRA scores. BLAB English had $b = .384$, $t(111) = 4.988$, $p < .01$ while CPM had $b = .232$, $t(111) = 3.374$, $p < .01$. Multiple hierarchical regression was conducted to examine the effect of predictors on BSRA as shown in Table 7.3. Children's demographic variables (i.e., age and gender) were examined in the first model. Age of children was found significantly predicted performance in BSRA, $\beta = .31$, $t() = 3.39$, $p < .01$. Age and gender also explained a significant proportion of variance in BSRA scores: adjusted $R^2 = .086$, $F(2, 108) = 6.15$, $p < .01$. Parent education level, family income, and language used primarily at home were entered into the second model. Parents who received university education ($\beta = .362$, $t() = 2.24$) and had a high family income ($\beta = .3$, $t() = 2.45$) significantly predicted BSRA performance at .05 level, after controlling effects of children's age and gender. All the predictors of model 2 explained a significant proportion of variance in BSRA scores: adjusted $R^2 = .339$, $F(2, 102) = 7.91$, $p < .001$. Of additional importance is the effect of age remained significant, $\beta = .308$, $t() = 3.89$, $p < .001$. The third model examined the effect of time spent in enrichment activities and parenting self-efficacy. These two predictors only marginally, $p = .086$ and $p = .07$, respectively, predicted performance. The age of children, however, still significantly predicted the performance, $\beta = .299$, $t() = 3.8$, $p < .001$. In addition, the model 3 explained a significant proportion of variance in BSRA scores: adjusted $R^2 = .374$, $F(2, 100) = 3.8$, $p < .05$. Performance in English language (i.e., BLAB English) was entered into model 4. This language performance showed significant effect on BSRA, $\beta = .476$, $t() = 56$, $p < .001$. The last model also explained a significant proportion of variance in BSRA scores: adjusted $R^2 = .52$, $F(1, 99) = 31.34$, $p < .001$. Table 7.3 shows the details of the regression models.

The finding of this study are unsurprising. First, the impact of SES and gender on academic outcomes is consistent with other studies (e.g., Coley, 2002). The association between age and school readiness is also expected given that older children would had more time to acquire the academic competencies. Whilst this may not be so for older children (c.f., Morrison, Griffith, & Albert, 1997), age seems to have an impact for younger children

attending the first year in kindergarten as in the case of this study. It has also been documented that intelligence is associated with school readiness (Porwancher & DeLisi, 1993). In addition to replicating the findings of other studies, this study also contributes by providing evidence for the relationship between English language and school readiness.

Predictors of English language (BLAB-II-E) outcomes

Table 4.3 showed that in Model 1, child's age and SES were strong predictors of BLAB English scores. It accounted for a significant proportion of variance in BLAB English scores, adjusted $R^2 = .249$, $F(3, 107) = 13.147$, $p < .01$. In Model 2, after taking into consideration of the 3 basic predictors, it was found that parent-child activities, CPM and primary language at home (English) were also strong predictors of BLAB English scores. Primary language at home (English) was the strongest predictor, $b = .249$, $t(108) = 2.970$, $p < .01$.

The relationship between age and English vocabulary is expected as the latter was measured by the raw score from the BLAB-II-E. This study highlights the importance of home usage of English as well as parent child-activities for the development of English vocabulary.

Predictors of mother tongue (BLAB-II-MT) outcomes

Table 4.4 showed that the child's age was found to be a good predictor of BLAB MT scores, $b = .274$, $t(83) = 2.610$, $p < .05$. However, after taking into account the 3 basic factors, Model 2 explained a significant proportion of variance in BLAB MT scores, adjusted $R^2 = .192$, $F(7, 72) = 2.187$, $p < .05$. Primary language at home (English) was the strongest predictor, $b = -.356$, $t(80) = 3.154$, $p < .01$.

The relationship between age and mother tongue vocabulary is expected as the latter was measured by the raw score from the BLAB-II-MT. However, its relationship with English use

(as opposed to the use of mother tongue at home) is surprising.

Predictors of intelligence (CPM)

In predicting child's IQ, Table 4.6 showed child's age and SES were strong predictors of CPM scores. Child's age, $b = .215$, $t(111) = 2.384$, $p < .05$ while SES, $b = .267$, $t(111) = 2.969$, $p < .01$. However, Model 2 accounted for a significant proportion of variance in CPM scores, adjusted $R^2 = .210$, $F(3, 104) = 5.380$, $p < .01$. The temperament, 'persistence' was the strongest predictor of CPM scores with $b = .221$, $t(108) = 2.443$, $p < .05$.

Whilst the often described relationship between SES and intelligence was replicated in this study (Bradley & Corwyn, 2002), this study also highlighted parent-rated persistence of the child as a factor. On the one hand, this relationship may be interpreted as persistence as being a positive trait (e.g., Sigman, Cohen, Bechwith, & Topinka, 1987); alternatively, this persistence on test-taking behaviors may leading to better performance on the CPM.

Predictors of creativity (TTCT)

In predicting TTCT scores, Table 4.5 indicated that child's age was the strongest predictor, $b = .399$, $t(108) = 4.544$, $p < .01$. Taking this into account, Model 2 explained a significant proportion of variance in TTCT scores, adjusted $R^2 = .220$, $F(3, 107) = 7.862$, $p < .01$. The strongest predictor of TTCT scores is the temperament or sociability of the child, $b = .206$, $t(108) = 2.224$, $p < .05$.

Unlike the previously discussed factors where there appeared to be associations with proximal factors, creativity as measured by the TTCT in this study, was associated only with the child's age (maturation) and reported sociability.

Predictors of child behavior (SDQ-Teacher)

Multiple hierarchical regression was conducted to examine the effect of predictors on teacher report of problem behaviors on the SDQ (see Table 7.4). Children demographic variables (i.e., age and gender) were examined in the first model. Gender of children (i.e., being a boy) was found significantly predicted teacher rating on the SDQ, $\beta = -.351$, $t() = -3.88$, $p < .001$. Both age and gender explained a significant proportion of variance in teacher SDQ scores: adjusted $R^2 = .11$, $F(2, 108) = 7.79$, $p < .01$. No other factors predicted problem (externalizing) behaviors rated by teachers. No factors were associated with internalizing behaviors among the children. Parent education level, family income, and language used primarily at home were entered into the second model. None of the predictors showed significant effect. Similarly, time spent in enrichment activities and parenting self-efficacy in model 3 and performance in English language in model 4 did not show significant effect, nor did they explain a significant proportion of variance in teacher SDQ of internalizing problem.

Age of First Enrolment in Preschool

The MCYS had announced that 200 more child care centres will be established by 2013 in order to cater to increasing family needs for centre based child care and education. Parent responses in our survey indicate that a child's age at first enrolment in preschool does not appear to be dependent on whether the family has a domestic helper. We found that 40% of the children who were first enrolled in preschool between 36-47 months came from families without domestic helpers, while 32.4% of children who were first enrolled at the same age came from families with domestic helpers. 32.4% of children who were enrolled earlier, between 24-35 months, came from families with domestic helpers. This early enrolment in preschool seems in line with the population's emphasis on providing their children with early education in structured programmes. Although preschool education is not compulsory in Singapore, there has been above 95% of preschool attendance in the last five years. Coded qualitative responses to the open-ended Q 59 ("Why did you enroll your child at that age?") confirm that most parents felt their child needed to be exposed to academic

learning, which they could prepare for formal schooling. This echoes earlier publications on Singaporean parents' priorities for their children (Seng, 1991; Raban & Ure, 1999).

Future regression analyses could examine the relationship between family SES and age of entry into either half-day kindergarten programmes or full-day child care. The NICHD Study of Early Child Care (1998) with a sample of 1364 children, found that both maternal and non-maternal incomes predicted the amount, the age of entry into child care as well as the type and quality of care that the children received.

Parenting Styles

This refers to Baumrind's (1971) descriptions of authoritative, authoritarian, and permissive parenting styles. We believe that parenting styles determine the quality of relationships between child and parent (or other primary caregiver) which in turn influences all areas of the child's development and learning. At the same time, researchers are still learning about the many cultural approaches to parenting, shaped by community norms, expectations, group behaviours, ideas, and values (Bornstein, 1991; Bornstein & Lansford, 2010). Through cultures, children are constructed and parental cognitions about childrearing shaped (Bornstein, 1991; Cole, 2005). Hence, Baumrind's typology may be understood differently across cultures when utilised in research. Ang and Goh (2006) reported in their study on the impact of perceived authoritarian parenting on adolescent outcomes that authoritarian parenting style could have a different cultural meaning for individuals living in Asia, not necessarily associated with negative adolescent outcomes. The psychometric properties of the PSDQ that we reported in the earlier part of this report did not seem ideal. The part-time RA interviewers had also given us feedback that some parents did not understand some of the statements. We will need to pilot either the 63-item PSDQ in future, or review alternative measures of parenting styles that would be more appropriately understood in the Singapore context.

Discipline Methods

This refers to behaviour management methods. In the Singapore context, the term “discipline” is more widely understood among adults. To the best of our knowledge, there have been no empirical studies on the discipline methods of Singapore parents with 4-to-5-year-olds published in the last five years. Ebbeck and Gokhale (2004) interviewed 40 parents to examine their views of child development and learning against the views and practices of the preschools that their children were attending. They reported that 14% of the parents in the sample believed in reasoning and explanations as discipline methods while 60% stated that threatening children was an effective method of discipline.

Thus, our pilot survey included questions to gather descriptive information on the discipline methods used by this group of parents. Respondents were asked to rank a maximum of six methods based on frequency (most often to least often) from a given list that included “talk/reason” as well as “remove privileges” and “cane”. Table 5.15 shows that the highest percentage of parents regardless of their education level, preferred to “talk/reason” rather than “cane” or “beat with ruler.” The ranked responses are supported by qualitative responses to the open-ended Q 45 (“Under what circumstances do you use a cane or any physical punishment?”). Our qualitative coding process reveal that this group of parents appear to use physical punishment sparingly. Common reasons given by the parents for resorting to physical punishment: a) child’s safety is at stake; b) child is physically aggressive; c) child is stubborn and would not listen to repeated warnings; d) as a last resort when parents run out of strategies. A few responses were: a) child is disrespectful towards grandparents; b) child wastes or plays with food.

Future analyses would need to be carried out to examine parent demographic factors and/or parental well-being and mental health dimensions (not yet analysed although the parent survey has a section on Parental Health using questions in LSAC) related to their choice of discipline methods.

Family Activities and Enrichment Programmes

In the parent survey, Activities refer to a list of 22 activities that we asked parents to identify as being “regular”(i.e., once a month) or “at least twice every week.” Figure 6.1

shows that parents would take the children outdoors regularly, but Figure 6.2 shows that they would spend slightly more time on educational activities.

Enrichment programmes refer to structured activities which parents pay for their children to participate in outside their preschool hours. Through this pilot survey, we wanted to have a sense of a) the types of enrichment programmes that the children are enrolled in, and b) if family income is associated with the quantity or type of enrichment programme. Ebbeck and Gokhale (2004) found that the majority of children in a sample size of 40 received private tuition in preparation for the academics in primary one. Their finding seems to be in line with common assumption that many Singaporean parents want their children to acquire academic knowledge (especially English Language, Chinese Language, and Mathematics) before Primary One. Table 6.9 shows that more than 90% of parent respondents in the \$6000-7999 income bracket enrolled their preschooler in at least one type of enrichment programme, with more than 60% of those earning more favouring at least one category of enrichment programmes: language, visual and performing arts, or sports.

Difference between parent and teacher perception on SDQ

We compared parents' and teachers' SDQ responses. Table 3 shows the means and standard deviation and t Ratio between Teacher and Parent Strength and Difficulty Questionnaire (SDQ). In our study, t test was used to test whether parents and teachers rate children's behaviors differently. Consistent with the previous literature, our study has shown that parents and teachers rated children's behaviors differently on SDQ.

On the conduct problem scale, parents ($M=2.46$; $SD=1.80$) perceived children having more conduct problems than teachers ($M=1.51$, $SD=1.60$) ($t=-4.39$, $p<.00$), which is consistent with previous literature (Mathieson & Banerjee, 2010; Papageorgiou et al., 2008). On the hyperactivity scale, parents ($M=3.96$, $SD=2.35$) rated higher than teachers did ($M=3.40$; $SD=2.10$) ($t=-2.65$, $p<.01$), which is also consistent with previous literature (Mathieson & Banerjee, 2010; Papageorgiou et al., 2008). On the pro-social behavior scale, parents ($M=7.55$, $SD=1.83$) rated higher than teachers did ($M=6.30$, $SD=1.86$). On emotion problem scale, there is no statistical difference between parents' and teachers' ratings,

which is consistent with a previous study (Papageorgiou et al., 2008). Although, on the emotion problem and peer problem scale, parents and teachers ratings did not reach statistical significance on t test in our study, parents and teachers did perceive children's behaviors differently on overall SDQ ratings ($t=-3.95$, $p<.00$). Parents rated children having more behavior problems than did teachers ($M=10.26$, $SD=5.07$; $M=8.02$, $SD=4.56$ - parents and teachers respectively).

Studies have shown that parents and teachers perceived the behaviors of the same child differently (Culp et al., 2001; Smith-Bonahue et al., 2009). Based on Papageorgiou and colleagues' study (2008), the level of agreement between parents' and teachers' reports of Teacher and Parent Strength and Difficulty Questionnaire (SDQ) was low to moderate for the SDQ (0.16-0.34). In Mathieson and Banerjee' study (2010), their SDQ results also demonstrated little correlations on the scales of emotional problems, conduct problems, hyperactivity, and peer problems. In comparison to international literature, our study has shown that, in spite of the differences in parenting styles and cultures between western and eastern countries, overall, parents and teachers did perceive children's behaviors differently. The differences in parents' and teachers' ratings could be attributed to several reasons. First, parents may not be well informed about the behaviors of their children in the school setting, and teachers may not be well informed about the behaviors of children at home settings (Papageorgiou et al., 2008). Second, children might behave differently at home than at school (Papageorgiou et al., 2008). After all, schools are typically more structured than home settings and establish set routines, rules, and behavioral expectations. Children may follow the rules and meet the expectations of the school settings better than a less structured setting like home.

Limitations of Pilot Study

The sample of $n=112$ was insufficient in measuring the numerous family variables that we had designed in the parent survey. However, this pilot was valuable in surfacing the need to continue refining and trialling sections of the lengthy survey instrument before

working with a much larger sample. We have yet to analyse the factorability of all the sections in the survey. The part-time RAs who interviewed parents helped us to evaluate the suitability of the length, language, and content of the survey, giving us insights into questions which posed difficulty for parents to answer. There were limitations in the measures for school in this study. The first limitation is the small number of participants from Principals and teachers. Due to the short length of survey questions completed by teachers and the small number of Principals who had time to complete the survey items, it was found to be a less viable data collection method in the pilot study. It is recommended that interviewers should be recruited to administer the survey forms for both teachers and Principals as one-to-one individual interviews (like that for the parents) in order to collect substantial data about the preschools' staffing, organisation, philosophy, programme, curriculum, and daily practices.

CONCLUSION

The child measures seem robust enough to be used with a larger sample if we were to design a large scale longitudinal study. On the other hand, the family measures need to be more robust. This pilot study has shown that parent SES seems to predict much of the child outcomes. If modelled upon the EPPE-UK study, a longitudinal study utilising multi-level modelling of home and preschool factors may reveal more nuanced results beneficial to both policymakers and practitioners. A baseline survey study on family childrearing practices in itself would be worth pursuing in future, to counter or affirm current assumptions about supposed Confucian values that influence parenting styles and priorities for children. And a step further, an investigation of the variables in the home environment that have lasting impact on child outcomes, regardless of "quality" of preschool and primary school environment, is warranted. Discipline methods surveyed in this pilot study seem to contradict other studies; it would be valuable to add to the parenting studies that have been published to understand how families in Singapore raise adolescents.

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