COGNITIVE ASSESSMENT OF CHINESE IMMIGRANT STUDENTS IN CANTONESE AND ENGLISH

by

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ABSTRACT

Assessing English-as-a-second-language (ESL) children in their native and second languages (L1 & L2) is likely to result in a better estimate of their academic potential than in the L2 alone. In the present study, the Hong Kong-Wechsler Intelligence Scale for Children (HK-WISC), the Stanford-Binet Intelligence Scale: Fourth Edition (SB: FE), and the Woodcock Language Proficiency Battery (WLPB) were administered to 32 Cantonese-speaking children from Hong Kong. The mean age of these children was 11.01 years. Their mean age on arrival (AOA) was 9.27 years, while their mean length of residence (LOR) was 1.74 years. Results of the multiple regression analyses and analysis of variance indicated that AOA and LOR are significant predictive variables for ESL immigrant's verbal performance. In addition, variables such as family socioeconomic status, frequency of speaking Cantonese at home, gender, and having studied English before are also useful to make predictions of these children's performance. The present sample had a high nonverbal and low verbal profile of performance on the English IQ measure. However, this profile of performance was not present on the Chinese IQ measure. These findings add to the cumulative data that Orientals have a characteristic intellectual profile. Finally, this study suggests that, if feasible, immigrant children should be assessed in both L1 and L2. Standardized tests can be used to assess ESL immigrant children, even in their first few

years of arrival to a new country. The results of the assessment should be kept as a record so that comparisons can be made with future assessment results. However, all these results need to be interpreted with extreme caution because inappropriate labelling and misplacement of these children are unacceptable.

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CHAPTER I

INTRODUCTION

The purpose of this study was to determine the differences in performance of Chinese immigrant students on measures that were given in their native or second language (Cantonese or English). With a better estimate of these children's academic potential, inappropriate labelling and misplacement of these children may be eliminated.

1.1 BACKGROUND OF THE PROBLEM

During the past 15 years in Canada, there has been a dramatic increase in the number of immigrant students, whose native language (L1) is other than that of the school (L2). For example, the British Columbia Ministry of Education (1986) reported that only 6 districts had no English-as-a-second-language (ESL) students, while Vancouver had 63.2% of all ESL students in the province.

Assessment for special education is a complicated process and is made even more so when the referred individual is from a culturally diverse or limited English-speaking background. While accuracy and care are always essential in assessment, these factors are even more critical when a culturally diverse student is the focus. Limited English-proficient (LEP) and culturally diverse students are at higher risk for premature labelling,

misclassification, and inappropriate placement (Cummins, 1984). Thus, the assessment of these students must be conducted with extreme care (Barona & Barona, 1987).

According to Samuda and Crawford (1980), initial placement of immigrant students is usually made on the basis of a review of the student's records, an interview with the student, and an orientation to the school. Most students are placed in the grade level appropriate to their age. When a student experiences academic difficulties, an assessment is usually initiated by the teacher or parent. During the assessment period, tests that are most frequently given to ESL students are teacher-made tests and the Wechsler Intelligence Scale for Children-Revised (WISC-R) (Wechsler, 1974) (Samuda & Crawford, 1980).

Within about 1 1/2-2 years of arrival in the host country, most immigrant students have acquired relatively fluent and peer-appropriate, face-to-face communicative skills in the L2. When they appear to have overcome obvious communicative difficulties in the L2, most teachers and psychologists tend to consider that these students have sufficient English proficiency to be administered psychological and educational tests. Psychologists often assume that these children are no longer handicapped on a verbal IQ test by their ESL background because their L2 face-to-face communicative skills appear adequate. It is

assumed that the language proficiency is the same for L2 face-to-face communication as for performance on an L2 cognitive/academic task. This assumption often leads directly to the conclusion that poor performance on an L2 verbal IQ test is a function of deficient cognitive abilities (Cummins & Swain, 1986). Contributing to the tendency of psychologists to make logically invalid inferences is the apparent fluency of many immigrant students in English and the fact that psychologists and teachers have no information on how long it takes immigrant students to approach grade norms in English cognitive/academic skills (Cummins, 1984).

Cummins (1981) has suggested that immigrant children who arrive in the host country after the age of six require at least 5 years, on the average, to approach grade norms in L2 cognitive/academic language proficiency. According to Cummins (1984), an immigrant child takes approximately 2 years to acquire oral language skills in their L2 and approximately 5-7 years to acquire the language skills that are necessary for academic success comparable to that of a native language speaker. Thus, conversational and academic aspects of language proficiency need to be distinguished. Failure to take into account these two dimensions of language proficiency may lead to an underestimation of children's academic potential. These children's poor

performance on psychological assessment is likely to reflect insufficient time to attain age-appropriate levels of English proficiency. Immigrant students acquire L2 conversational skills more rapidly than age-appropriate L2 academic skills; this may be due to the fact that greater contextual support is available for communicating and receiving meaning in conversational settings than in academic settings. Thus, less knowledge of the L2 is required to function appropriately in conversational settings.

Collier (1987) also conducted a study on age and rate of second language acquisition (SLA) for academic purposes. The results indicated that LEP students who entered the ESL program at ages 8-11 were the fastest achievers, requiring 2-5 years to reach the 50th percentile on national norms in all the subject areas tested. LEP students who entered the program at ages 5-7 were 1-3 years behind the performance level of their LEP peers who entered the program at ages 8-11, when both groups had the same length of residence (LOR). Arrivals at ages 12-15 experienced the greatest difficulty and were projected to require as much as 6-8 years to reach grade-level norms in academic achievement when schooled all in the L2. Whereas some groups of LEP students may reach proficiency in some subjects in as little as 2 years, it is projected that at least 4-8 years may be

required for all ages of LEP students to reach grade-level norms of native speakers in all subject areas of language and academic achievement, as measured on standardized tests.

A number of studies (e.g., Cummins, 1979; Skutnabb-Kangas & Toukomaa, 1976; Ekstrand, 1978) have supported the issue that the cognitive/academic aspects of L1 and L2 are interdependent. Also, the development of proficiency in L2 is partially a function of the level of L1 proficiency at the time when intensive exposure to L2 is begun. Appel (1979), Ekstrand (1977), and Snow and Hoefnagel-Hohle (1978) have shown a clear advantage for older learners in mastery of L2 syntax and morphology as well as in the cognitive/academic types of L2 skills measured by conventional standardized tests. However, the findings are less clear in aspects of L2 proficiency directly related to communicative skills, such as oral fluency, phonology, and listening communication. For example, Oyama (1978) reports an advantage for younger immigrant learners on both productive phonology and listening comprehension tests. On the other hand, Snow and Hoefnagel-Hohle (1978) found that older learners performed better on measures of these skills.

According to the Professional Conduct Manual (National Association of School Psychologists, 1984) and Hartshorne and Hoyt (1985), tests and other evaluation materials should

be provided and administered in the child's L1 or other mode of communication, unless it is clearly not feasible to do so. Willig (1986) has also suggested that in order to determine whether an immigrant child does indeed have an educational handicap, the child must be tested in his/her strongest language (L1) because a true disability must be apparent in the dominant language. If there is no disability in the child's dominant language, there can be no disability. Any symptoms of disability must then be manifestations of the process of SLA.

1.2 STATEMENT OF THE PROBLEM

The present study addresses the question, to what extent does immigrant students' age on arrival (AOA) and length of residence (LOR) affect their performance on standardized tests that are given in their native or second language (L1 or L2)? The problems associated with the assessment of immigrant students have stimulated a number of alternative procedures in evaluating them. One of these procedures is the use of translated versions of North American standardized tests, which are normed, item-analyzed, and factor-analyzed cross-culturally. The development of these versions is an attempt to correct the difficulties inherent in direct translations of these tests; for example, the level of difficulty may change as a result

of the translation, and there are many concepts which have no equivalents. For example, the WISC-R has been adapted and standardized on various populations, including children from Hong Kong, Mexico, and Spain. These tests are applicable for students who reside in those countries or who have recently migrated to a new country from them (Esquivel, 1985).

In the present study, the Hong-Kong Wechsler Intelligence Scale for Children (HK-WISC, administered in Cantonese) (Yung, 1981), the short form of the Stanford-Binet Intelligence Scale: Fourth Edition (SB: FE, administered in English) (Thorndike, Hagen, & Sattler, 1986a), and the Woodcock Language Proficiency Battery-English Form (WLPB) (Woodcock, 1984) were administered to Cantonese-speaking immigrant children from Hong Kong. Lynn, Pagliari, and Chan (1988) have suggested that Hong Kong children and other Oriental populations share a similar profile of performance on tests of intelligence. They usually display higher visual-spatial scores, higher perceptual rates, and lower verbal scores when compared with Caucasian populations.

The present study had three hypotheses. First, it was hypothesized that immigrant students' AOA and LOR in Canada and performance on standardized tests would be correlated. Thus, the longer the immigrant children have obtained

education in Canada (or LOR), the better their performance on the SB: FE and WLPB (measures of their English language proficiency) should be. On the other hand, it was hypothesized that there would be a significant negative correlation between LOR and subjects' performance on the Chinese IQ measure. With regard to AOA, older learners (who immigrated to Canada when they were older) were hypothesized to have better performance than younger learners on the English measures. On the Chinese measure, there should be a significant positive correlation between AOA and performance. Secondly, subjects' HK-WISC performance was hypothesized to have a significant positive correlation with performance on the SB: FE. Thus, the subjects' HK-WISC performance should be predictive of their performance on the SB: FE. Finally, it was hypothesized that a high nonverbal and low verbal abilities profile would be apparent on the SB: FE. Subjects' performance on nonverbal measures (e.g., the SB Pattern Analysis & Matrices subtests) would be significantly better than their performance on the verbal measures (e.g., the SB Vocabulary & Memory for Sentences subtests). Since subjects' HK-WISC verbal and nonverbal performance should be similar, there would be a larger difference between their HK-WISC and SB: FE scores in verbal than nonverbal areas.

1.3 JUSTIFICATION OF THE STUDY

Assessing ESL students with measures that are given in their L1 and L2 is likely to result in a better estimate of their academic potential. With the knowledge of their abilities in both languages, the potential for misinterpretation of test results may be reduced. Since there is an increasing number of immigrant children in Vancouver, it is important to gather more information on them in order to better serve their educational needs.

At present, the technology, knowledge base, and regulations governing the practice of psycho-educational assessment are inadequate to meet the needs of immigrant students with varying levels of linguistic proficiency and home-language backgrounds. The present study attempted to provide further knowledge in this field to help psychologists and teachers make logically valid inferences from educational and psychological test results. In summary, the present study has both practical and theoretical implications.

CHAPTER II

REVIEW OF THE LITERATURE

This chapter reviews the research and theories relating to the assessment of English-as-a-second-language (ESL) students. Issues regarding the purposes and procedures of assessment in bilingual and ESL settings, differentiation of basic interpersonal communicative skills (BICS) and cognitive/academic language proficiency (CALP), interdependence of CALP across languages, and the intelligence profile of Oriental populations are all being addressed. In addition, the purpose and hypotheses of the present study are restated to specify the significance of this study with regard to the literature.

2.1 ASSESSMENT OF ENGLISH-AS-A-SECOND-LANGUAGE (ESL) STUDENTS

Assessment is used for many different purposes in bilingual and ESL settings, including placement, diagnosis, exit from a program, and evaluation of a program (Ovando & Collier, 1985). Attempting to understand all the issues in the assessment of language-minority students is challenging, complicated, and sometimes very confusing. While we can easily agree that these children differ in their abilities and styles of learning, and that some of these differences may be related to cultural or social factors, it is not at all clear when such differences need to be considered disabilities or impairments (MacIntyre,

1985). According to Samuda and Crawford's (1980) survey of 34 school boards in Toronto, assessment is perceived as the most difficult part of the school placement process for immigrant students. Respondents commented on the difficulty of identifying the student's level of functioning and had trouble deciding whether the problem was one of language or of learning.

In interpreting assessment data for the culturally and linguistically different child, many psychologists and diagnosticians do not seem to understand the characteristics of the second language acquisition (SLA) process and their overlap with characteristics of language disorders or deficiencies among native speakers of English (Shephard & Smith, 1981; Wright & Santa Cruz, 1983). Cummins' (1980, 1984) analyses of the teacher referral forms and psychological assessments of 428 children from ESL backgrounds in one Canadian school district exposes a variety of problems associated with the assessment of minority language children. If a non-native child speaks English, regardless of its quality, he/she is usually considered to possess the same skills and linguistic background as a native speaker of the language. That is, the child is considered proficient enough to compete with native speakers in academic areas and is expected to perform as one. Consequently, data interpretation and program assignment may be based upon a misconception which has the

potential, eventually, to limit the academic learning measured by standardized tests. Cummins (1984) shows that many students manage to rapidly acquire the surface structures of English and impress assessors as having the linguistic abilities necessary to handle the complex context-reduced language which is used by teachers and found in textbooks and other instructional materials. However, if these students begin to experience achievement difficulties, a referral to special education is likely to follow. Often, lack of English proficiency is ruled out as a possible cause of the problem because the child appears to have no difficulty understanding or communicating with teachers or peers. Cummins (1984) shows that such students often demonstrate good interpersonal communicative skills in English, but they may actually need more time to obtain the academic language proficiency required for schooling than is usually afforded them. As a result, the possibility of school failure for such students is exacerbated.

Procedures for evaluating limited-English-proficient (LEP) and bilingual students involve informal and formal approaches (Esquivel, 1985). Informal approaches include consultation, parent interviews, collection of background information, observations, and child interviews. Consultation with teachers working with the child may serve as a means of problem clarification. Through a collaborative relationship between teachers and the school

psychologist, the actual source and nature of the child's difficulties are hopefully identified. Involving parents in the assessment process further facilitates the understanding of specific cultural values which may affect the child's school adjustment.

The extent of exposure to formal learning experiences, the pattern of mobility, age on arrival (AOA), and length of residence (LOR) in the country are variables which influence academic achievement and SLA. Consideration of these important factors provide significant diagnostic information. Observational techniques such as sociometric measures, naturalistic observations, behavioral procedures, classroom interaction scales, and anecdotal reports are useful. However, these observations are meaningful only when interpreted within the context of the child's unique cultural experience. Communicating with children is one of the most significant ways to learn about them, since verbal interaction may shed light on their reasoning ability, problem-solving style, and language skills. The use of drawings and play activities are useful diagnostic tools for those children who are less verbal.

Formal approaches include non-verbal tests, verbal tests, test translations, and standardized-translated versions. The rationale for the use of non-verbal tests is that LEP and bilingual children usually do significantly better in tests of performance where the use of language is

limited and the influence of culture reduced. The use of standardized verbal scales is applicable primarily for language-minority children who have been properly identified as English dominant. Nevertheless, findings need to be interpreted in light of the child's level of acculturation and sociocultural factors (Valencia, 1983).

Since the degree of bilingualism varies in children, they may mix languages or alternate between two language systems in understanding and responding to questions. Their ability to express themselves in either language may depend on the nature of the task or the context within which they learned the specific skill required. Consequently, the examiner may have to switch from one language to the other and to translate specific items or instructions.

Direct translations of tests have inherent flaws in that they do not yield technically equivalent forms. For example, some words do not have exact counterparts, the level of difficulty may change as a result of the translation, there are many concepts which have no equivalents, and the test content remains culture-bound (Olmedo, 1981). The development of translated versions which are item-analyzed and factor-analyzed cross-culturally is another approach which has been attempted as a means of correcting for difficulties inherent in direct test translations. For example, the Wechsler Intelligence Scale for Children-Revised (WISC-R) (Wechsler, 1974) has been

adapted and standardized on various populations, including children from Hong Kong, Mexico, and Spain. These tests are applicable for students who reside in those countries or who have recently migrated to this country from them (Esquivel, 1985).

According to Maldonado-Colon (1986), whenever linguistically/culturally different children are to be assessed for the purpose of distinguishing disorders or disabilities from problems of SLA, information related to the following areas should be obtained: (1) results of a language proficiency measure in each language, along with results of other measures or procedures considered appropriate to evaluate a suspected handicap or disability; (2) documentation of the language of the home as well as an estimate of the quality of language use in the home; (3) documentation of pre-academic experiences relevant to what is being evaluated; (4) records of any previous intervention in which the child was involved; and (5) the child's linguistic preference by setting (e.g., classroom, home, & play area). The consideration of complete language data guides appropriate assessment, facilitates interpretation, and is essential for making the distinction between deficiencies caused by functioning in a second language (L2) and true disorders which would be evident in the native language (L1).

2.2 SECOND LANGUAGE ACQUISITION (SLA)

With regard to SLA, Collier (1987) suggests the following questions need to be addressed: (1) How long does it take to master an L2 for schooling? (2) Is it easier to acquire that language when one is younger or older? (3) What level of proficiency in the L1 and L2 is needed to succeed academically in an L2? (4) How long does it take to reach the level of average performance by native speakers in all academic subjects in the L2? Before one attempts to answer the above questions, one has to understand the meaning of factors like basic interpersonal communicative skills (BICS), cognitive/academic language proficiency (CALP), and interdependence of CALP across languages.

2.2.1 Basic Interpersonal Communicative Skills (BICS) and Cognitive/Academic Language Proficiency (CALP)

Hernandez-Chavez, Burt, and Dulay (1978) argue that language proficiency involves multiple factors along with three distinct parameters: (1) the linguistic components, (2) modality, and (3) sociolinguistic performance. The linguistic components include phonology, syntax, semantics, and lexicon. Modality involves comprehension and production through the oral channel and reading and writing through the written channel. Sociolinguistic performance involves the dimensions of style, function, variety, and domain. Thus, Hernandez-Chavez et al.'s (1978) model gives rise to a three dimensional matrix representing 64 separate proficiencies.

Hypothetically, each of these proficiencies is independently measurable.

However, this may be practically impossible and even theoretically questionable. For example, Oller (1978) claims that there exists a global language proficiency factor which accounts for the bulk of the reliable variance in a wide variety of language proficiency measures. Oller (1978) argues that this factor is strongly related to IQ and to other aspects of academic achievement. Also, he claims that it is about equally well measured by listening, reading, and writing tasks. Nonetheless, Oller (1979) does allow for the possibility that, in addition to the global proficiency, there may be unique variances attributable to specific components of language skills.

However, Oller's (1978, 1979) arguments seem to ignore the existence of a dimension of language proficiency which can be assessed by a variety of listening, reading, speaking, and writing tests and which is strongly related both to general cognitive skills and to academic achievement. Also, the sociolinguistic aspects of communicative competence appear unlikely to be reducible to a global proficiency dimension (Canale & Swain, 1979).

For these reasons, Cummins (1980) has suggested using the term cognitive/academic language proficiency (CALP) in place of Oller's (1978, 1979) global language proficiency. CALP is defined as those aspects of language proficiency

which are closely related to the development of literacy skills in a person's L1 and L2. CALP can also be referred to as context-reduced oral and written languages, which rely primarily on linguistic cues for meaning. CALP consists of the language skills necessary to function in an academic setting. This language proficiency includes academic tasks in abstract thought and formal written language. Contrasted with CALP, Cummins (1980) uses the term basic interpersonal communicative skills (BICS) to reflect the ability to speak fluently in face-to-face conversations. BICS can be referred to as language proficiency for context-embedded, face-to-face communication where meaning can be negotiated and is enhanced with a wide range of paralinguistic and situational cues.

Several investigators have made distinctions similar to those between BICS and CALP. For example, Krashen (1978) has noted that the Words in Sentences subtest of the Modern Language Aptitude Test (Carroll & Sapon, 1959) involves a conscious awareness of language and grammar quite different from the tacit knowledge or competence that all native speakers have of their language. Similarly, Wells (1979), a large-scale longitudinal study of preschool language development among English-dominant children, found that there is only a weak relationship between measures of children's performance on language tests administered under controlled conditions and developmental measures of oral

language ability derived from spontaneous speech. Wells (1979) also reports that measures of oral language ability derived from spontaneous speech on entry to school were only weakly related to attainment in reading at age 7.

Hernandez-Chavez et al. (1978) have also distinguished between natural communication tasks and linguistic manipulation tasks. They suggest that these two tasks lead to quite different results in terms of the quality of the language produced. Although CALP is likely to be more readily assessed by linguistic manipulation tasks (e.g., oral or written cloze), it should not be assumed that it cannot also be assessed by means of natural communication tasks. Studies have shown that certain aspects of oral discourse are related to reading but others are not (Fry, 1967).

If the purpose of language proficiency assessment is to assign bilingual children to classes taught through the language in which they are most capable of learning, it is essential that these measures assess CALP. Thus, if natural communication tasks do not assess CALP, their relevance to the educational performance of bilingual children under linguistically different conditions is questionable.

The distinction between CALP and BICS is also consistent with the findings of Skutnabb-Kangas and Toukomaa (1976). In this study, parents and teachers of grades 3-6 Finnish immigrant children in Sweden were asked to judge the

language proficiency of these children. The results indicated that it took 4-5 years, on the average, for a change of language dominance to occur. Although these parents and teachers considered Finnish immigrant children's Swedish to be quite fluent, tests in Swedish which required cognitive operations to be carried out showed that this surface fluency was not reflected in the cognitive/academic aspects of Swedish proficiency.

Since Skutnabb-Kangas and Toukomaa's (1976) study involved subjective judgments on the relative strengths of immigrant children's L1 and L2, it did not supply enough information on the absolute levels of L1 and L2 proficiency. However, Cummins' (1981) reanalysis of data from a Toronto Board of Education survey (Ramsey & Wright, 1974) shows how LOR is related to the rapidity with which immigrant students approach grade norms in English proficiency. Ramsey and Wright's (1974) study involved 1,210 immigrant students in grades 5, 7, and 9 who were learning English as a second language. The language tests administered were a Picture Vocabulary Test (PVT) derived from the Ammons Picture Vocabulary Test and a six-part test of English language skills developed by the Board for the survey (Ramsey & Wright, 1974). It was found that students who arrived in Canada after the age of six performed progressively further below-grade norms on measures of English proficiency as AOA increased. However, AOA was not distinguished from LOR in

the original analysis. Cummins' (1981) reanalysis was designed to disentangle the effects of these two factors. The results of the reanalysis suggest that it takes 5-7 years, on the average, for students who arrived in Canada at age 6 or later to approach grade norms in English vocabulary. Students who have been in Canada for 3 years and who arrived between ages 8 and 13 are approximately 1 standard deviation below grade norms. However, these students continue to approach grade norms over time. Cummins (1981) argues that immigrant children tend to acquire fluent surface skills in their L2 more rapidly than they develop L2 conceptual and literacy skills. In general, BICS develops within 2 years of exposure to the new culture. On the other hand, CALP usually takes an average of 5-7 years for language-minority students to master in an L2.

Failure by psychologists to take account of this developmental process and the limitations of psychological assessment instruments can result in incorrect diagnoses of immigrant students' academic difficulties and inappropriate academic placement. Although the above studies (e.g., Ramsey & Wright, 1974; Cummins, 1981) provide useful findings, there are limitations to their generalizations. Since the children in these studies were only assessed in English, their proficiency in their L1 was unknown. As Maldonado-Colon (1986) mentioned, it is essential to measure a child's proficiency in his/her L1 in order to make the

distinction between deficiencies caused by functioning in an L2 and true disorders which would be evident in the L1.

2.2.2 Interdependence of CALP across Languages

It is widely believed that young children are the fastest, most efficient acquirers of an L2. Language researchers dispute this common assumption but continue to debate the optimal age for beginning SLA. However, increasing research evidence indicates that the age question cannot be separated from another key variable in SLA: cognitive development and proficiency in the L1 (Collier, 1989).

First language acquisition (FLA) is not a quick and easy process; it takes a minimum of 12 years (McLaughlin, 1984; de Villiers & de Villiers, 1978). From birth through age 5, children acquire enormous amounts of L1 phonology, vocabulary, grammar, semantics, and pragmatics, but the process is not all complete by the time children reach school age. From ages 6 to 12, children still have to develop the complex skills of reading and writing in the L1. In addition to continuing acquisition of more complex rules of morphology and syntax, there are elaboration of speech acts, expansion of vocabulary (which continues throughout a person's lifetime), semantic development, and even some aspects of phonological development (McLaughlin, 1984; de Villiers & de Villiers, 1978). For school purposes,

language acquisition also includes the vocabulary and special uses of language for each subject area, such as metalinguistic analysis of language in language arts classes and many other learning strategies associated with the use of language in each content area (Chamot & O'Malley, 1987; Heath, 1986).

SLA research has found that this process of L1 development has a significant influence on the development of L2 proficiency. One important finding is that the lack of continuing L1 cognitive development during SLA may inadvertently lead to lower proficiency levels in the L2 and in cognitive/academic growth. Lambert (1984) refers to this as subtractive bilingualism. On the other hand, Cummins (1981) describes this in terms of a lower threshold level in the L1, or limited bilingualism, with which negative cognitive effects are associated. Several research reviews have identified groups of students experiencing some negative cognitive effects of subtractive or limited bilingualism (Cummins 1981, 1984; Dulay & Burt, 1980; Skutnabb-Kangas, 1981).

When the debate about the optimal age for beginning acquisition of an L2 for schooling purposes takes this important intervening variable - L1 cognitive development - into account, the arguments can be resolved fairly conclusively (Cummins, 1981). Before puberty, it does not matter when one begins exposure to (or instruction in) a L2,

as long as cognitive development in the L1 continues up through age 12 (the age by which FLA is largely completed). Cummins (1981) refers to a common underlying proficiency, or interdependence, existing between a bilingual's two languages (even given widely varying surface features), with development of one language strongly aiding development of the second one.

Cummins (1979) and Skutnabb-Kangas and Toukomaa (1976) have hypothesized that the cognitive/academic aspects of L1 and L2 are interdependent. Also, the development of proficiency in L2 is partially a function of the level of L1 proficiency at the time when intensive exposure to L2 is begun. Since L1 and L2 CALP are hypothesized to be manifestations of the same underlying dimension, previous learning of literacy-related functions of language (in L1) will predict future learning of these functions (in L2).

If the interdependence hypothesis is valid, L1 and L2 CALP should relate strongly to each other and show a similar pattern of correlations with other variables, such as verbal and nonverbal abilities. Evidence supporting this prediction from nine studies (e.g., Cummins, 1976; Lapkin & Swain, 1977; Genesee & Hamayan, 1979) is presented in Cummins' (1979) article. In these studies, the correlations between L1 and L2 ranged from .42-.77, with the majority in the range of .60-.70. In addition, L1 and L2 showed a very similar pattern of correlations with language aptitude and

IQ variables. For example, the relationships between both L1 and L2 verbal IQ or language aptitude measures were usually in the .60-.70 range, while those between L1 and L2 nonverbal IQs tended to be in the .40-.50 range. Ekstrand (1978) has also reviewed several studies which investigated the relationships between L1 and L2. Although the correlations (correlation coefficients ranged from .20-.50) in these studies are generally lower than in those reviewed in Cummins' (1979) article, Ekstrand (1978) also suggests that the range is the same as for correlations between L1 and L2 variables.

Cummins (1979) and Ekstrand's (1978) findings suggest that measures of the cognitive/academic aspects of L1 and L2 are assessing the same underlying dimension to a similar degree. However, these relationships do not exist in an affective or experiential vacuum. There are several factors which might reduce the relationships between L1 and L2 measures of CALP in comparison to those between intralanguage (L1-L1, L2-L2) measures. For example, Cummins (1979) suggests that when motivation to learn an L2 (or maintain an L1) is low, CALP will not be applied to the task of learning L2 (or maintaining L1). The interdependence hypothesis also presupposes adequate exposure to both languages.

Cummins (1979) proposes that the view of the cognitive/academic aspects of language proficiency in L1 and

L2 as a unified dimension gives rise to two predictions regarding the issues of bilingual education and age and L2 learning. First, in relation to bilingual education, it is predicted that to the extent that instruction in Lx is effective in promoting cognitive/academic proficiency in Lx, transfer of this proficiency to Ly will also occur. This transference will occur when there is adequate exposure to Ly (either in school or environment) and adequate motivation to learn Ly. Second, in relation to age and L2 learning, it is predicted that older learners (i.e., who came to Canada when they were older), whose CALP is better developed, will acquire cognitive/academic L2 skills more rapidly than younger learners (who came to Canada when they were younger). However, this will not necessarily be the case for those aspects of L2 proficiency unrelated to CALP (Cummins, 1979).

An examination of the considerable number of studies (e.g., Appel, 1979; Ekstrand, 1977; Snow & Hoefnagel-Hohle, 1978) relating age to L2 learning supports the prediction made above. These studies have consistently shown a clear advantage for older learners in mastery of L2 syntax and morphology as well as in the cognitive/academic types of L2 skills measured by conventional standardized tests.

The findings are less clear in aspects of L2 proficiency directly related to communicative skills (i.e., BICS), such as oral fluency, phonology, and listening

comprehension (Ekstrand, 1977; Oyama, 1978; Snow & Hoefnagel-Hohle, 1978). For example, Oyama (1978) reports an advantage for younger immigrant learners (6-10 years old on arrival) on both productive phonology and listening comprehension tests. On the other hand, Snow and Hoefnagel-Hohle (1978) found that older learners performed better on measures of these skills. Ekstrand (1977) reported that oral production was the only variable on which older immigrant learners did not perform significantly better than younger learners. In areas such as listening comprehension, the findings may well depend upon the measurement procedures used. A cautious generalization from these findings is that oral fluency and accent are the areas where older learners most often do not show an advantage over younger learners. The prediction which follows from the present theoretical framework is that given sufficient exposure to the L2 and motivation to learn L2, older learners will perform better than younger learners on any measures that load on an CALP factor (Ekstrand, 1978).

The only clear exception to the trend for older learners to perform better on measures of cognitive/academic L2 skills is Ramsey and Wright's (1974) study, as mentioned earlier in this chapter. Ramsey and Wright (1974) reported that students who arrived in Canada at age 6 or 7 or younger suffered no academic handicap on measures of English language skills in relation to grade norms for the Toronto

system. However, for those who arrived at older ages, there was a clear negative relationship between AOA and performance. However, Cummins' (1981) reanalysis of these data suggests that this negative relationship can be largely accounted for by LOR. Ramsey and Wright's (1974) findings do not necessarily contradict those of other studies. Ramsey and Wright's (1974) conclusions are based on standard scores, whereas most of the other studies (e.g., Appel, 1979; Ekstrand, 1977) have compared older and younger learners in terms of raw (absolute) scores. Thus, older learners may learn more L2 in absolute terms but still be further behind grade norms in comparison to younger learners (Cummins, 1981).

Based on Ramsey and Wright (1974) and Cummins' (1981) findings, AOA does appear to have subtle effects on the rapidity with which the L2 learners approach grade norms. For example, in these studies immigrant children who arrived at ages 6-7 made somewhat more rapid progress towards grade norms than those who arrived at either ages 4-5 or 8-9. For example, the 6-7 AOA group with an LOR of 5 were somewhat closer to grade norms than the 4-5 AOA group with an LOR of 7. Also, there is a sharp decline in scores at both LOR of 5 and 7 between AOA of 6-7 and 8-9. Thus, the AOA of 6-7 highlighted by Ramsey and Wright (1974) as a critical age does appear to have some importance in terms of progression towards grade norms. Within each LOR level, there is a

linear increase in absolute score with AOA. In addition, within each AOA level, there is a linear increase in absolute score with LOR. For example, those who arrived at ages 14-15 acquired more English vocabulary (as measured by the PVT) (Ramsey & Wright, 1974) in 1 year than those who arrived at ages 4-5 acquired in 7 years (27.1 vs. 26.3). However, the 14-15 AOA group is 1.6 unit normal deviates below the grade mean compared to .30 for the 4-5 AOA group.

The findings from Cummins' (1981) reanalysis of Ramsey and Wright's (1974) data is consistent with the findings of the other studies (e.g., Appel, 1979; Ekstrand, 1977; Snow & Hoefnagel-Hohle, 1978). Thus, older L2 learners, whose L1 CALP is better developed, manifest L2 cognitive/academic proficiency more rapidly than younger learners because it already exists in the L1 and is therefore available for use in the new context.

Collier (1987) analyzed the length of time required for 1,548 advantaged LEP students to become proficient in English for academic purposes while receiving instruction in English in all subject areas. Variables included were AOA, English proficiency level upon arrival, basic literacy and math skills in the L1 upon arrival, and number of years of schooling in English or LOR. L2 and content-area achievement were measured by students' performance on the Science Research Associates (SRA) Achievement Series (Science Research Associates, 1978) in reading, language

arts, mathematics, science, and social studies. The results indicated that LEP students who entered the ESL program at ages 8-11 were the fastest achievers, requiring 2-5 years to reach the 50th percentile on national norms in all the subject areas tested. LEP students who entered the program at ages 5-7 were 1-3 years behind the performance level of their LEP peers who entered the program at ages 8-11, when both groups had the same LOR. Arrivals at ages 12-15 experienced the greatest difficulty and were projected to require as much as 6-8 years to reach grade-level norms in academic achievement when schooled all in the L2. Whereas some groups of LEP students may reach proficiency in some subjects in as little as 2 years, it is projected that at least 4-8 years may be required for all ages of LEP students to reach grade-level norms of native speakers in all subject areas of language and academic achievement, as measured on standardized tests.

L2 proficiency and academic achievement do not occur quickly; they involve a developmental process that takes a much longer time than school personnel have tended to assume. When schooled exclusively in the L2, students require a minimum of 5 years to reach the 50th percentile on standardized tests. This is true even for the most advantaged students, that is, those who have a strong educational background and who come from a middle- or upper middle-class background (Collier, 1987; Cummins, 1981).

2.3 PRESENT STUDY

Overrepresentation of culturally diverse students in special education has been a persistent problem (Brosnan, 1983; Tucker, 1980; Wright & Santa Cruz, 1983). If these students can be assessed with measures given in their L1 and L2, the comparisons of their performance is likely to provide an accurate estimate of their academic potential.

In the present study, the Hong-Kong Wechsler Intelligence Scale for Children (HK-WISC, administered in Cantonese) (Yung, 1981), the short form of the Stanford-Binet Intelligence Scale: Fourth Edition (SB: FE, administered in English) (Thorndike, Hagen, and Sattler, 1986a), and the Woodcock Language Proficiency Battery (WLPB) (Woodcock, 1984) were administered to Cantonese-speaking immigrant children from Hong Kong.

Since children from Hong Kong were recruited for this study, studies that are related to Oriental populations will be briefly reviewed. A number of studies have shown that Oriental populations have a different profile of performance on intelligence tests from that of Caucasian populations in the United States and the United Kingdom (Lynn, 1987). Generalizations are largely derived from studies of the intelligence of the Japanese and of ethnic Orientals in the United States (Lynn, Pagliari, & Chan, 1988). The principal distinguishing features of the Caucasian and Oriental populations are that Oriental students' scores are

characterized by somewhat higher general intelligence or Spearman's g as assessed by tests of abstract reasoning or from the factor scores derived from the first principal component of the Wechsler tests (Wechsler, 1967, 1974, 1981). Orientals also tend to have high scores on tests of visual-spatial abilities, as represented by tests of spatial intelligence and perceptual speed. On the other hand, scores on tests of verbal abilities appear to be relatively low among Oriental populations.

For instance, Lynn, et al. (1988) conducted a study to ascertain values for some of the major visual-spatial and verbal abilities in Hong Kong children. Samples of 10-year-old children in Hong Kong and the United Kingdom were administered the Progressive Matrices (Raven, Court, & Raven, 1983). These groups of children were matched for years of schooling and socioeconomic status (SES). The results indicated that the Hong Kong sample obtained a significantly higher mean on the Progressive Matrices than the British sample. Hong Kong boys obtained a mean percentile of 71.48, which is equivalent to an IQ of 108.5. Hong Kong girls obtained a mean percentile of 68.44, which is equivalent to an IQ of 107.4. On the other hand, British boys and girls obtained an identical mean percentile of 51.72, which is equivalent to an IQ of 100.5.

The children were also administered the Space Relations and Perceptual Speed Scales from the Primary Mental

Abilities Test (PMA) (Cattell, 1971) and a word fluency test to measure verbal abilities. The results indicated that Hong Kong children resembled Japanese children in having high Spearman's g, high spatial ability, high perceptual speed, and low word fluency. The findings that both Hong Kong and Japanese children obtain higher means on spatial ability than they do on Spearman's g confirm previously noted characteristics of Oriental populations.

The present study differs from previous studies (e.g., Cummins, 1981; Collier, 1987) in that immigrant children were tested in both their L1 and L2. Unless test results in the two languages are compared, it may not be possible to obtain an accurate estimate of a child's academic potential and current functioning. Predictive variables such as children's age, gender, AOA, LOR in Canada, prior experience with English, frequency of use of Cantonese, and parents' educational attainments and occupations were included for regression analyses in order to determine their relationship to subjects' performance on cognitive and language measures.

The present study had three hypotheses. First, it was hypothesized that immigrant students' AOA and LOR in Canada and performance on standardized tests would be correlated. Thus, the longer the immigrant children have obtained education in Canada (or LOR), the better their performance on the English measures should be. On the contrary, due to lack of enrichment, the longer they have been in Canada, the

poorer their performance on the Chinese measure would be. With regard to AOA, older learners were hypothesized to have better performance than younger learners on the English measures. Older learners were also hypothesized to have better performance on the Chinese measure because older learners would have obtained education in Chinese longer than the younger ones. Secondly, subjects' HK-WISC performance was hypothesized to have a significant positive correlation with their performance on the SB: FE. If there is interdependence of CALP across languages, the subjects' HK-WISC performance should be predictive of performance on the SB: FE. Finally, it was hypothesized that there would be a high nonverbal and low verbal abilities profile on the SB: FE. Subjects' performance on nonverbal measures (e.g., the SB Pattern Analysis & Matrices subtests) would be significantly better than their performance on the verbal measures (e.g., the SB Vocabulary & Memory for Sentences subtests). On the other hand, this profile should not be present in the HK-WISC performance because the HK-WISC was standardized in Hong Kong, where the subjects migrated from. As a result, there would be a larger difference between their HK-WISC and SB: FE scores in verbal than nonverbal areas.

CHAPTER III

METHODOLOGY

3.1 SUBJECTS

Thirty-three Cantonese-speaking immigrant students from Hong Kong were recruited for this study. In order to eliminate practice effects, none of these children had been previously tested with the Hong Kong-Wechsler Intelligence Scale for Children (HK-WISC) (Yung, 1981), other Wechsler Intelligence Scales (Wechsler, 1967, 1974, 1981), the Stanford-Binet Intellience Scale: Fourth Edition (SB: FE) (Thorndike, Hagen, & Sattler, 1986a), or the Woodcock Language Proficiency Battery (WLPB) (Woodcock, 1984). All children were placed in a regular classroom. One subject's age on arrival (AOA) was 3.33 years and length of residence (LOR) was 6.33 years, which were significantly different from the other subjects' AOA (mean AOA was 9.27 years, with a minimum of 6.42 & a maximum of 11.83 years) and LOR (mean LOR was 1.74 years, with a minimum of .67 year & a maximum of 3.17 years). The initial statistical analyses indicated that this subject's AOA and LOR significantly affected the results of the stepwise regression analyses. Therefore, this subject's data were excluded from the final statistical analyses. This study had a final sample of 32 subjects. They were students from four Richmond schools whose grade placement ranged from 4-7. There were 21 male and 11 female

students. The mean age of this sample was 11.01 years, with a range of 9.33 to 13.50 years.

3.2 MATERIALS

The present study involved three measures. Two were IQ tests and one was a language test. One of the IQ measures was given in Cantonese (subjects' native language, L1), while the other was given in English (subjects' second language, L2). The purpose of giving these two IQ tests was to determine subjects' performance differences on measures that were given in their L1 and L2. On the other hand, the language measure was given in English in order to obtain more information on subjects' English language proficiency.

The SB: FE Technical Manual (Thorndike, Hagen, & Sattler, 1986b) reports correlations between the SB Area and Test Composite scores and the Wechsler Intelligence Scale for Children-Revised (WISC-R) (Wechsler, 1974) for a sample of 205 non-exceptional children. The correlation between the SB Test Composite score and WISC-R Verbal Scale score was .78; with WISC-R Performance Scale score it was .73; and with WISC-R Full Scale score it was .83. The scores on the SB Verbal Reasoning Area correlated .72 with WISC-R Verbal Scale score, .60 with WISC-R Performance Scale score, and .73 with WISC-R Full Scale scores. Scores on the SB Abstract/Visual Reasoning, Quantitative Reasoning, and Short-Term Memory Areas correlated about equally as high

with the WISC-R Verbal and Performance Scale scores. For the WISC-R Verbal Scale, the correlations ranged from .64-.68; and for the WISC-R Performance Scale, they ranged from .63-.67.

Since the publication of the SB: FE, a number of independent validation studies have been reported. One study (Livesay, 1986) compared SB Area Standard Age Scores (SAS) and Test Composite with WISC-R IQ scores of 166 gifted white elementary children. Mean WISC-R Full Scale score was significantly different from the mean SB Test Composite (123.33 vs. 120.63). Correlations between the various scales were .55 (WISC-R Full Scale vs. SB Test Composite), .58 (WISC-R Full Scale vs. Verbal Reasoning), .28 (WISC-R Full Scale vs. Abstract/Visual Reasoning), .38 (WISC-R Full Scale vs. Quantitative Reasoning), and .31 (WISC-R Full Scale vs. Short-Term Memory). Livesay (1986) found that scores on the SB: FE were slightly lower than the WISC-R IQs and indicated that while the SB: FE is an acceptable alternative to the WISC-R, use of the SB: FE in evaluation of the gifted would reduce the number of students meeting eligibility requirements.

Carvajal & Weyand (1986) reported a correlation of .78 between SB: FE SAS and WISC-R IQs for 23 third-grade children. There was no significant difference between the SB Test Composite mean (113.3) and the WISC-R Full Scale mean (115). Rothlisberg (1987) obtained a significant

difference between the WISC-R Full Scale mean (112.53) and the SB Test Composite mean (105.53) in a sample of 32 first and second grade children. However, the magnitude of the correlation between the SB: FE SAS and WISC-R IQs was similar (r = .77).

In summary, the magnitude of the correlations between the SB: FE and the WISC-R and the degree of correspondence between the respective means suggest that the tests share a common conceptual background.

In this study, the Hong Kong-Wechsler Intelligence Scale for Children (HK-WISC) (Yung, 1981), the short form of the Stanford-Binet Intelligence Scale: Fourth Edition (SB: FE) (Thorndike, et al., 1986a), and the Woodcock Language Proficiency Battery-English Form (WLPB) (Woodcock, 1984) were administered to the subjects.

The HK-WISC (Yung, 1981) is basically a modification of the Wechsler Intelligence Scale for Children (WISC) (Wechsler, 1949) and the WISC-R (Wechsler, 1974) administered in Cantonese (a southern Chinese dialect commonly used in Hong Kong). The HK-WISC was introduced after 2 years of work on adaptation, translation, modification, and standardization on a representative sample of 1,100 5-15 years old Chinese children in Hong Kong (Lau & Lee, 1986). Although most subtest items are translated equivalents of the WISC or WISC-R, a few items are adapted from the 1971 British version of the WISC and the Wechsler

Adult Intelligence Scale (WAIS) (Wechsler, 1955). Efforts were made to avoid items specific to American culture (Chan, 1984). There are 12 subtests, and they have been divided into Verbal Scale subtests (Information, Similarities, Arithmetic, Vocabulary, Comprehension, and Digit Span) and Performance Scale subtests (Picture Completion, Picture Arrangement, Block Design, Object Assembly, Coding, and Mazes). Among these subtests, Vocabulary is the only subtest that is not a translated equivalent; the language difference required construction of Cantonese items (Chan, 1984). According to Lee and Lam (1988), the factor-analytic properties (factor pattern matrices, covariance matrices of common factors, and the matrices of uniqueness) of the HK-WISC are invariant from those on the WISC-R. Lau and Lee (1986) have suggested that the HK-WISC has satisfactory reliability. The HK Verbal, Performance, and Full Scale IQs have an average relaibility coefficient of .91, .81, and .91 respectively. These average coefficients are comparable to those of the WISC-R (.94 for Verbal, .90 for Performance, & .96 for Full Scale IQs) (Wechsler, 1974).

The SB: FE (Thorndike et al., 1986a) is designed for ages 2-0 to 23 years. In the complete battery of the SB: FE, some of the subtests are administered only at the preschool and elementary school ages (e.g., Absurdities and Copying), while others are administered only at the upper year levels (e.g., Number Series and Equation Building). Of

the 15 subtests, only 6 run throughout the scale - Vocabulary, Comprehension, Pattern Analysis, Quantitative, Bead Memory, and Memory for Sentences. These six subtests make up the short form of the SB: FE. In addition to these six subtests, the Matrices subtest was also administered in this study. Thus, a total of seven SB: FE subtests were given to the subjects. The major advantage of using the short form is that every child was exposed to the same types of subtests. Standard age scores (SAS) can be obtained in four areas: Verbal Reasoning, Abstract/Visual Reasoning, Quantitative Reasoning, and Short-Term Memory. The SB Test Composite is based upon these four area scores. The short form can yield estimates of two factor scores: Verbal Comprehension (Vocabulary, Comprehension, and Memory for Sentences) and Nonverbal Reasoning/Visualization (Pattern Analysis, Quantitative, and Bead Memory) using Sattler's (1988) method. His analysis results with varimax rotation suggest the development of these two factor scores in guiding interpretations needed for clinical and psycho-educational evaluations. The Verbal Comprehension Factor score differs from the Verbal Reasoning SAS in that the Memory for Sentences subtest score is included. On the other hand, the Nonverbal Reasoning/Visualization Factor Score differs from the Abstract/Visual Reasoning SAS in that the Quantitative and Bead Memory subtest scores are

included. According to Sattler (1988), the SB: FE has excellent norms, reliability, and validity.

The WLPB (Woodcock, 1984) represents selected portions of the Woodcock-Johnson Psycho-Educational Battery (Woodcock, 1977). The WLPB has eight subtests with norms for age 3 to geriatric level. Four subtest cluster scores are the primary sources for interpretation of an individual's performance: (1) Oral Language (Picture Vocabulary, Antonyms-Synonyms, & Analogies), (2) Reading (Letter-Word Identification, Word Attack, & Passage Comprehension), (3) Written Language (Dictation & Proofing), and (4) Broad Language (Oral Language, Reading, & Written Language). According to Noyce (1985) and Quinn (1985), the WLPB is a promising tool that will furnish a comprehensive picture of an individual's language skills (in English & Spanish) for a broad range of purposes. In addition, Anderson and Morris (1989) suggest that the WLPB may be a useful tool for the assessment of culturally diverse students.

3.3 PROCEDURES

Before carrying out this study, permission for conducting it was obtained from various sources. First, general permission was obtained from the Department of Educational Psychology and Special Education of the University of British Columbia, the University of British

Columbia's Behavioral Sciences Screening Committee, and Richmond School Board. Secondly, consent was obtained from the subjects' parents (see Appendix A). When the parents had given consent for their child to participate in this study, they were asked to complete a Background Information Form (see Appendix B).

After obtaining permission, the researcher administered the HK-WISC, SB: FE, and WLPB to the children. In order to control progressive errors, such as practice and boredom effects, test administration was counterbalanced. Thus, half of the children were tested with the HK-WISC and the first four subtests of the WLPB first, while half were tested with the SB: FE and the first four subtests of the WLPB first. Therefore, the WLPB was administered in two sessions. The time interval between tests was 1 month because Anastasi (1988) has suggested that intelligence tests can be given after approximately an 1-month interval for determining retest reliability. Each child was identified by a serial number so that his/her identity remained confidential. According to standardized procedures, each child was tested in two sessions, each lasting for approximately 1 1/2 hours. Testing took place in a room located in the child's school. It was presumed that the children would not remember enough items to influence others' performance.

On the HK-WISC, raw scores were converted into scaled scores (M = 10 & SD = 3) within the examinee's own age group. Then these scaled scores were used to obtain Deviation IQs, including a Verbal Scale IQ, a Performance Scale IQ, and a Full Scale IQ. These can also be referred to as standard scores (M = 100 & SD = 15). The Verbal Scale IQ is based on the Verbal subtests (except Digit Span), while the Performance Scale IQ is based on the Performance subtests (except Mazes). All the conversion tables can be found in the HK-WISC Manual (Yung, 1981). On the SB: FE, raw scores were first converted into SAS or scaled scores (M = 50 & SD = 8) within the examinee's own age group. Then these scaled scores were used to obtain area scores (M = 100 & SD = 16). Finally, these area scores were converted into a Composite Score (M = 100 & SD = 16). The Composite Score is similar to the Deviation IQ employed on the Wechsler scales (Sattler, 1988). The conversion tables can be found in the Guide for Administering and Scoring, the Standford-Binet Intelligence Scale: Fourth Edition (Thorndike, et al., 1986a). On the WLPB, raw scores were converted into part scores. Then the part scores for each cluster were summed to obtain the cluster score. The cluster score for Broad Language was obtained by summing the cluster scores for Oral Language, Reading, and Written Language, and then dividing by three. For all clusters a value of 500 represents the level of performance

approximately equal to the beginning fifth-grade level of English-speaking pupils in the United States. The range of most cluster scores extends from a low of less than 400 to a high of about 600. A standard score scale, based upon a mean of 100 and a standard deviation of 15, is provided. These standard scores are based on the distance a subject's cluster score is above or below the average cluster score for the group with which comparison is being made (e.g., the subject's grade placement). A cluster difference score of zero means that the subject's cluster score is the same as the average cluster score for the reference group. The conversion tables can be found in the Examiner's Manual of the WLPB (Woodcock, 1984).

3.4 STATISTICAL ANALYSES

Means and standard deviations of children's performance on the IQ and language measures were computed in order to test the third hypothesis regarding the high nonverbal and lower verbal abilities profile. For testing the second hypothesis, that is, to determine if performance on the HK-WISC could be used to predict performance on the SB: FE, HK-WISC Full Scale scores and SB Test Composite scores were correlated. Pearson correlation matrices were constructed to determine the correlations and intercorrelations of subtest and summary scores. Several stepwise multiple regression analyses were performed in order to determine the

significant predictive variables (e.g., AOA & LOR) on the present psychometric battery. The combination of AOA and LOR for regression analyses was especially significant for testing this study's first hypothesis. Due to the small sample size, several stepwise multiple regression analyses were performed instead of using one. If a significant correlation was found between a predictor and summary score, analysis of variance (ANOVA) was computed to determine the significant differences between groups. The results are reported in Chapter 4.

CHAPTER IV

RESULTS

This chapter presents the results of the statistical analyses conducted for this study. These results include the descriptive statistics for each of the predictive variables and subjects' performance on the IQ and language measures, Pearson correlation coefficients of the predictors and subtest and summary scores, results of the stepwise multiple regression analyses, and subsequent operations of analysis of variance (ANOVA) to determine the significant differences between groups.

4.1 DESCRIPTIVE STATISTICS

4.1.1 Demographic Information

In the present study, the following predictive variables of each subject were included: age on arrival (AOA), length of residence in Canada (LOR), age of child (AOC), gender, school, grade, father's highest educational attainment (father's education), mother's highest educational attainment (mother's education), father's occupation (HK), father's occupation (Canada), mother's occupation (HK), mother's occupation (Canada), whether the child studied English before, months of studying English before (MSEB), whether the child studied Chinese before, months of studying Chinese before (MSCB), whether the child was receiving education in Chinese, frequency of studying

Chinese (FREQSC), and frequency of speaking Cantonese at home.

Table 1

Means and Standard Deviations of Some of the Predictive Variables

Predictor	M	SD
Age on Arrival (AOA)	9.27	1.29
Length of Residence (LOR)	1.74	.65
Age of Child (AOC)	11.01	1.18
Months of Studying English Before (MSEB)	35.75	23.96
Months of Studying Chinese Before (MSCB)	50.00	15.39
Frequency of Studying Chinese (FREQSC)	1.28	2.90

Note. n = 32

Table 1 shows the means and standard deviations of some of the predictors. The mean AOA was 9.27 years (with a minimum of 6.42 & a maximum of 11.83 years). The mean LOR was 1.74 years (with a minimum of .67 year & a maximum of 3.17 years). The 32 children in this study had a mean age of 11.01 years (ranging from 9.33 to 13.50 years old). There were 21 male and 11 female students. They were attending grades 4-7 (10 in grade 4, 11 in grade 5, 7 in grade 6, & 4 in grade 7) at four different schools (8 at Brighouse, 21 at Diefenbaker, 1 at McKinney, & 2 at St. Francis Xavier). Family's socioeconomic status (SES) was also included in the present study. The family status variables were parents' highest educational attainments and

occupations in Canada and Hong Kong. Table 2 shows the parents' highest educational attainments. Most of the parents (41%) had grade 12/13 education. However, more subjects' fathers (41%) than mothers (16%) had post secondary school trainings.

Table 2

Parents' Highest Educational Attainments

	Parent	
Educational Attainment	Father	Mother
Grade 6	1	3
Grades 7-9	2	5
Grades 10-11	4	5
Grade 12/13	12	14
College/Technical School	4	4
University	9	1

Note. n = 32

Table 3

Parents' Occupations

	Father		Mother	
Occupation	Canada	Hong Kong	Canada	Hong Kong
Professional	7	5	5	5
Managerial	18	22	4	4
Clerical	0	0	4	6
Sales	3	3	2	3
Service	4	2	2	0
Housewife	0	0	14	14
Others	0	0	1	0

Note. n = 32

As shown in Table 3, most of the subjects' fathers were in managerial positions (both in Canada & Hong Kong). On the other hand, most of the mothers were housewives (both in Canada & Hong Kong).

Among the subjects, 25 (78%) had studied English when they were attending schools in Hong Kong. The duration (MSEB) ranged from 1.50 to 6 years. On the other hand, all of these subjects had studied Chinese before they came to Canada. In this case, the duration (MSCB) ranged from 2 to 7 years. When the subjects were tested in this study, 10 (31%) of them were studying Chinese. The frequency of their Chinese lessons (FREQSC) ranged from 2 to 15 hours per week. Finally, 21 (66%) of the subjects 'often' speak Cantonese at home, while 11 (34%) 'always' speak Cantonese at home.

4.1.2 Performance on the Hong Kong-Wechsler Intelligence Scale for Children (HK-WISC)

Table 4 shows the means and standard deviations of the HK-WISC (Yung, 1981) summary and subtest scores. As shown in the table, subjects' mean Full and Performance Scale scores were in the High Average range. On the other hand, their mean Verbal Scale score was in the Average range. Subjects' mean Verbal and Performance Scale scores were not significantly different.

On the Verbal subtests, the subjects obtained the highest mean score on the Comprehension subtest (best performance among all the HK-WISC subtests) but the lowest

mean score on the Arithmetic subtest. On the Performance subtests, they obtained the highest mean score on the Coding subtest but the lowest mean score on the Picture Completion subtest. Overall, their mean subtest scores were within 1 standard deviation above or below the mean, except on the Comprehension, Block Design, and Coding subtests (more than 1 standard deviation above the mean).

Table 4

Means and Standard Deviations of the HK-WISC Scores

HK-WISC	M	SD
Summary Scale:a		
Full	112.41	10.71
Verbal	108.00	12.21
Performance	113.91	11.73
Subtest:b		
Information	9.22	2.60
Similarities	12.88	2.42
Arithmetic	9.19	2.24
Vocabulary	10.53	2.30
Comprehension	14.06	3.44
Digit Span	11.03	2.82
Picture Completion	9.78	2.51
Picture Arrangement	12.03	3.32
Block Design	13.09	2.93
Object Assembly	12.09	2.96
Coding	13.41	3.73
Mazes	11.25	2.19

Note. n = 32
a - Summary scores have a mean of 100 and a standard deviation of 15. Average range is 90-109.
b - Subtest scores have a mean of 10 and a standard deviation of 3. Average range is 7-13.

4.1.3 Performance on the Stanford-Binet Intelligence Scale: Fourth Edition (SB: FE)

Table 5 shows the subjects' performance on the SB: FE (Thorndike, Hagen, & Sattler, 1986a).

Table 5

Means and Standard Deviations of the SB: FE Scores

SB: FE	M	SD
Summary:a		
Test Composite	92.50	11.12
Verbal Reasoning	79.16	13.27
Abstract/Visual Reasoning	112.63	13.42
Quantitative Reasoning	96.25	16.13
Short-Term Memory	84.69	13.35
Verbal Comprehension	71.84	12.06
Nonverbal Reasoning/Visualization	104.94	12.03
Subtest:b		
Vocabulary	37.00	6.27
Comprehension	43.91	7.77
Pattern Analysis	56.00	7.38
Matrices	55.13	7.73
Quantitative	48.13	8.07
Bead Memory	52.16	7.85
Memory for Sentences	34.69	5.58

Note. n = 32
a - Summary scores have a mean of 100 and a standard deviation of 16. Average range is 89-110.
b - Subtest scores have a mean of 50 and a standard deviation of 8. Average range is 42-58.

These subjects' mean Test Composite and Quantitative Reasoning standard age scores (SAS) were in the Average range. On the other hand, their mean Verbal Reasoning and Short-Term Memory SAS were in the Low Average range. However, their mean Abstract/Visual Reasoning SAS was in the High Average range. Regarding the two factor scores (Sattler, 1988), their mean Verbal Comprehension Factor

Score was in the classification of Slow Learner, while their mean Nonverbal Reasoning/Visualization Factor Score was average. Their mean Verbal Comprehension Factor Score was 7.32 points lower than their mean Verbal Reasoning SAS. In addition, their mean Nonverbal Reasoning/Visualization Factor Score was 7.69 points lower than their mean Abstract/Visual Reasoning SAS. Overall, their Verbal and Nonverbal summary scores were significantly different. Their best performance was in Abstract/Visual Reasoning and their worst performance was in Verbal Comprehension.

Among the seven mean subtest scores, the following were within 1 standard deviation above or below the mean: Comprehension, Pattern Analysis, Matrices, Quantitative, and Bead Memory subtests. However, their mean Vocabulary subtest score was more than 1 standard deviation below the mean. In addition, their mean Memory for Sentences subtest score was about 2 standard deviations below the mean. In sum, they did best on the Pattern Analysis subtest and worst on the Memory for Sentences subtest.

4.1.4 Differences between Subjects' HK-WISC and SB: FE Summary Scores

Subjects' summary scores on the HK-WISC and SB: FE were compared in order to obtain a better understanding of their cognitive/academic potential. Comparisons were made between the following scores: Full Scale (FS), Verbal Scale (VS), and Performance Scale (PS) of the HK-WISC with Test

Composite (TC), Verbal Reasoning (VR), Verbal Comrehension (VC), Abstract/Visual Reasoning (AVR), and Nonverbal Reasoning/Visualization (NVRV) of the SB: FE.

As shown in Table 6, only one subject did not have a higher HK Full Scale than SB Test Composite score. In fact, this was the only subject who performed better in English than Chinese with regard to the Verbal and Performance/ Nonverbal scores. The differences between the two test composite scores ranged from 8-46 points (M = 19.91 & SD = 11.81).

Table 6

Subjects' Differences on the HK-WISC and SB: FE Summary Scores

	HK-WISC>SB: FE				
Range	FS>TC	VS>VR	VS>VC	PS>AVR	PS>NVRV
1-10	4a	1	0	8	10
11-20	12	8	3	7	10
21-30	11	6	7	1	5
31-40	3	7	8	0	0
41-50	1	4	6	0	0
51-60	0	4	4	0	0
61-70	0	0	3	0	0

Note. n = 32
a - Number of Subjects

Subjects had greater differences between their performance in Verbal (VS>VR: 1-58 & VS>VC: 11-66) than Performance/Nonverbal areas (PS>AVR: 1-24 & PS>NVRV: 1-27). The mean difference between their HK Verbal Scale and SB Verbal Reasoning scores was 28.84 (SD = 17.99). In

addition, the mean difference between their HK Verbal Scale and SB Verbal Comprehension scores was 36.16 (SD = 17.37). On the contrary, the mean of their differences between the HK Performance Scale and SB Abstract/Visual Reasoning scores was only 1.28 (SD = 12.05). In fact, 14 (44%) of these subjects had a higher score in SB Abstract/Visual Reasoning. On the other hand, the mean difference between their HK Performance Scale and SB Nonverbal Reasoning/Visualization scores was 8.97 (SD = 11.42). In this case, 6 (19%) of them had better performance in SB Nonverbal Reasoning/ Visualization. Overall, these subjects' Verbal cognitive abilities differed more than Nonverbal abilities with regard to their native (L1) and second (L2) languages.

4.1.5 Performance on the Woodcock Language Proficiency Battery (WLPB)

On the WLPB (Woodcock, 1984), the subjects had a mean standard score of 76.44 (SD = 12.02) in Oral Language (Picture Vocabulary, Antonyms-Synonyms, & Analogies). In Reading (Letter-Word Identification, Word Attack, & Passage Comprehension), their mean standard score was 79.34 (SD = 12.68). In Written Language (Dictation & Proofing), they had a mean standard score of 93.88 (SD = 13.03). As a result, their mean Broad Language standard score was 83.66 (SD = 14.36). Overall, their mean Oral Language, Reading, and Broad Language standard scores were more than 1 standard deviation (15) below the mean (100), while their mean

performance in Written Language was within 1 standard deviation below the mean.

4.2 PEARSON CORRELATION MATRICES

Pearson correlation matrices were computed in order to determine the relationships between subtest and summary scores. Intercorrelations among individual tests were also determined. In addition, all the predictive variables' intercorrelations were computed.

4.2.1 Correlations between Summary Scores

Pearson correlation matrices were computed between the IQ and language measures in order to determine the relationships between their summary scores (see Tables 7-12).

The results in Tables 7-9 can be summarized as follows. First, the HK Full Scale scores had significant correlations with the Verbal and Performance Scale scores of the HK-WISC and Test Composite, Quantitative Reasoning, and Nonverbal Reasoning/Visualization scores of the SB: FE. Secondly, the HK Verbal Scale scores correlated significantly with the HK Full Scale, HK Performance Scale and SB Quantitative Reasoning scores. Interestingly, the HK Verbal Scale scores had no correlation with the SB Verbal Reasoning SAS. Thirdly, the HK Performance Scale scores were significantly correlated with the Full and Verbal Scale scores of the HK-WISC and Test Composite, Abstract/Visual Reasoning,

Quantitative Reasoning, and Nonverbal Reasoning/ Visualization scores of the SB: FE. Finally, all these scale scores had no significant correlations with any of the WLPB standard scores. Overall, the HK Verbal Scale scores had the highest correlation with the HK Full Scale scores (r = .82, $p<.01$).

Table 7

Correlations of the HK-WISC Summary Scores

	HK-WISC Scale		
HK-WISC Scale	Full	Verbal	Performance
Full	1.00	.82**	.78**
Verbal	.82**	1.00	.30*
Performance	.78**	.30*	1.00

Note. * - Significant at the .05 level
** - Significant at the .01 level

Table 8

Correlations between the HK-WISC and SB: FE Summary Scores

	HK-WISC Scale		
SB: FE	Full	Verbal	Performance
Test Composite	.42**	.20	.48**
Verbal Reasoning	.06	.00	.07
Abstract/Visual Reasoning	.29	-.05	.55**
Quantitative Reasoning	.59**	.57**	.36*
Short-Term Memory	.19	-.01	.28
Verbal Comprehension	.08	-.02	.14
Nonverbal Reasoning/ Visualization	.51**	.29	.54**

Note. * - Significant at the .05 level
** - Significant at the .01 level

Table 9

Correlations between the HK-WISC and WLPB Summary Scores

	HK-WISC Scale		
WLPB	Full	Verbal	Performance
Oral Language	.23	.26	.10
Reading	.06	.07	.02
Written Language	.20	.25	.06
Broad Language	.20	.23	.08

Table 10

Correlations of the SB: FE Summary Scores

	SB: FE						
SB: FE	TC	VR	AVR	QR	STM	VC	NVRV
Test Composite (TC)	1.00	.64**	.74**	.66**	.75**	.77**	.91**
Verbal Reasoning (VR)	.64**	1.00	.27	.19	.47**	.92**	.33*
Abstract/Visual Reasoning (AVR)	.74**	.27	1.00	.32*	.46**	.41**	.74**
Quantitative Reasoning (QR)	.66**	.19	.32*	1.00	.23	.28	.70**
Short-Term Memory (STM)	.75**	.47**	.46**	.23	1.00	.68**	.75**
Verbal Comprehension (VC)	.77**	.92**	.41**	.28	.68**	1.00	.49**
Nonverbal Reasoning/ Visualization (NVRV)	.91**	.33*	.74**	.70**	.75**	.49**	1.00

Note. * - Significant at the .05 level
** - Significant at the .01 level

Table 11

Correlations between the SB: FE and WLPB Summary Scores

	WLPB			
SB: FE	Oral Language	Reading	Written Language	Broad Language
Test Composite	.63**	.55**	.44**	.59**
Verbal Reasoning	.75**	.52**	.48**	.60**
Abstract/Visual Reasoning	.21	.25	.04	.19
Quantitative Reasoning	.40*	.27	.30*	.35*
Short-Term Memory	.52**	.58**	.49**	.60**
Verbal Comprehension	.83**	.69**	.61**	.74**
Nonverbal Reasoning/ Visualization	.40*	.39*	.29	.42**

Note. * - Significant at the .05 level
** - Significant at the .01 level

From Tables 8, 10, and 11, the following relations can be noted. First, the SB Test Composites were significantly correlated with all the HK-WISC, SB:FE, and WLPB summary scores, except the HK Verbal Scale scores. Second, the SB Verbal Reasoning scores correlated significantly with the Test Composite, Short-Term Memory, Verbal Comprehension, and Nonverbal Reasoning/Visualization scores of the SB: FE and all the WLPB summary scores. However, the SB Verbal Reasoning scores did not have a significant correlation with any HK-WISC Scale scores. Third, the SB Abstract/Visual Reasoning scores had significant correlations with the HK Performance Scale and Test Composite, Quantitative Reasoning, Short-Term Memory, Verbal Comprehension, and

Nonverbal Reasoning/Visualization scores of the SB: FE. However, the SB Abstract/Visual Reasoning scores did not significantly correlate with the WLPB summary scores. Fourth, the SB Quantitative Reasoning scores were significantly correlated with the Test Composite, Abstract/Visual Reasoning, and Nonverbal Reasoning/ Visualization scores of the SB: FE and the WLPB standard scores in Oral Language, Written Language, and Broad Language. In addition, all the SB Quantitative Reasoning scores correlated significantly with the HK-WISC Scale scores. Fifth, the SB Short-Term Memory scores correlated significantly with all the SB: FE (except in Quantitative Reasoning) and WLPB summary scores. However, these memory scores did not have a significant correlation with the HK-WISC Scale scores. Sixth, the SB Verbal Comprehension Factor scores had significant correlations with all the SB: FE summary scores (except in Quantitative Reasoning) and all the WLPB summary scores. However, these factor scores did not correlate significantly with the HK-WISC Scale scores. Finally, the Nonverbal Reasoning/Visualization Factor scores were significantly correlated with the HK Full Scale, HK Performance Scale, and WLPB standard scores in Oral Language, Reading, and Broad Language. Moreover, these factor scores had significant correlations with all the SB: FE summary scores. Overall, the Nonverbal Reasoning/

Visualization Factor scores had the highest correlation with the SB Test Composites (r = .91, p<.01).

Table 12

Correlations of the WLPB Summary Scores

	WLPB			
WLPB	Oral Language	Reading	Written Language	Broad Language
Oral Language	1.00	.76**	.72**	.89**
Reading	.76**	1.00	.78**	.93**
Written Language	.72**	.78**	1.00	.87**
Broad Language	.89**	.93**	.87**	1.00

Note. ** - Significant at the .01 level

As shown in Table 12, the WLPB summary scores correlated significantly with each other. However, the Reading standard scores had the highest correlation with the Broad Language standard scores (r = .93, p<.01).

4.2.2 Correlations between Subtest Scores

A Pearson correlation matrix was computed in order to determine the correlations between the HK-WISC and SB: FE subtests.

Table 13

Correlations between the HK-WISC and SB: FE Subtests

	SB: FE						
HK-WISC	VOCAB	COMP	PANALYSIS	MATRICES	QUANT	BMEMORY	SMEMORY
Verbal:							
Information	-.23	.15	-.22	.17	.55**	-.02	-.08
Similarities	.04	.17	-.01	.16	.48**	.13	.05
Arithmetic	.07	.15	.11	.13	.36*	.24	.10
Vocabulary	-.21	.14	-.28	.01	.36*	-.22	-.14
Comprehension	-.20	-.02	-.24	.00	.38*	-.03	-.11
Digit Span	-.06	.23	.28	.05	.18	.34*	.34*
Performance:							
Picture Completion	-.22	.05	-.03	.05	.33*	.09	.00
Picture Arrangement	.10	.01	-.04	.45**	.35*	.22	.17
Block Design	.28	.57**	.67**	.44**	.24	.49**	.46**
Object Assembly	-.31*	-.27	.35*	.37*	.22	.14	-.05
Coding	-.02	.06	.05	.05	-.12	-.19	.00
Mazes	.21	.31*	.15	.26	.27	.37*	.23

Note. * - Significant at the .05 level
** - Significant at the .01 level

Table 13 shows several findings. First, the Picture Completion, Picture Arrangement, and all the Verbal subtest scores (except Digit Span) of the HK-WISC had significant correlations with the SB Quantitative (QUANT) subtest scores. Second, the Digit Span and Block Design subtest scores correlated significantly with the SB Bead Memory (BMEMORY) and Memory for Sentences (SMEMORY) subtest scores. Third, the Picture Arrangement, Block Design, and Object Assembly subtest scores were significantly correlated with the SB Matrices subtest scores. Fourth, only the scores on Block Design and Mazes subtests had significant correlations with the SB Comprehension (COMP) subtest scores. Fifth, the

Block Design and Object Assembly subtest scores correlated significantly with the SB Pattern Analysis (PANALYSIS) subtest scores. Sixth, only the scores on the Object Assembly subtest significantly correlated (the only significant negative correlation) with the SB Vocabulary (VOCAB) subtest scores. Finally, only the scores on the Coding subtest did not have a significant correlation with any SB: FE subtest scores.

4.2.3 Correlations between the SB: FE Subtest and WLPB Summary Scores

Table 14 presents the following findings. First, the SB Vocabulary, Comprehension, and Memory for Sentences subtest scores had significant correlations with all the WLPB summary scores. Secondly, the scores on the SB Pattern Analysis subtest only had a significant correlation with the Reading standard scores. Thirdly, the SB Matrices subtest scores did not have a significant correlation with the WLPB summary scores. Fourthly, the SB Quantitative subtest scores were significantly correlated with the WLPB summary scores (except in Reading). Finally, the SB Bead Memory subtest scores had significant correlations with the WLPB Reading and Broad Language standard scores. Overall, the Memory for Sentences subtest scores had the highest correlations with all the WLPB summary scores.

Table 14

Correlations between the SB: FE Subtest and WLPB Summary Scores

	WLPB			
SB: FE	Oral Language	Reading	Written Language	Broad Language
Vocabulary	.70**	.54**	.43**	.57**
Comprehension	.61**	.37*	.40*	.48**
Pattern Analysis	.25	.34*	.16	.26
Matrices	.09	.09	-.07	.06
Quantitative	.40*	.27	.30*	.35*
Bead Memory	.23	.30*	.25	.33*
Memory for Sentences	.75**	.76**	.66**	.75**

Note. * - Significant at the .05 level
** - Significant at the .01 level

4.2.4 Intercorrelations of Subtest and Summary Scores

Pearson correlation matrices were computed in order to determine the intercorrelations of the HK-WISC and SB: FE scores.

As shown in Table 15, the HK Information subtest scores had the highest correlations with the HK Full (r = .69, p<.01) and Verbal (r = .87, p<.01) Scale scores. On the other hand, the HK Picture Arrangement subtest scores had the highest correlation with the HK Performance Scale scores (r = .60, p<.01). Overall, the highest significant correlation was between the HK Verbal Scale and Information subtest scores (r = .87, p<.01).

Table 15

Correlations between the HK-WISC Subtest and Summary Scores

HK-WISC Subtest	HK-WISC Summary Scale		
	Full	Verbal	Performance
Verbal:			
Information	.69**	.87**	.21
Similarities	.64**	.71**	.33*
Arithmetic	.40*	.50**	.15
Vocabulary	.57**	.76**	.12
Comprehension	.65**	.80**	.23
Digit Span	-.14	-.10	-.14
Performance:			
Picture Completion	.60**	.49**	.51**
Picture Arrangement	.59**	.35*	.60**
Block Design	.37*	.08	.54**
Object Assembly	.28	-.02	.55**
Coding	.28	-.04	.47**
Mazes	.03	-.09	.15

Note. * - Significant at the .05 level
** - Significant at the .01 level

Table 16 shows only the significant intercorrelations of the HK-WISC subtest scores. For the full matrix, please refer to Appendix C. As shown in this table, among the HK Verbal subtests, the Information and Comprehension subtest scores had the highest correlation (r = .68, p<.01). This correlation coefficient was also the highest among all the HK-WISC subtest intercorrelations. Between the Verbal and Performance subtest scores, both correlations between the Similarities and Picture Arrangement subtest scores and Comprehension and Picture Completion subtest scores were highest (r = .45, p<.01 in both cases). On the other hand,

the Performance subtest scores had no significant correlations with each other.

Table 16

Significant Intercorrelations of the HK-WISC Subtest Scores

	HK-WISC											
HK-WISC	INFO	SIM	ARITH	VOCAB	COMP	DS	PC	PA	BD	OA	COD	MAZ
Verbal:												
Information (INFO)	--	.41**	.42**	.62**	.68**	--.40*		--	--	--	--	--
Similarities (SIM)	.41**	--	--	.46**	.50**	--.43**		.45**	--	--	--	--
Arithmetic (ARITH)	.42**	--	--	--	--	--	--	--	.36*	--	--	--
Vocabulary (VOCAB)	.62**	.46**	--	--	.46**	--	--	--	--	--	--	--
Comprehension (COMP)	.68**	.50**	--	.46**	--	--.45**		--	--	--	--	--
Digit Span (DS)	--	--	--	--	--	--	--	--	--	--	--	--
Performance:												
Picture Completion (PC)	.40*	.43**	--	--	.45**	--	--	--	--	--	--	--
Picture Arrangement (PA)	--	.45**	--	--	--	--	--	--	--	--	--	--
Block Design (BD)	--	--	.36*	--	--	--	--	--	--	--	--	--
Object Assembly (OA)	--	--	--	--	--	--	--	--	--	--	--	--
Coding (COD)	--	--	--	--	--	--	--	--	--	--	--	--
Mazes (MAZ)	--	--	--	--	--	--	--	--	--	--	--	--

Note. * - Significant at the .05 level
** - Significant at the .01 level

Table 17

Correlations between the SB: FE Subtest and Summary Scores

	SB: FE Summary						
SB: FE Subtest	TCOM	VERBR	ABSTRACT	QUANT	S-TMEMORY	VERBC	NVERBAL
Vocabulary	.52**	.83**	.21	.10	.41**	.81**	.21
Comprehension	.58**	.89**	.26	.23	.41**	.78**	.35*
Pattern Analysis	.65**	.33*	.78**	.25	.46**	.45**	.59**
Matrices	.54**	.09	.79**	.29	.29	.20	.59**
Quantitative	.66**	.19	.32*	1.00	.23	.28	.70**
Bead Memory	.53**	.24	.31*	.10	.90**	.36*	.67**
Memory for Sentences	.77**	.63**	.49**	.32*	.79**	.88**	.57**

Note. * - Significant at the .05 level
** - Significant at the .01 level

Table 17 presents the following findings. First, the SB Memory for Sentences subtest scores had the highest correlations with the SB Test Composite (TCOM) (r = .77, p<.01) and Verbal Comprehension (VERBC) Factor (r = .88, p<.01) scores. Secondly, the SB Comprehension subtest scores had the highest correlation with the SB Verbal Reasoning (VERBR) SAS (r = .89, p<.01). Thirdly, the SB Matrices subtest scores had the highest correlation with the SB Abstract/Visual Reasoning (ABSTRACT) SAS (r = .79, p<.01). Fourthly, the SB Quantitative subtest scores had the highest correlation with the SB Nonverbal Reasoning/ Visualization (NVERBAL) Factor scores (r = .70, p<.01). Finally, besides the perfect correlation between the SB Quantitative subtest and Quantitative (QUANT) Reasoning scores, the highest significant correlation was between the

SB Bead Memory subtest and Short-Term Memory (S-TMEMORY) summary scores (r = .90, p<.01).

Table 18

Significant Intercorrelations of the SB: FE Subtest Scores

	SB: FE						
SB: FE	VOCAB	COMP	PANALYSIS	MATRICES	QUANT	BMEMORY	SMEMORY
Vocabulary (VOCAB)	--	.49**	.36*	--	--	--	.62**
Comprehension (COMP)	.49**	--	--	--	--	--	.49**
Pattern Analysis (PANALYSIS)	.36*	--	--	--	--	--	.52**
Matrices (MATRICES)	--	--	--	--	--	--	--
Quantitative (QUANT)	--	--	--	--	--	--	.32*
Bead Memory (BMEMORY)	--	--	--	--	--	--	.43**
Memory for Sentences (SMEMORY)	.62**	.49**	.52**	--	.32*	.43**	--

Note. * - Significant at the .05 level
** - Significant at the .01 level

Table 18 only presents the significant intercorrelations of the SB: FE subtest scores. For the full matrix, please refer to Appendix D. As shown in this table, the highest correlation was between the SB Vocabulary and Memory for Sentences subtest scores (r = .62, p<.01). In fact, Memory for Sentences subtest scores correlated significantly with all the other SB: FE subtest scores (except Matrices).

4.2.5 Intercorrelations of All the Predictive Variables

The following only mentions some of the significant intercorrelations of the predictors. For all the intercorrelations, please refer to Appendices E and F.

The 19 predictive variables can be grouped into three categories: (1) general (AOA, LOR, age of child, gender, school, & grade); (2) SES (parents' education & parents' occupations in Canada & Hong Kong); and (3) language (whether the child studied Chinese or English before, months of studying Chinese or English before, whether the child was receiving education in Chinese, frequency of studying Chinese, & frequency of speaking Cantonese at home).

Among the general variables, intercorrelation of AOA and age of child was highest (r = .86, p<.01). AOA and LOR also had a significantly high correlation (r = -.42, p<.01). Among the SES variables, the intercorrelation of father's occupation in Canada and Hong Kong was highest (r = .84, p<.01). Among the language variables, whether the child studied English before and months of studying English before had the highest correlation (r = .80, p<.01).

4.3 STEPWISE MULTIPLE REGRESSION ANALYSES

Different stepwise multiple regression analyses were computed in order to determine the significant predictive variables of the subjects' performance. Predictive variables that were included in the various analyses were:

age on arrival (AOA), length of residence (LOR), age of child (AOC), gender, school, grade, father's highest educational attainment (father's education), mother's highest educational attainment (mother's education), father's occupation (HK), father's occupation (Canada), mother's occupation (HK), mother's occupation (Canada), whether the child studied English before, months of studying English before (MSEB), whether the child studied Chinese before, months of studying Chinese before (MSCB), whether the child was receiving education in Chinese, frequency of studying Chinese (FREQSC), and frequency of speaking Cantonese at home. Since the sample size was small (32 subjects), groups of only two or three variables were used as predictors in each of the stepwise multiple regression analyses. Findings are given below for only those significant regressions yielding predictive variables. For the results of all the regression analyses computed, please refer to Appendix G.

In the present study, the stepwise multiple regression analyses followed three stages. First, the 19 predictive variables were grouped in two or three's to determine their significance in predicting subjects' performance. In this stage, the combination of AOA and LOR for the analyses was useful to test the first hypothesis that these two variables and performance on standardized tests would be correlated.

Secondly, significant predictive variables that were identified in Stage 1 were grouped for further stepwise multiple regression analyses to determine their combined predictabilities. Finally, the significant predictors that were identified in Stage 1 were combined individually with AOA and LOR to determine their combined effects in predicting subjects' performance. Multiple regression analyses in Stages 2 and 3 were for exploratory purposes.

4.3.1 Multiple Regression Analyses on the HK-WISC Scale Scores

Initially, AOA and LOR were paired, while gender was paired with age of child (AOC) for stepwise multiple regression analyses. As shown in Table 19, only gender was significant enough to enter the prediction equation for subjects' Verbal Scale scores (*Rsq* = .16, *p*<.05). It should be noted that since every subject had studied Chinese before, r squares could not be computed because there were no variations.

Table 19

R Squares of All the Predictive Variables and HK-WISC Scale Scores

Predictor	HK-WISC Scale		
	Full	Verbal	Performance
Age on Arrival	.03	.04	.01
Length of Residence	.06	.10	.02
Age of Child	.00	.00	.00
Gender	.05	.16*	.00
School	.00	.01	.00
Grade	.01	.01	.00
Father's Education	.00	.07	.04
Mother's Education	.00	.02	.07
Father's Occupation (HK)	.00	.00	.02
Mother's Occupation (HK)	.04	.02	.04
Father's Occupation (Canada)	.00	.00	.00
Mother's Occupation (Canada)	.01	.02	.00
Studied English Before	.01	.01	.00
Months of Studying English Before	.01	.00	.01
Studied Chinese Before	x	x	x
Months of Studying Chinese Before	.01	.01	.00
Receiving Education in Chinese	.07	.04	.05
Frequency of Studying Chinese	.02	.00	.05
Frequency of Speaking Cantonese	.01	.02	.11

Note. x - R squares cannot be computed.
* - Significant at the .05 level

Since AOA and LOR were hypothesized to be significantly related to subjects' performance, they were combined with gender to compute additional regression analyses. Table 20 presents the results of the analysis for subjects' HK Verbal Scale scores. Gender entered the equation first; subsequently, AOA and LOR were not significant enough to enter the equation. However, the combination of these two variables with gender did increase the predictability from 16 to 26%. Overall, AOA, LOR, and gender were the only

significant predictive variables for subjects' HK Verbal Scale scores.

Table 20

Multiple Regression Analysis for Subjects' HK Verbal Scale Scores with AOA, LOR, and Gender

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	Gender	.39	.16	.16	5.52*	5.52
2	LOR > AOA	.51	.26	.10	3.23*	1.92
Full Equ.	All Three	.51	.26	.26	3.23*	3.23

Note. * - Significant at the .05 level

4.3.2 Multiple Regression Analyses on the SB: FE Summary Scores

On the SB: FE, more significant predictive variables were found than for the HK-WISC. Table 21 shows the r squares of all the predictors and subjects' SB: FE Summary scores. Again, r squares of whether the child studied Chinese before and performance on the SB: FE could not be computed due to lack of variabilities. Results of the stepwise multiple regression analyses in Stage 1 revealed the following findings.

Table 21

R Squares of All the Predictive Variables and Subjects' SB: FE Summary Scores

Predictor	SB: FE Summary Scale						
	TCOM	VERBR	ABSTRACT	QUANT	STMEMORY	VERBC	NVERBAL
Age on Arrival	.03	.08	.08	.04	.03	.08	.00
Length of Residence	.05	.12	.06	.00	.01	.13*	.00
Age of Child	.00	.01	.03	.04	.02	.01	.00
Gender	.04	.00	.01	.20**	.01	.00	.06
School	.01	.01	.00	.00	.05	.01	.01
Grade	.00	.00	.04	.06	.00	.00	.00
Father's Education	.01	.03	.04	.01	.01	.03	.05
Mother's Education	.00	.12	.02	.01	.01	.13*	.02
Father's Occupation (HK)	.04	.00	.00	.01	.17*	.03	.05
Mother's Occupation (HK)	.01	.00	.00	.07	.01	.01	.02
Father's Occupation (Canada)	.03	.01	.00	.02	.13*	.00	.07
Mother's Occupation (Canada)	.05	.14*	.01	.00	.08	.15*	.01
Studied English Before	.03	.11	.02	.00	.02	.13*	.00
Months of Studying English Before	.03	.07	.00	.04	.01	.08	.01
Studied Chinese Before	x	x	x	x	x	x	x
Months of Studying Chinese Before	.00	.00	.02	.04	.01	.01	.00
Receiving Education in Chinese	.01	.03	.00	.01	.00	.01	.01
Frequency of Studying Chinese	.04	.04	.02	.00	.01	.02	.02
Frequency of Speaking Cantonese	.10	.13*	.08	.01	.10	.10	.05

Note. x - R squares cannot be computed.
* - Significant at the .05 level
** - Significant at the .01 level

First, mother's occupation (Canada) and frequency of speaking Cantonese at home were significant predictive variables of subjects' SB Verbal Reasoning SAS (VERBR). It should be noted that frequency of speaking Cantonese at home

had a negative correlation with subjects' SB Verbal Reasoning SAS (r = -.36, p<.05). Secondly, gender was a significant predictive variable of subjects' SB Quantitative Reasoning SAS (QUANT). Thirdly, father's occupations in Canada and Hong Kong were significant predictive variables of subjects' SB Short-Term Memory SAS (STMEMORY). Finally, LOR, mother's education, mother's occupation (Canada), and whether the child studied English before were the significant predictive variables of subjects' SB Verbal Comprehension Factor scores (VERBC). Overall, no significant predictors were found for subjects' SB Test Composite (TCOM), Abstract/Visual Reasoning (ABSTRACT), and Nonverbal Reasoning/Visualization Factor (NVERBAL) scores.

Table 22 shows the only significant combined predictive variables in Stage 1. As shown in this table, gender and age of child (AOC) were significant in predicting subjects' SB Quantitative Reasoning SAS. Gender entered the equation first and accounted for 20% of the r square change. The inclusion of AOC increased the predictive value by 1%.

Table 22

Multiple Regression Analysis for the Subjects' SB Quantitative Reasoning SAS with Gender and Age of Child (AOC)

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	Gender	.45	.20	.20	7.64**	7.64
2	AOC	.47	.21	.01	4.01*	.50
Full Equ.	Both	.47	.21	.21	4.01*	4.01

Note. * - Significant at the .05 level
** - Significant at the .01 level

In the second stage, LOR, mother's education, mother's occupation (Canada), whether the child studied English before, and frequency of speaking Cantonese at home were combined (in groups of three's) to determine their predictabilities of the subjects' Verbal performance (in Verbal Reasoning and Verbal Comprehension). Moreover, father's occupation (HK) and father's occupation (Canada) were combined to compute regression analyses to determine if their predictabilities could be increased. However, there were no significant findings with this combination. The following were the significant findings of the multiple regression analyses for subjects' performance in Verbal Reasoning and Verbal Comprehension (see Tables 23-33).

Table 23

Multiple Regression Analysis for the Subjects' SB Verbal Comprehension Factor Scores with LOR, Mother's Education (ME), and Mother's Occupation in Canada (MCO)

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MCO	.39	.15	.15	5.40*	5.40
2	LOR > ME	.49	.24	.09	2.97*	1.63
Full Equ.	All Three	.49	.24	.24	2.97*	2.97

Note. * - Significant at the .05 level

The results in Table 23 indicated that among the three variables, mother's occupation (Canada) was the best predictive variable. In addition, the combination of these three variables contributed to 24% of the predictability for the subjects' performance in Verbal Comprehension.

Table 24

Multiple Regression Analysis for the Subjects' SB Verbal Reasoning SAS with LOR, Mother's Education (ME), and Frequency of Speaking Cantonese at Home (FSCH)

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	FSCH	.36	.13	.13	4.51*	4.51
2	LOR	.50	.25	.12	4.92*	4.77
3	ME	.57	.33	.08	4.57*	3.13
Full Equ.	All Three	.57	.33	.33	4.57*	4.57

Note. * - Significant at the .05 level

Table 24 shows that frequency of speaking Cantonese at home had the highest predictive value among these variables.

The combination of LOR and this variable accounted for 25% of the variances in the subjects' SB Verbal Reasoning SAS. Furthermore, the inclusion of mother's education increased the predictability to 33%.

Table 25

Multiple Regression Analysis for the Subjects' SB Verbal Comprehension Factor Scores with LOR, Mother's Education (ME), and Frequency of Speaking Cantonese at Home (FSCH)

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	ME	.37	.13	.13	4.68*	4.68
2	FSCH > LOR	.57	.32	.19	4.43*	3.86
Full Equ.	All Three	.57	.32	.32	4.43*	4.43

Note. * - Significant at the .05 level

As shown in Table 25, mother's education had the highest predictive value. Moreover, the combination of these three variables accounted for 32% of the variances in subjects' SB Verbal Comprehension Factor scores.

Table 26 reveals the following findings. First, mother's occupation (Canada) had the best predictive value. Second, the combination of these variables was able to predict 27% of the variances of subjects' performance in Verbal Reasoning.

Table 26

Multiple Regression Analysis for the Subjects' SB Verbal Reasoning SAS with LOR, Mother's Occupation in Canada (MCO), and Frequency of Speaking Cantonese at Home (FSCH)

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MCO	.37	.14	.14	4.73*	4.73
2	FSCH > LOR	.52	.27	.13	3.45*	2.56
Full Equ.	All Three	.52	.27	.27	3.45*	3.45

Note. * - Significant at the .05 level

Table 27

Multiple Regression Analysis for the Subjects' SB Verbal Comprehension Factor Scores with LOR, Mother's Occupation in Canada (MCO), and Frequency of Speaking Cantonese at Home (FSCH)

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MCO	.39	.15	.15	5.40*	5.40
2	FSCH > LOR	.51	.26	.11	3.26*	2.00
Full Equ.	All Three	.51	.26	.26	3.26*	3.26

Note. * - Significant at the .05 level

The results in Table 27 indicated that mother's occupation in Canada had the highest predictability among these variables. In addition, these three variables accounted for 26% of the variances in subjects' SB Verbal Comprehension Factor scores.

Table 28

Multiple Regression Analysis for the Subjects' SB Verbal Reasoning SAS with LOR, Studied English Before (SEB), and Frequency of Speaking Cantonese at Home (FSCH)

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	FSCH	.36	.13	.13	4.51*	4.51
2	LOR	.50	.25	.12	4.92*	4.77
3	SEB	.54	.29	.04	3.91*	1.67
Full Equ.	All Three	.54	.29	.29	3.91*	3.91

Note. * - Significant at the .05 level

As shown in Table 28, frequency of speaking Cantonese at home had the highest predictability. Moreover, when LOR was combined with this variable, the predictability increased from 13 to 25%. Furthermore, the combination of these three variables increased the predictability to 29%.

Table 29

Multiple Regression Analysis for the Subjects' SB Verbal Comprehension Factor Scores with LOR, Studied English Before (SEB), and Frequency of Speaking Cantonese at Home (FSCH)

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	SEB	.36	.13	.13	4.53*	4.53
2	FSCH > LOR	.54	.29	.16	3.79*	3.10
Full Equ.	All Three	.54	.29	.29	3.79*	3.79

Note. * - Significant at the .05 level

Based on the results in Table 29, among the three variables, whether the child studied English before was the

best predictive variable. Also, the combination of these three variables was able to predict 29% of the variances in subjects' SB Verbal Comprehension Factor scores.

Table 30

Multiple Regression Analysis for the Subjects' SB Verbal Reasoning SAS with Mother's Education (ME), Mother's Occupation in Canada (MCO), and Frequency of Speaking Cantonese at Home (FSCH)

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MCO	.37	.14	.14	4.73*	4.73
2	FSCH > ME	.49	.24	.10	3.01*	2.00
Full Equ.	All Three	.49	.24	.24	3.01*	3.01

Note. * - Significant at the .05 level

Table 31

Multiple Regression Analysis for the Subjects' SB Verbal Comprehension Factor Scores with Mother's Education (ME), Mother's Occupation in Canada (MCO), and Frequency of Speaking Cantonese at Home (FSCH)

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MCO	.39	.15	.15	5.40*	5.40
2	FSCH > ME	.49	.24	.09	2.98*	1.65
Full Equ.	All Three	.49	.24	.24	2.98*	2.98

Note. * - Significant at the .05 level

As shown in Tables 30 and 31, mother's occupation in Canada had the highest predictabilities among these three

variables (14% in Verbal Reasoning & 15% in Verbal Comprehension). In addition, the inclusion of frequency of speaking Cantonese at home and mother's education increased the predictabilities in both cases (10% in Verbal Reasoning & 9% in Verbal Comprehension).

Table 32

Multiple Regression Analysis for the Subjects' SB Verbal Reasoning SAS with Mother's Education (ME), Studied English Before (SEB), and Frequency of Speaking Cantonese at Home (FSCH)

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	FSCH	.36	.13	.13	4.51*	4.51
2	ME > SEB	.50	.25	.12	3.15*	2.28
Full Equ.	All Three	.50	.25	.25	3.15*	3.15

Note. * - Significant at the .05 level

Table 33

Multiple Regression Analysis for the Subjects' SB Verbal Comprehension Factor Scores with Mother's Education (ME), Studied English Before (SEB), and Frequency of Speaking Cantonese at Home (FSCH)

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	ME	.37	.13	.13	4.68*	4.68
2	FSCH > SEB	.50	.25	.12	3.14*	2.18
Full Equ.	All Three	.50	.25	.25	3.14*	3.14

Note. * - Significant at the .05 level

Tables 32 and 33 present the regression analyses for the subjects' SB Verbal Reasoning and Comprehension Factor scores respectively. As shown in Table 32, frequency of speaking Cantonese at home had the highest predictability (13%) among the three variables. In addition, the combination of all these variables increased this predictive value by 12%. On the other hand, based on Table 33, mother's education had the best predictability of the subjects' SB Verbal Comprehension Factor scores. The inclusion of the other two variables did increase the predictability (from 13 to 25%).

The last stage involved the combination of AOA and LOR with the significant predictive variables identified in Stage 1. Since this study hypothesized that AOA and LOR were significantly related to subjects' performance, the combination of these two variables with the significant predictive variables should increase the predictabilities.

Tables 34 and 35 show the multiple regression analyses with AOA, LOR, and mother's education for the subjects' SB Verbal Reasoning and Verbal Comprehension Factor scores respectively. As shown in Table 34, only the combination of all these variables had a significant predictive value (Rsq = .24, $p<.05$). On the other hand, Table 35 presents the following findings. First, mother's education entered the equation and accounted for 13% of the r square change. Then

the combination with AOA and LOR increased the r square value to .26 ($p<.05$).

Table 34

Multiple Regression Analysis for the Subjects' SB Verbal Reasoning SAS with AOA, LOR, and Mother's Education (ME)

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	ME \ AOA > LOR /	.49	.24	.24	2.97*	2.97
Full Equ.	All Three	.49	.24	.24	2.97*	2.97

Note. * - Significant at the .05 level

Table 35

Multiple Regression Analysis for the Subjects' SB Verbal Comprehension Factor Scores with AOA, LOR, and Mother's Education (ME)

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	ME	.37	.13	.13	4.68*	4.68
2	AOA > LOR	.51	.26	.13	3.33*	2.43
Full Equ.	All Three	.51	.26	.26	3.33*	3.33

Note. * - Significant at the .05 level

Table 36 shows the multiple regression analysis for the subjects' SB Short-Term Memory SAS. Father's occupation in HK entered the equation first. Although AOA and LOR were not selected into the equation, combining these two

variables with father's occupation did increase the predictability by 8%.

Table 36

Multiple Regression Analysis for the Subjects' SB Short-Term Memory SAS with AOA, LOR, and Father's Occupation in Hong Kong (FHKO)

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	FHKO	.42	.17	.17	6.36*	6.36
2	LOR > AOA	.50	.25	.08	3.11*	1.40
Full Equ.	All Three	.50	.25	.25	3.11*	3.11

Note. * - Significant at the .05 level

Table 37 reveals the finding that the predictability of the subjects' performance in Short-Term Memory was increased from 13 to 24% when father's occupation was combined with AOA. In this analysis, father's occupation (Canada) was selected into the equation first, while AOA and LOR were not selected. In Step 2, AOA was combined with father's occupation (Canada) and resulted in an increase in predictability. In Step 3, LOR was also included, but this variable only increased the predictability negligibly (RsqCh = .00004, $p<.05$).

Table 37

Multiple Regression Analysis for the Subjects' SB Short-Term Memory SAS with AOA, LOR, and Father's Occupation in Canada (FCO)

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	FCO	.36	.13	.13	4.47*	4.47
2	AOA	.49	.24	.11	4.66*	4.34
3	LOR	.49	.24	.00	3.00*	.002
Full Equ.	All Three	.49	.24	.24	3.00*	3.00

Note. * - Significant at the .05 level

Finally, Table 38 presents the following results. First, frequency of speaking Cantonese at home had the highest predictability (Rsq = .13, p<.05). Secondly, the combination of this variable with LOR increased the predictability to 25%. Finally, the addition of AOA slightly (1%) increased the predictive value.

Table 38

Multiple Regression Analysis for the Subjects' SB Verbal Reasoning SAS with AOA, LOR, and Frequency of Speaking Cantonese at Home (FSCH)

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	FSCH	.36	.13	.13	4.51*	4.51
2	LOR	.50	.25	.12	4.92*	4.77
3	AOA	.51	.26	.01	3.30*	.30
Full Equ.	All Three	.51	.26	.26	3.30*	3.30

Note. * - Significant at the .05 level

In summary, the combinations of AOA and LOR with mother's education in predicting SB Verbal Comprehension Factor scores and with frequency of speaking Cantonese at home in predicting SB Verbal Reasoning SAS both provided the highest predictability (both from 13 to 26%). Moreover, the combination of gender and age of child (AOC) had the best predictability for subjects' SB Quantitative Reasoning SAS (Rsq = .21, p<.05). Furthermore, father's occupation (HK) was the best predictor of subjects' Short-Term Memory SAS (Rsq = .17, p<.05). On the other hand, no predictive variables were identified for the subjects' SB Test Composite, Abstract/Visual Reasoning, or Nonverbal Reasoning Factor scores. Overall, the combination of LOR, mother's education, and frequency of speaking Cantonese at home provided the best predictabilities of subjects' performance in SB Verbal Reasoning (33%) and Verbal Comprehension (32%).

4.3.3 Multiple Regression Analyses on the WLPB Standard Scores

On the WLPB, two significant predictive variables: AOA and whether the child studied English before were identified in Stage 1. Table 39 presents the r squares of all the predictive variables and subjects' WLPB standard scores. Due to lack of variations, r squares could not be computed for whether the child studied Chinese before and the WLPB performance.

Table 39

R Squares of All the Predictive Variables and Subjects' WLPB Standard Scores

	WLPB Summary Scale			
Predictor	Oral Language	Reading	Written Language	Broad Language
Age on Arrival	.09	.15*	.03	.14*
Length of Residence	.06	.03	.00	.01
Age of Child	.04	.11	.05	.12
Gender	.01	.01	.08	.00
School	.02	.00	.00	.00
Grade	.00	.03	.01	.03
Father's Education	.08	.01	.04	.02
Mother's Education	.11	.03	.10	.05
Father's Occupation (HK)	.00	.02	.03	.01
Mother's Occupation (HK)	.00	.03	.00	.01
Father's Occupation (Canada)	.02	.00	.00	.00
Mother's Occupation (Canada)	.01	.00	.02	.00
Studied English Before	.13*	.03	.09	.07
Months of Studying English Before	.07	.00	.06	.02
Studied Chinese Before	x	x	x	x
Months of Studying Chinese Before	.03	.07	.01	.04
Receiving Education in Chinese	.00	.00	.00	.00
Frequency of Studying Chinese	.01	.00	.01	.01
Frequency of Speaking Cantonese	.03	.01	.02	.03

Note. x - R squares cannot be computed.
* - Significant at the .05 level

As shown in Table 40, AOA was paired with LOR for the regression analysis. AOA correlated significantly with subjects' Reading standard scores (r = -.38, p<.05). In addition, AOA entered the equation first, while LOR was not selected to enter the equation. Furthermore, the combination of these two variables did not change the predictive power (Rsq remained unchanged).

Table 40

Multiple Regression Analysis for the Subjects' Reading Standard Scores with AOA and LOR

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	AOA	.38	.15	.15	5.21*	5.21
2	LOR	.38	.15	.00	2.52	.00
Full Equ.	Both	.38	.15	.15	2.52	2.52

Note. * - Significant at the .05 level

Table 41

Multiple Regression Analysis for the Subjects' Broad Language Standard Scores with AOA and LOR

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	AOA	.37	.14	.14	4.68*	4.68
2	LOR	.37	.14	.00	2.31	.09
Full Equ.	Both	.37	.14	.14	2.31	2.31

Note. * - Significant at the .05 level

Table 41 presents the results of the regression analysis for the subjects' Broad Language standard scores with AOA and LOR. In this case, AOA also entered the equation first, while LOR was not selected to enter the equation. In addition, the combination of these two variables did not change the predictive power either (Rsq remained unchanged). It should be noted that AOA had a significant negative correlation with the subjects' Broad Language standard scores ($r = -.37$, $p<.01$).

Table 42 presents the results of the regression analysis for the subjects' Oral Language standard scores with whether the child studied English before (SEB) and months of studying English before (MSEB). As shown in this table, SEB had a significant correlation with the subjects' Oral Language standard scores (r = .36, p<.05). In this analysis, SEB entered the equation first, while MSEB was not selected to enter the equation. Moreover, the combination of these two variables did not change the predictive power (Rsq remained unchanged).

Table 42

Multiple Regression Analysis for the Subjects' Oral Language Standard Scores with SEB and MSEB

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	SEB	.36	.13	.13	4.60*	4.60
2	MSEB	.37	.13	.00	2.27	.08
Full Equ.	Both	.37	.13	.13	2.27	2.27

Note. * - Significant at the .05 level

In order to increase the predictability of AOA and SEB, they were combined for more regression analyses. As shown in Table 43, the inclusion of AOA had increased the predictability by 6%. Thus, the combination of these two predictors accounted for 19% of the subjects' variability in Oral Language. However, it should be noted that SEB had a significant positive relationship (r = .36, p<.05), while

AOA had a significant negative relationship (*r* = -.30, *p*<.05) with subjects' performance in Oral Language. Finally, it should be noted that LOR was combined to these two variables for regression analyses. However, no significant findings were obtained.

Table 43

Multiple Regression Analysis for the Subjects' Oral Language Standard Scores with AOA and SEB

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	SEB	.36	.13	.13	4.60*	4.60
2	AOA	.44	.19	.06	3.45*	2.12
Full Equ.	Both	.44	.19	.19	3.45*	3.45

Note. * - Significant at the .05 level

4.4 ANALYSIS OF VARIANCE (ANOVA)

ANOVA was carried out when a significant correlation was found between a predictor and summary score. On the HK-WISC, ANOVA was used to determine if male and female students differed significantly on the HK Verbal Scale subtests. The results indicated that males (*M* = 13.62 & *SD* = 1.91) did significantly better than females (*M* = 11.45 & *SD* = 2.73) on the Similarities subtest, *F*(1, 30) = 6.87, *p*<.01.

On the SB: FE, the following were found. First, male subjects (*M* = 50.71 & *SD* = 8.52) performed significantly better than female subjects (*M* = 43.18 & *SD* = 3.97) on the

SB Quantitative subtest, $F(1, 30) = 7.64$, $p<.01$. Secondly, subjects with mothers having different educational attainments (see Table 44) differed significantly in their performance on the SB Vocabulary, $F(5, 26) = 3.25$, $p<.05$ and Comprehension subtests, $F(5, 26) = 2.99$, $p<.05$. Subjects with mothers having educational attainment in the 'College or Technical School' category scored highest, while those with mothers in the 'Grade 6' category scored lowest on both subtests.

Table 44

Subjects' Performance with Regard to Mother's Education

	SB: FE Subtest	
Educational Attainment	Vocabulary	Comprehension
Grade 6	28.67a, 4.04b	31.33, 5.51
Grades 7-9	41.00 , 2.45	46.80, 5.02
Grades 10-11	36.20 , 3.96	43.40, 9.02
Grade 12/13	35.79 , 6.80	44.57, 7.11
College/Technical School	43.25 , 3.20	49.50, 3.87
University	38.00 , 0.00	38.00, 0.00

Note. n = 32
a - Mean Score
b - Standard Deviation

Thirdly, subjects with fathers having different occupations differed significantly on the SB Bead Memory subtest, $F(3, 28) = 3.52$, $p<.05$. As shown in Table 45, the results indicated that subjects with fathers as professionals scored highest, while those with fathers as salesmen scored lowest. Finally, subjects who 'always'

speak Cantonese at home (M = 40.00 & SD = 4.52) scored significantly lower than those who 'often' speak Cantonese at home (M = 45.95 & SD = 8.41) on the SB Comprehension subtest F(1, 30) = 4.75, p<.05. Overall, subjects' performance did not significantly differ with regard to LOR, father's occupation (HK), mother's occupation (Canada), and whether they studied English before.

Table 45

Subjects' SB Bead Memory Subtest Scores with Regard to Father's Occupation (Canada)

	Bead Memory Subtest	
Occupation	M	SD
Professional	55.29	9.05
Managerial	53.44	7.07
Sales	40.67	2.52
Service	49.50	3.32

Note. n = 32

Finally, the results of the ANOVA on the WLPB indicated that children who had studied English before (M = 78.72 & SD = 9.03), regardless of duration, performed significantly better in Oral Language than those who had not (M = 68.29 & SD = 17.93), F(1, 30) = 4.60, p<.05. On the contrary, their performance did not differ with regard to AOA.

CHAPTER V

DISCUSSION

This final chapter discusses the results of the present study, makes recommendations for future research and comments on the implications of the results on assessment of English-as-a-second-language (ESL) children.

To what extent does immigrant students' age on arrival (AOA) and length of residence (LOR) in Canada affect their performance on standardized tests that are given in their native language (L1) or second language (L2)?
The present study attempted to answer this question by testing the following hypotheses:

(1) Immigrant students' AOA and LOR and performance on standardized tests should be correlated.

(2) Subjects' performance on the two IQ measures should have a significant positive correlation.

(3) A high nonverbal and lower verbal abilities profile would be apparent on the English IQ measure.

5.1 DISCUSSION OF HYPOTHESIS ONE

The first hypothesis of the present study was that immigrant students' AOA and LOR in Canada and performance on standardized tests should be correlated. Thus, the longer the immigrant children have obtained education in Canada (or LOR), the better their performance on the English measures should be. Therefore, LOR and subjects' performance on the

English measures should have significant positive correlations. On the contrary, an increase in LOR was hypothesized to lower their performance on the Chinese measure because of the lack of enrichment in Chinese language development. Thus, LOR and their performance on the Chinese measure would have a significant negative correlation.

With regard to AOA, older learners (who came to Canada when they were older) were hypothesized to perform better than younger ones on the English measures. Since older learners usually had studied Chinese longer than younger learners, there should be a significant positive correlation between AOA and their performance on the Chinese measure.

Results on the Hong Kong-Wechsler Intelligence Scale for Children (HK-WISC) (Yung, 1981) indicated that the combination of AOA and LOR with gender increased the predictability for subjects' Verbal performance from 16 to 26%. Also, AOA had a positive correlation, while LOR had a negative correlation with subjects' performance. These findings supported the hypothesis regarding the effects of AOA and LOR on subjects' performance on the Chinese IQ measure.

When the Stanford-Binet Intelligence Scale: Fourth Edition (SB: FE) was used as the dependent variable, AOA was negatively correlated with subjects' performance, while LOR was positively correlated. The hypothesis with regard to

LOR was supported. Thus, the longer the children have obtained education in Canada, the better their performance on the English measure. However, the hypothesis regarding AOA was not supported. The negative correlations between AOA and subjects' performance in SB Verbal Reasoning and Verbal Comprehension may suggest the involvement of communicative skills, such as listening comprehension, oral fluency and phonology. As Oyama (1978) mentioned, younger learners tend to have an advantage over older learners in communicative skills.

On the Woodcock Language Proficiency Battery (WLPB) (Woodcock, 1984), LOR was not significantly correlated with subjects' performance. AOA was identified as having a significant negative correlation with subjects' performance in Oral Language (Letter-Word Identification, Word Attack, & Passage Comprehension). This finding may indicate that the Oral Language subtests assess children's communicative skills, where younger learners tend to perform better than the older ones (Oyama, 1978).

Overall, AOA and LOR did not have significant effects on subjects' nonverbal performance. This result may be due to the fact that nonverbal performance is less sensitive to the effects of AOA and LOR. Apparently, these two variables are more related to verbal performance. There is a possible reason for the significant negative correlations between AOA and performance on English measures. This study probably

did not have learners that were old enough to cause significant differences in their performance on tasks that were unrelated to the communicative skills. In previous studies, older learners often referred to children who had an AOA of 14-15 years (e.g., Appel, 1979). In this study, AOA and LOR had a significant negative correlation, which supported Cummins' (1981) finding that LOR decreases as AOA increases.

5.2 DISCUSSION OF HYPOTHESIS TWO

The second hypothesis was only partially supported. According to Cummins (1979), cognitive/academic aspects of L1 and L2 are interdependent. Thus, L1 and L2 are related to each other and will show a similar pattern of correlations with other variables, such as verbal and nonverbal abilities. Therefore, the present study hypothesized that subjects' HK-WISC performance (measured in their L1) should be predictive of their SB: FE performance (measured in their L2).

The results indicated that subjects' HK-WISC Full Scale and SB Test Composite scores had a significant positive correlation. However, their correlation was low; only 17% of the total variability in subjects' SB Test Composite scores was associated with the variability in subjects' HK Full Scale scores. In fact, the results indicated that

subjects' HK Verbal Scale and SB Verbal Reasoning scores had no correlation.

Subjects' WLPB summary scores had no correlation with the HK-WISC Scale scores, while these WLPB scores had significant positive correlations with the SB: FE summary scores. These findings suggested that the verbal subtests of the HK-WISC and SB: FE might also be assessing subjects' language proficiency. As Johnson (1989) suggested, interdependence between languages is exhibited in tasks that are cognitively demanding, such as tasks that measure nonverbal mental capacity and verbal-conceptual repertoire. On the other hand, variables that measure specific proficiency in a language do not exhibit cross-language correlations. The findings that the WLPB summary scores had no correlation with the HK-WISC Scale scores while having significant positive correlations with the SB: FE summary scores might indicate that the verbal subtests of the HK-WISC and SB: FE were assessing areas more than the subjects' verbal abilities. In sum, the hypothesis regarding the interdependence of CALP across languages in verbal areas was not supported in this study.

Cummins (1979) and Ekstrand (1978) have mentioned that CALP across languages does not exist in an affective or experiential vacuum. If motivation to learn an L2 (or maintain an L1) is low, CALP will not be applied to the task of learning L2 (or maintaining L1). Also, the

interdependence hypothesis presupposes adequate exposure to both languages. The second hypothesis of this study being partially supported may be due to the fact that the subjects had different exposure to L1 and L2 education. Thus, these children probably did not have equal exposure to both languages for the development of CALP as suggested by Cummins (1979).

With regard to subjects' HK Performance and SB Abstract/Visual Reasoning scores, a significant positive correlation was found. Thus, this finding supported Cummins' (1979) claim that L1 and L2 will show similar pattern of correlations with IQ variables (in nonverbal abilities in this study).

5.3 DISCUSSION OF HYPOTHESIS THREE

The third hypothesis was that a high nonverbal and lower verbal abilities profile would be apparent on the English IQ measure. According to Vernon (1980), the same pattern of high nonverbal and lower verbal abilities has persisted in both Chinese and Japanese children. Therefore, this study hypothesized that the subjects would have this profile of performance on the SB: FE (standardized in the United States). On the HK-WISC, this profile of performance was not hypothesized to present because the HK-WISC was standardized in Hong Kong, where the subjects migrated from. With this characteristic intellectual profile, it was

hypothesized that there would be a smaller difference between their performance on nonverbal than verbal measures. Thus, the differences between their Verbal Performance (HK Verbal Scale scores vs. SB Verbal Reasoning SAS; HK Verbal Scale scores vs. Verbal Comprehension Factor scores) would be greater than the differences between their Nonverbal performance (HK Performance Scale scores vs. SB Abstract/Visual Reasoning SAS; HK Performance Scale scores vs. Nonverbal Reasoning/Visualization Factor scores). The findings supported this hypothesis.

The mean differences between subjects' HK Verbal Scale (Average) and SB Verbal Reasoning SAS (Low Average) and SB Verbal Comprehension Factor scores (Slow Learner) were 28.84 and 36.16 respectively. On the other hand, the mean differences between subjects' HK Performance Scale (High Average) and SB Abstract/Visual Reasoning SAS (High Average) and Nonverbal Reasoning/Visualization Factor scores (Average) were 1.28 and 8.97 respectively. Thus, it is apparent that their Nonverbal performance differences were much smaller than their Verbal performance differences.

The findings of the Verbal Comprehension and Nonverbal Reasoning/Visualization Factor scores being lower than the Verbal and Abstract/Visual Reasoning SAS may be due to the following. First, in Verbal Comprehension, subjects' Memory for Sentences subtest scores were included in the computation. Since the subjects had the worst performance

(about 2 standard deviations below the mean) on this subtest, the inclusion of these scores deflated their Verbal Comprehension Factor scores. Second, in Nonverbal Reasoning/Visualization, subjects' Quantitative subtest scores were included. Since the Quantitative subtest involved subjects' verbal skills, their Nonverbal Reasoning/Visualization Factor scores became lower than their Abstract/Visual Reasoning SAS, in which no verbal skills were required. It should be noted that their Quantitative subtest scores had the highest correlation with the Nonverbal Reasoning/Visualization Factor scores (r = .70, p<.01).

5.4 DISCUSSION OF OTHER SIGNIFICANT FINDINGS

5.4.1 Test Observations

It was a valuable opportunity to observe subjects' different behaviors in the two testing sessions (one when the HK-WISC was given, and the other when the SB: FE was given). Overall, subjects were more persistent, relaxed, and talkative when the Chinese measure was given. When they were assessed with the English measures (SB: FE & WLPB), they usually gave up easily and were unwilling to take chances in guessing the answers. However, it should be noted that the behaviors of the child who had better performance on the SB: FE than HK-WISC had just the opposite behaviors.

5.4.2 Other Significant Predictive Variables

Besides AOA and LOR, the following predictive variables were also identified to have significant effects on subjects' performance. These predictors include gender, mother's education, father's occupation (HK), father's occupation (Canada), mother's occupation (Canada), whether the child studied English before, and frequency of speaking Cantonese at home.

Gender had significant effects on subjects' HK Similarities and SB Quantitative subtest scores. In both cases, male subjects did significantly better than famale subjects. These findings support previous findings (e.g., Maccoby & Jacklin, 1974) in suggesting that males are educated to produce better analytic and math performance.

Family's socioeconomic status (SES), including mother's education, father's occupation (Canada & HK), and mother's occupation (Canada), had significant correlations with subjects' performance on the English IQ measure. These results support the claim that SES and IQ scores are related (Thorndike, Hagen, & Sattler, 1986b).

Subjects who had studied English before they came to Canada had better performance than those who had not in SB Verbal Reasoning, SB Verbal Comprehension, and WLPB Oral Language. These findings suggest that children who started learning English when they were in Hong Kong might have a

'head start'. Thus, they might have a background in English that facilitates their further learning in English.

Children who 'often' speak Cantonese at home did significantly better than those who 'always' speak Cantonese at home. Initially, this finding seemed to contradict researchers' (e.g., Cummins, 1984) advice that speaking L1 at home may avoid poor models of English. However, it should be noted that in this study, children rather than parents' frequency of speaking Cantonese at home was measured. Thus, it was different from the issue of having a poor language model. Whether children speak L1 or L2 at home may provide insights into their language abilities. For example, a child who does not speak his/her L2 may be having difficulties. Also, exclusive use of L1 in the home may reflect a family's general lack of adjustment to the new society, rather than a cause of learning difficulties.

In addition to these findings, the combination of LOR, mother's education, and frequency of speaking Cantonese at home had the highest correlations with the subjects' Verbal Reasoning SAS and Verbal Comprehension Factor scores (r = .57, $p<.05$ in both cases). Thus, among the significant SES variables, mother's education was the most important variable. As Wilson (1983) suggested, when mothers are intellectually trained and have high social status, their children tend to score higher on IQ tests.

Overall, the effects of these variables appeared to be smaller on subjects' HK-WISC than SB: FE performance. This may be due to the effects of other variables, such as familiarity of the Chinese language and novelty of the Chinese IQ measure to these children.

5.5 LIMITATIONS OF THE PRESENT STUDY

The present study was limited in terms of sample size, types of subjects, and types of cognitive and language measures being used.

First, this study had included 19 predictive variables. With a sample size of 32, a single multiple regression analysis was impossible to compute. As a result, different stepwise multiple regression analyses were computed, with variables combined in groups of two or three's for analyses. By computing different multiple regression analyses, some important interaction effects among variables might remain undetected.

Secondly, the present sample involved children who had an LOR from .67 year to 3.17 years. Previous studies (e.g., Cummins, 1984; Colliers, 1987) on the differences between children's basic interpersonal communicative skills (BICS) and cognitive/academic language proficiency (CALP) often involved children who had a larger range of LOR (e.g., 2 to 7 years) for comparisons. The smaller range of LOR in this study may have resulted in the failure to replicate Cummins

(1984) and Colliers' (1987) findings. Thus, this study was unable to determine if in fact immigrant children will take at least 5 years, on the average, to approach grade norms in L2 cognitive/academic language proficiency (CALP).

Finally, this study had to use the HK-WISC as the measure of subjects' Chinese language proficiency because it was the only Chinese standardized measure available. As a result, an English IQ measure was used for comparisons. If a Chinese achievement or language measure was available to compare with an English measure, different findings might have been obtained. Moreover, since this study only could afford a 1-month test-retest interval, the SB: FE was chosen over the Wechsler Intelligence Scale for Children-Revised (WISC-R) (Wechsler, 1974). The HK-WISC was likely to have greater differences with the SB: FE than WISC-R. Thus, obtaining a high correlation between the HK-WISC and SB: FE was less likely. The fact that the WLPB does not have derived scores for subtests limited the comparisons between children's performance on these, HK-WISC and SB: FE subtests. For example, the correlation between children's performance on the Picture Vocabulary subtest of the WLPB and SB Vocabulary subtest remained unknown. In addition, the WLPB Written Language standard scores were derived from subjects' performance in Dictation and Proofing (i.e., the mechanics of writing). If a measure of written expression was used, subjects' written language scores might have been

lower (being more consistent with the other WLPB language scores).

5.6 RECOMMENDATIONS FOR FUTURE RESEARCH

Suggestions for future research include the following. First, a larger scale study is needed to replicate the findings of this study. The sample size should be large enough so that a single multiple regression analysis can be computed to determine the interaction effects of all the predictive variables.

Second, the present study only involved Chinese children from Hong Kong. Thus, the findings may not be applicable to other ethnic children. Other researchers should replicate this study by involving children from other ethnic backgrounds.

Third, if the present study is to be replicated, more time should be allowed for the test-retest interval so that the WISC-R can be used to replace the SB: FE. As Lee and Lam (1988) suggested, the HK-WISC and WISC-R have invariant factor-analytic properties; therefore, results from these two tests should provide higher correlations (i.e., better predictabilities).

Fourth, the present study basically drew conclusions from the findings of IQ measures. It will be beneficial to find out whether the findings will hold for a study that

involves achievement or language measures in children's L1 and L2.

Finally, social factors such as parents' pressure for achievement, parents' encouragement and support, and the child's motivation to learn a language may be useful in predicting their performance. Therefore, these factors should be included in further studies. However, these factors are more difficult to measure than factors like SES.

5.7 IMPLICATIONS FOR ASSESSMENT OF ENGLISH-AS-A-SECOND-LANGUAGE (ESL) CHILDREN

The present results have two major implications for the assessment of ESL children. First, assessing ESL children with both their L1 and L2 is likely to result in a better estimate of their cognitive/academic potential than L2 alone. As Maldonado-Colon (1986) mentioned, in order to determine whether an immigrant child does indeed have an educational handicap, it is essential to make the distinction between deficiencies caused by functioning in an L2 and true disorders which would be evident in the L1.

Second, the findings that Sattler's (1988) Verbal Comprehension and Nonverbal Reasoning Factor scores provided lower verbal and nonverbal scores discredit the use of these two factor scores with ESL children. Based on the present findings, Verbal Reasoning and Abstract/Visual Reasoning standard age scores (SAS) should provide a better estimate of subjects' verbal and nonverbal abilities on the SB: FE.

5.8 SUMMARY OF DISCUSSION

In conclusion, AOA and LOR are important predictive variables for ESL immigrant's verbal performance. In addition, variables such as family socioeconomic status, frequency of speaking Cantonese at home, gender, and having studied English before are also useful to make predictions on these children's performance.

Moreover, the hypothesis on the interdependence of CALP across languages being partially supported may be due to the children's inadequate exposure to both languages.

The present sample had a high nonverbal and low verbal profile of performance on the SB: FE. This finding adds to the cumulative data that Orientals have a characteristic intellectual profile.

Finally, if feasible, immigrant children should be assessed in both L1 and L2. Standardized tests can be used to assess ESL immigrant children, even in their first few years of arrival to a new country. The assessment results should be kept on file rather than being used for placement purposes. Comparisons between these and reassessment results can be made if an immigrant child continues to experience academic difficulties. However, all the assessment results need to be interpreted with extreme caution because inappropriate labelling and misplacement of these children are unacceptable.

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APPENDIX A

Letter of Permission

The enclosed letter was given to the parents in order to obtain consent for their child's participation in this study.

The University of British Columbia
Faculty of Education
2125 Main Mall
Vancouver, B.C.
V6T 125

致家長及監護人：

關於：決定最適當的時間用標準測驗來測試移民子弟。

此信的目的是請你准許你的兒/女，_____，來參加這個研究計劃。這個計劃準備在一九九零年四月在列治文學校區展開。這個計劃已獲得該校區批准。

這計劃的目的是希望找出何時應使用標準測驗來測試移民子弟。這計劃的結果對課程編排及學生安排有一定的幫助。香港兒童若在加拿大就讀已過二至四年及五至七年，便會被邀請參加研究。*

這個計劃會需要使用三個測驗，其中兩個是能力測驗（一個是以中文執行的，而另一個是以英文執行的），而另一個是英語測驗。

我們準備用兩個測驗期每次為一小時半，合共約三小時。由於我們會用數目來代替人名，你子女的姓名便能保密。

因為這計劃的結果是用來作研究工作使用，所以你子女的測驗結果並不會成為學校記錄。請注意，你子女的參與是出於自願的。如你決定不參加或希望在中途退出，這決定對你的子女在校的一切並無任何影響。

* 由於考研究的些微更改，故此在加拿大不足兩年的移民子弟亦會被邀請參加。

...2

Parent Permission Form

I do or do not (circle one) grant permission for my child to participate in this project, and I acknowledge receipt of a copy of this letter and all attachments. I understand that my child will be tested by a qualified examiner in the child's school. I also understand that my child's individual results will be kept strictly confidential.

I am this child's parent or legal guardian, and I am completing this form on the child's behalf.

Name (please print): _____

Signature: _____

Relationship to child: _____

Address: _____

Telephone: _____

家長批准書

我批准或不批准(請圈出)我的子女參加這計劃. 我現通知你我已收到這封信及一切附件. 我知道我的子女會在被一個合資格的測驗員測試. 我也知道我子女的測驗結果會被保密.

我是這個兒童的家長或合法監護人, 我現替他/她填寫這表格.

姓名: _____

簽名: _____

與兒童的關係: _____

地址: _____

電話: _____

APPENDIX B

Background Information

The following information was provided by the immigrant students' parents, who had permitted their child to participate in this study.

Background Information

If you consent for your child to participate, please complete the following confidential background information.

Name of Child: _____

Date of Birth: _____

Present Age: _____

Year of Arrival in Canada: _____

Age of Arrival in Canada: _____

Father's Occupation: In H.K.: _____
In Canada: _____

Mother's Occupation: In H.K.: _____
In Canada: _____

Father/Male Guardian and Mother/Female Guardian's Highest Educational Attainment (check one for each column):

Years of Education Completed	Father/Male Guardian	Mother/Female Guardian
Up to Grade/Primary 6	___	___
Grade 7-9/Form 1-3	___	___
Grade 10-11/Form 4-5	___	___
Grade 12/13 or Form 6-7	___	___
1-3 Years of College or Technical School	___	___
Four Years of University or More	___	___

Has your child ever been referred for educational or psychological assessment (check one)? __ Yes __ No
If yes, please give reason(s) for referral: _____
_____

Is your child receiving special assistance in learning at school (check one)? __ Yes __ No
If yes, please explain: _____
_____

Had your child received any education in English before coming to Canada (check one)? __ Yes __ No
If yes, please indicate the duration: __ years __ months

...2

Background Information

Had your child received any education in Chinese before coming to Canada (check one)? __ Yes __ No
If yes, please indicate the duration: __ years __ months

Is your child receiving any education in Chinese (check one)? __ Yes __ No
If yes, please indicate the frequency (e.g., 2 hours per week): _____

What is the frequency of your child speaking Cantonese at home (check one)?
__ Never
__ Seldom
__ Often
__ Always

背景資料

如你准許你的子女參加，請填寫以下的保密資料

子女姓名：_____

出生日期：_____

年齡：_____

到達加拿大時的年份：_____

到達加拿大時的年歲：_____

父親職業：在香港時：_____

（男監護人）在加拿大時：_____

母親職業：在香港時：_____

（女監護人）在加拿大時：_____

父親或男監護人及母親或女監護人的教育程度（擇一）

	父親/男監護人	母親/女監護人
小學畢業	____	____
中三畢業	____	____
中五畢業	____	____
中學預科畢業	____	____
專科或專上學院畢業	____	____
大學或以上畢業	____	____

你的子女曾否接受任何教育或心理測驗（擇一）？

____有 ____沒有。若有的話，請列出原因：_____

_____

你的子女曾否接受過特殊教育（擇一）？____有____沒有

若有的話，請說明：_____

_____

你的子女在來到加拿大前曾否接受英語教育（擇一）？

____有 ____沒有。若有的話，請列出期間：____年____月

背景資料

你的子女在未到加拿大前曾否接受中文教育(擇一)
____ 有, ____ 沒有. 若有的話, 請列出期間: _____ 年 ____ 月

現時你的子女有沒有接受任何中文教育(擇一)?
____ 有, ____ 沒有. 若有的話, 請列出次數及時間(例如每星期兩小時): _____

請選出你的子女在家說中文(廣東話)的次數或頻率(擇一):

_____ 從未
_____ 很少
_____ 時常
_____ 永遠

APPENDIX C

Intercorrelations of the HK-WISC Subtest Scores

	HK-WISC											
HK-WISC	INFO	SIM	ARITH	VOCAB	COMP	DS	PC	PA	BD	OA	COD	MAZ
Verbal:												
INFO	1.00	.41**	.42**	.62**	.68**	-.02	.40*	.25	.02	-.02	-.02	-.01
SIM	.42**	1.00	.22	.46**	.50**	-.14	.43**	.46**	.15	.10	-.16	.08
ARITH	.42**	.22	1.00	.27	.08	.00	.18	.15	.36*	-.15	-.07	-.03
VOCAB	.62**	.46**	.27	1.00	.46**	-.11	.28	.25	.00	-.17	-.03	-.24
COMP	.68**	.50**	.08	.46**	1.00	-.11	.45**	.19	-.16	.12	.07	-.14
DS	-.02	-.14	.00	-.11	-.11	1.00	-.11	-.27	.25	.10	-.28	.22
Performance:												
PC	.40*	.43**	.18	.28	.45**	-.11	1.00	.16	.11	.25	.03	.03
PA	.25	.45**	.15	.25	.19	-.27	.16	1.00	.21	.11	.08	.27
BD	.02	.15	.36*	.00	-.16	.25	.11	.21	1.00	.24	-.04	.22
OA	-.02	.10	-.15	-.17	.12	.10	.25	.11	.24	1.00	-.02	.00
COD	-.02	-.16	-.07	-.03	.07	-.28	.03	.08	-.04	-.02	1.00	-.08
MAZ	-.01	.08	-.03	-.24	-.14	.22	.03	.27	.22	.00	-.08	1.00

Note. INFO - Information
SIM - Similarities
ARITH - Arithmetic
VOCAB - Vocabulary
COMP - Comprehension
DS - Digit Span
PC - Picture Completion
PA - Picture Arrangement
BD - Block Design
OA - Object Assembly
COD - Coding
MAZ - Mazes
* - Significant at the .05 level
** - Significant at the .01 level

APPENDIX D

Intercorrelations of the SB: FE Subtest Scores

	SB: FE						
SB: FE	VOCAB	COMP	PANALYSIS	MATRICES	QUANT	BMEMORY	SMEMORY
VOCAB	1.00	.49**	.36*	-.04	.10	.16	.62**
COMP	.49**	1.00	.22	.18	.23	.24	.49**
PANALYSIS	.36*	.22	1.00	.23	.25	.29	.52**
MATRICES	-.04	.18	.23	1.00	.29	.22	.27
QUANT	.10	.23	.25	.29	1.00	.10	.32*
BMEMORY	.16	.24	.29	.22	.10	1.00	.43**
SMEMORY	.62**	.49**	.52**	.27	.32*	.43**	1.00

Note. VOCAB - Vocabulary
COMP - Comprehension
PANALYSIS - Pattern Analysis
MATRICES - Matrices
QUANT - Quantitative
BMEMORY - Bead Memory
SMEMORY - Memory for Sentences
* - Significant at the .05 level
** - Significant at the .01 level

APPENDIX E

Intercorrelations of All the Predictive Variables

Intercorrelations of the 19 predictors were computed for this study.

	AOA	LOR	AOC	GENDER	SCHOOL	GRADE	FE	ME	FHKO	MHKO	FCO
AOA	1.0000	-.4164*	.8633**	-.1836	.0645	.8136**	-.0637	.0773	-.2022	.2332	-.3632
LOR	-.4164*	1.0000	.0994	-.0083	.1779	.1191	.0698	.1569	.0145	-.1615	.1347
AOC	.8633**	.0994	1.0000	-.2056	.1693	.9565**	-.0309	.1717	-.2132	.1655	-.3227
GENDER	-.1836	-.0083	-.2056	1.0000	-.0882	-.1783	-.1368	.0099	.1669	-.0892	.1674
SCHOOL	.0645	.1779	.1693	-.0882	1.0000	.1064	.0657	.0108	.1968	.0641	.2061
GRADE	.8136**	.1191	.9565**	-.1783	.1064	1.0000	.0066	.1699	-.2465	.2249	-.3131
FE	-.0637	.0698	-.0309	-.1368	.0657	.0066	1.0000	.6212**	-.1007	-.3059	.0225
ME	.0773	.1569	.1717	.0099	.0108	.1699	.6212**	1.0000	-.1729	-.4541*	-.0556
FHKO	-.2022	.0145	-.2132	.1669	.1968	-.2465	-.1007	-.1729	1.0000	.1437	.8355**
MHKO	.2332	-.1615	.1655	-.0892	.0641	.2249	-.3059	-.4541*	.1437	1.0000	.0547
FCO	-.3632	.1347	-.3227	.1674	.2061	-.3131	.0225	-.0556	.8355**	.0547	1.0000
MCO	.0424	-.3718	-.1600	-.0996	.0975	-.0760	-.1394	-.5523**	.3579	.4902*	.3534
SEB	-.1665	.2878	-.0225	.0647	.3497	-.0683	.4187*	.6093**	.1871	-.4326*	.2035
MSEB	.1582	.1220	.2409	.1193	.2443	.2077	.2347	.4538*	.3211	-.2814	.2480
SCB	.	.	.	.	.	.	.	.	.	.	.
MSCB	.4754*	-.2259	.3949	-.1303	-.0114	.3495	-.0247	.0397	.2501	-.0316	.1696
RC	-.2538	-.1055	-.3363	-.2041	.1807	-.3066	.2300	-.2363	-.1442	-.0580	-.0233
FREQSC	-.2314	-.1395	-.3307	-.1636	.2704	-.2883	.1876	.0005	.2253	-.2331	.3542
FSCH	.1368	.0088	.1546	-.2468	.2759	.1496	-.0876	-.0428	.0382	-.0556	.0114

* - SIGNIF. LE .01 ** - SIGNIF. LE .001 (1-TAILED, " . " PRINTED IF A COEFFICIENT CANNOT BE COMPUTED)

	MCO	SEB	MSEB	SCB	MSCB	RC	FREQSC	FSCH
AOA	.0424	-.1665	.1582	.	.4754*	-.2538	-.2314	.1368
LOR	-.3718	.2878	.1220	.	-.2259	-.1055	-.1395	.0088
AOC	-.1600	-.0225	.2409	.	.3949	-.3363	-.3307	.1546
GENDER	-.0996	.0647	.1193	.	-.1303	-.2041	-.1636	-.2468
SCHOOL	.0975	.3497	.2443	.	-.0114	.1807	.2704	.2759
GRADE	-.0760	-.0683	.2077	.	.3495	-.3066	-.2883	.1496
FE	-.1394	.4187*	.2347	.	-.0247	.2300	.1876	-.0876
ME	-.5523**	.6093**	.4538*	.	.0397	-.2363	.0005	-.0428
FHKO	.3579	.1871	.3211	.	.2501	-.1442	.2253	.0382
MHKO	.4902*	-.4326*	-.2814	.	-.0316	-.0580	-.2331	-.0556
FCO	.3534	.2035	.2480	.	.1696	-.0233	.3542	.0114
MCO	1.0000	-.4742*	-.3188	.	.1142	.2042	.2888	.3558
SEB	-.4742*	1.0000	.8023**	.	.0100	-.1325	.0787	-.0945
MSEB	-.3188	.8023**	1.0000	.	.4514*	-.1644	.1804	-.1430
SCB	.	.	.	1.0000	.	.	.	.
MSCB	.1142	.0100	.4514*	.	1.0000	-.0356	.2140	.0347
RC	.2042	-.1325	-.1644	.	-.0356	1.0000	.6661**	-.0621
FREQSC	.2888	.0787	.1804	.	.2140	.6661**	1.0000	.1823
FSCH	.3558	-.0945	-.1430	.	.0347	-.0621	.1823	1.0000

* - SIGNIF. LE .01 ** - SIGNIF. LE .001 (1-TAILED, " . " PRINTED IF A COEFFICIENT CANNOT BE COMPUTED)

APPENDIX F

List of Abbreviations for Appendix E

AOA - Age on Arrival

LOR - Length of Residence

AOC - Age of Child

FE - Father's Education

ME - Mother's Education

FHKO - Father's Occupation (HK)

MHKO - Mother's Occupation (HK)

FCO - Father's Occupation (Canada)

MCO - Mother's Occupation (Canada)

SEB - Whether the Child Studied English Before

MSEB - Months of Studying English Before

SCB - Whether the Child Studied Chinese Before

MSCB - Months of Studying Chinese Before

RC - Whether the Child was Receiving Education in Chinese

FREQSC - Frequency of Studying Chinese

FSCH - Frequency of Speaking Cantonese at Home

APPENDIX G

Results of All the Multiple Regression Analyses for Subjects' Performance on the HK-WISC, SB: FE, and WLPB

I. Stage 1:

A. HK-WISC

(1) Multiple Regression Analysis for Subjects' HK Full Scale Scores with Age on Arrival (AOA) and Length of Residence (LOR)

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	AOA > LOR	.26	.07	.07	1.01	1.01
---	---	---	---	---	---	---
Full Equ.	Both	.26	.07	.07	1.01	1.01

(2) Multiple Regression Analysis for Subjects' HK Verbal Scale Scores with AOA and LOR

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	AOA > LOR	.32	.10	.10	1.68	1.68
---	---	---	---	---	---	---
Full Equ.	Both	.32	.10	.10	1.68	1.68

(3) Multiple Regression Analysis for Subjects' HK Performance Scale Scores with AOA and LOR

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	AOA > LOR	.14	.02	.02	.28	.28
---	---	---	---	---	---	---
Full Equ.	Both	.14	.02	.02	.28	.28

(4) Multiple Regression Analysis for Subjects' HK Full Scale Scores with Gender and Age of Child (AOC)

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	AOC > Gender	.22	.05	.05	.70	.70
Full Equ.	Both	.22	.05	.05	.70	.70

(5) Multiple Regression Analysis for Subjects' HK Verbal Scale Scores with Gender and AOC

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	Gender	.39	.16	.16	5.52*	5.52
2	AOC	.40	.16	.00	2.71	.08
Full Equ.	Both	.40	.16	.16	2.71	2.71

Note. * - Significant at the .05 level

(6) Multiple Regression Analysis for Subjects' HK Performance Scale Scores with Gender and AOC

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	AOC > Gender	.06	.00	.00	.05	.05
Full Equ.	Both	.06	.00	.00	.05	.05

(7) Multiple Regression Analysis for Subjects' HK Full Scale Scores with School and Grade

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	Grade > School	.12	.01	.01	.20	.20
Full Equ.	Both	.12	.01	.01	.20	.20

(8) Multiple Regression Analysis for Subjects' HK Verbal Scale Scores with School and Grade

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	Grade > School	.12	.01	.01	.21	.21
Full Equ.	Both	.12	.01	.01	.21	.21

(9) Multiple Regression Analysis for Subjects' HK Performance Scale Scores with School and Grade

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	Grade > School	.07	.00	.00	.07	.07
Full Equ.	Both	.07	.00	.00	.07	.07

(10) Multiple Regression Analysis for Subjects' HK Full Scale Scores with Father's Education (FE) and Mother's Education (ME)

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	ME > FE	.13	.02	.02	.23	.23
Full Equ.	Both	.13	.02	.02	.23	.23

(11) Multiple Regression Analysis for Subjects' HK Verbal Scale Scores with FE and ME

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	ME > FE	.26	.07	.07	1.06	1.06
Full Equ.	Both	.26	.07	.07	1.06	1.06

(12) Multiple Regression Analysis for Subjects' HK Performance Scale Scores with FE and ME

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	ME > FE	.27	.08	.08	1.18	1.18
Full Equ.	Both	.27	.08	.08	1.18	1.18

(13) Multiple Regression Analysis for Subjects' HK Full Scale Scores with Father's Occupation in HK (FHKO) and Mother's Occupation in HK (MHKO)

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MHKO > FHKO	.19	.04	.04	.54	.54
Full Equ.	Both	.19	.04	.04	.54	.54

(14) Multiple Regression Analysis for Subjects' HK Verbal Scale Scores with FHKO and MHKO

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MHKO > FHKO	.13	.02	.02	.27	.27
Full Equ.	Both	.13	.02	.02	.27	.27

(15) Multiple Regression Analysis for Subjects' HK Performance Scale Scores with FHKO and MHKO

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MHKO > FHKO	.23	.06	.06	.84	.84
Full Equ.	Both	.23	.06	.06	.84	.84

(16) Multiple Regression Analysis for Subjects' HK Full Scale Scores with Father's Occupation in Canada (FCO) and Mother's Occupation in Canada (MCO)

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MCO > FCO	.10	.01	.01	.14	.14
Full Equ.	Both	.10	.01	.01	.14	.14

(17) Multiple Regression Analysis for Subjects' HK Verbal Scale Scores with FCO and MCO

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MCO > FCO	.14	.02	.02	.30	.30
Full Equ.	Both	.14	.02	.02	.30	.30

(18) Multiple Regression Analysis for Subjects' HK Performance Scale Scores with FCO and MCO

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MCO > FCO	.04	.00	.00	.02	.02
Full Equ.	Both	.04	.00	.00	.02	.02

(19) Multiple Regression Analysis for Subjects' HK Full Scale Scores with Studied English Before (SEB) and Months of Studying English Before (MSEB)

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MSEB > SEB	.11	.01	.01	.18	.18
Full Equ.	Both	.11	.01	.01	.18	.18

(20) Multiple Regression Analysis for Subjects' HK Verbal Scale Scores with SEB and MSEB

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MSEB > SEB	.10	.01	.01	.14	.14
Full Equ.	Both	.10	.01	.01	.14	.14

(21) Multiple Regression Analysis for Subjects' HK Performance Scale Scores with SEB and MSEB

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MSEB > SEB	.11	.01	.01	.16	.16
Full Equ.	Both	.11	.01	.01	.16	.16

(22) Multiple Regression Analysis for Subjects' HK Full Scale Scores with Studied Chinese Before (SCB) and Months of Studying Chinese Before (MSCB)

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MSCB	.08	.01	.01	.18	.18
Full Equ.	MSCB	.08	.01	.01	.18	.18

(23) Multiple Regression Analysis for Subjects' HK Verbal Scale Scores with SCB and MSCB

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MSCB	.12	.01	.01	.44	.44
Full Equ.	MSCB	.12	.01	.01	.44	.44

(24) Multiple Regression Analysis for Subjects' HK Performance Scale Scores with SCB and MSCB

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MSCB	.04	.00	.00	.06	.06
Full Equ.	MSCB	.04	.00	.00	.06	.06

(25) Multiple Regression Analysis for Subjects' HK Full Scale Scores with Frequency of Speaking Cantonese at Home (FSCH), Receiving Education in Chinese (RC), and Frequency of Studying Chinese (FREQSC)

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	FREQSC\ FSCH > RC /	.31	.09	.09	.96	.96
Full Equ.	All Three	.31	.09	.09	.96	.96

(26) Multiple Regression Analysis for Subjects' HK Verbal Scale Scores with FSCH, RC, and FREQSC

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	FREQSC\ FSCH > RC /	.26	.07	.07	.68	.68
Full Equ.	All Three	.26	.07	.07	.68	.68

(27) Multiple Regression Analysis for Subjects' HK Verbal Scale Scores with FSCH, RC, and FREQSC

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	FREQSC\ FSCH > RC /	.41	.17	.17	1.89	1.89
Full Equ.	All Three	.41	.17	.17	1.89	1.89

B. SB: FE

(1) Multiple Regression Analysis for Subjects' SB Test Composites with Age on Arrival (AOA) and Length of Residence (LOR)

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	AOA > LOR	.23	.05	.05	.83	.83
Full Equ.	Both	.23	.05	.05	.83	.83

(2) Multiple Regression Analysis for Subjects' SB Verbal Reasoning Standard Age Scores (SAS) with AOA and LOR

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	AOA > LOR	.38	.14	.14	2.38	2.38
Full Equ.	Both	.38	.14	.14	2.38	2.38

(3) Multiple Regression Analysis for Subjects' SB Abstract/ Visual Reasoning SAS with AOA and LOR

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	AOA > LOR	.31	.10	.10	1.59	1.59
Full Equ.	Both	.31	.10	.10	1.59	1.59

(4) Multiple Regression Analysis for Subjects' SB Quantitative Reasoning SAS with AOA and LOR

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	AOA > LOR	.21	.05	.05	.69	.69
Full Equ.	Both	.21	.05	.05	.69	.69

(5) Multiple Regression Analysis for Subjects' SB Short-Term Memory SAS with AOA and LOR

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	AOA > LOR	.18	.03	.03	.51	.51
Full Equ.	Both	.18	.03	.03	.51	.51

(6) Multiple Regression Analysis for Subjects' SB Verbal Comprehension Factor Scores with AOA and LOR

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	LOR	.35	.13	.13	4.27*	4.27
2	AOA	.38	.15	.02	2.46	.70
Full Equ.	Both	.38	.15	.15	2.46	2.46

Note. * - Significant at the .05 level

(7) Multiple Regression Analysis for Subjects' SB Nonverbal Reasoning/Visualization Factor Scores with AOA and LOR

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	AOA > LOR	.06	.00	.00	.05	.05
Full Equ.	Both	.06	.00	.00	.05	.05

(8) Multiple Regression Analysis for Subjects' SB Test Composites with Gender and Age of Child (AOC)

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	AOC > Gender	.22	.05	.05	.73	.73
Full Equ.	Both	.22	.05	.05	.73	.73

(9) Multiple Regression Analysis for Subjects' SB Verbal Reasoning SAS with Gender and AOC

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	AOC > Gender	.11	.01	.01	.18	.18
Full Equ.	Both	.11	.01	.01	.18	.18

(10) Multiple Regression Analysis for Subjects' SB Abstract/ Visual Reasoning SAS with Gender and AOC

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	AOC > Gender	.23	.05	.05	.82	.82
Full Equ.	Both	.23	.05	.05	.82	.82

(11) Multiple Regression Analysis for Subjects' SB Quantitative Reasoning SAS with Gender and AOC

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	Gender	.45	.20	.20	7.64**	7.64
2	AOC	.47	.21	.01	4.01*	.50
Full	Equ. Both	.47	.21	.21	4.01*	4.01

Note. * - Significant at the .05 level
** - Significant at the .01 level

(12) Multiple Regression Analysis for Subjects' SB Short-Term Memory SAS with Gender and AOC

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	AOC > Gender	.16	.03	.03	.39	.39
Full	Equ. Both	.16	.03	.03	.39	.39

(13) Multiple Regression Analysis for Subjects' SB Verbal Comprehension Factor Scores with Gender and AOC

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	AOC > Gender	.11	.01	.01	.19	.19
Full	Equ. Both	.11	.01	.01	.19	.19

(14) Multiple Regression Analysis for Subjects' SB Nonverbal Reasoning/Visualization Factor Scores with Gender and AOC

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	AOC > Gender	.26	.07	.07	1.05	1.05
Full Equ.	Both	.26	.07	.07	1.05	1.05

(15) Multiple Regression Analysis for Subjects' SB Test Composites with School and Grade

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	Grade > School	.12	.01	.01	.21	.21
Full Equ.	Both	.12	.01	.01	.21	.21

(16) Multiple Regression Analysis for Subjects' SB Verbal Reasoning SAS with School and Grade

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	Grade > School	.11	.01	.01	.19	.19
Full Equ.	Both	.11	.01	.01	.19	.19

(17) Multiple Regression Analysis for Subjects' SB Abstract/ Visual Reasoning SAS with School and Grade

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	Grade > School	.20	.04	.04	.63	.63
Full Equ.	Both	.20	.04	.04	.63	.63

(18) Multiple Regression Analysis for Subjects' SB Quantitative Reasoning SAS with School and Grade

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	Grade > School	.25	.06	.06	.96	.96
Full Equ.	Both	.25	.06	.06	.96	.96

(19) Multiple Regression Analysis for Subjects' SB Short-Term Memory SAS with School and Grade

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	Grade > School	.23	.05	.05	.82	.82
Full Equ.	Both	.23	.05	.05	.82	.82

(20) Multiple Regression Analysis for Subjects' SB Verbal Comprehension Factor Scores with School and Grade

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	Grade > School	.08	.01	.01	.09	.09
Full Equ.	Both	.08	.01	.01	.09	.09

(21) Multiple Regression Analysis for Subjects' SB Nonverbal Reasoning/Visualization Factor Scores with School and Grade

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	Grade > School	.12	.01	.01	.21	.21
Full Equ.	Both	.12	.01	.01	.21	.21

(22) Multiple Regression Analysis for Subjects' SB Test Composites with Father's Education (FE) and Mother's Education (ME)

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	ME > FE	.15	.02	.02	.31	.31
Full Equ.	Both	.15	.02	.02	.31	.31

(23) Multiple Regression Analysis for Subjects' SB Verbal Reasoning SAS with FE and ME

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	ME > FE	.35	.12	.12	1.98	1.98
Full Equ.	Both	.35	.12	.12	1.98	1.98

(24) Multiple Regression Analysis for Subjects' SB Abstract/ Visual Reasoning SAS with FE and ME

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	ME > FE	.20	.04	.04	.61	.61
Full	Equ. Both	.20	.04	.04	.61	.61

(25) Multiple Regression Analysis for Subjects' SB Quantitative Reasoning SAS with FE and ME

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	ME > FE	.09	.01	.01	.12	.12
Full	Equ. Both	.09	.01	.01	.12	.12

(26) Multiple Regression Analysis for Subjects' SB Short-Term Memory SAS with FE and ME

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	ME > FE	.20	.04	.04	.60	.60
Full	Equ. Both	.20	.04	.04	.60	.60

(27) Multiple Regression Analysis for Subjects' SB Verbal Comprehension Factor Scores with FE and ME

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	ME	.37	.13	.13	4.68*	4.68
2	FE	.38	.14	.01	2.41	.25
Full	Equ. Both	.38	.14	.14	2.41	2.41

Note. * - Significant at the .05 level

(28) Multiple Regression Analysis for Subjects' SB Nonverbal Reasoning/Visualization Factor Scores with FE and ME

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	ME > FE	.22	.05	.05	.72	.72
Full	Equ. Both	.22	.05	.05	.72	.72

(29) Multiple Regression Analysis for Subjects' SB Test Composites with Father's Occupation in HK (FHKO) and Mother's Occupation in HK (MHKO)

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MHKO > FHKO	.22	.05	.05	.76	.76
Full	Equ. Both	.22	.05	.05	.76	.76

(30) Multiple Regression Analysis for Subjects' SB Verbal Reasoning SAS with FHKO and MHKO

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MHKO > FHKO	.07	.00	.00	.06	.06
Full	Equ. Both	.07	.00	.00	.06	.06

(31) Multiple Regression Analysis for Subjects' SB Abstract/ Visual Reasoning SAS with FHKO and MHKO

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MHKO > FHKO	.03	.00	.00	.02	.02
Full Equ.	Both	.03	.00	.00	.02	.02

(32) Multiple Regression Analysis for Subjects' SB Quantitative Reasoning SAS with FHKO and MHKO

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MHKO > FHKO	.30	.09	.09	1.41	1.41
Full Equ.	Both	.30	.09	.09	1.41	1.41

(33) Multiple Regression Analysis for Subjects' SB Short-Term Memory SAS with FHKO and MHKO

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	FHKO	.42	.17	.17	6.36*	6.36
2	MHKO	.42	.17	.00	3.10	.04
Full Equ.	Both	.42	.17	.17	3.10	3.10

Note. * - Significant at the .05 level

(34) Multiple Regression Analysis for Subjects' SB Verbal Comprehension Factor Scores with FHKO and MHKO

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MHKO > FHKO	.19	.04	.04	.53	.53
Full Equ.	Both	.19	.04	.04	.53	.53

(35) Multiple Regression Analysis for Subjects' SB Nonverbal Reasoning/Visualization Factor Scores with FHKO and MHKO

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MHKO > FHKO	.29	.08	.08	1.33	1.33
Full Equ.	Both	.29	.08	.08	1.33	1.33

(36) Multiple Regression Analysis for Subjects' SB Test Composites with Father's Occupation in Canada (FCO) and Mother's Occupation in Canada (MCO)

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MCO > FCO	.25	.06	.06	.96	.96
Full Equ.	Both	.25	.06	.06	.96	.96

(37) Multiple Regression Analysis for Subjects' SB Verbal Reasoning SAS with FCO and MCO

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MCO	.37	.14	.14	4.73*	4.73
2	FCO	.43	.19	.05	3.31	1.77
Full Equ.	Both	.43	.19	.19	3.31	3.31

Note. * - Significant at the .05 level

(38) Multiple Regression Analysis for Subjects' SB Abstract/ Visual Reasoning SAS with FCO and MCO

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MCO > FCO	.11	.01	.01	.18	.18
Full Equ.	Both	.11	.01	.01	.18	.18

(39) Multiple Regression Analysis for Subjects' SB Quantitative Reasoning SAS with FCO and MCO

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MCO > FCO	.16	.03	.03	.38	.38
Full Equ.	Both	.16	.03	.03	.38	.38

(40) Multiple Regression Analysis for Subjects' SB Short-Term Memory SAS with FCO and MCO

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	FCO	.36	.13	.13	4.47*	4.47
2	MCO	.40	.16	.03	2.69	.92
Full Equ.	Both	.40	.16	.16	2.69	2.69

Note. * - Significant at the .05 level

(41) Multiple Regression Analysis for Subjects' SB Verbal Comprehension Factor Scores with FCO and MCO

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MCO	.39	.15	.15	5.40*	5.40
2	FCO	.40	.16	.01	2.76	.25
Full Equ.	Both	.40	.16	.16	2.76	2.76

Note. * - Significant at the .05 level

(42) Multiple Regression Analysis for Subjects' SB Nonverbal Reasoning/Visualization Factor Scores with FCO and MCO

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MCO > FCO	.27	.07	.07	1.16	1.16
Full Equ.	Both	.27	.07	.07	1.16	1.16

(43) Multiple Regression Analysis for Subjects' SB Test Composites with Studied English Before (SEB) and Months of Studying English Before (MSEB)

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MSEB > SEB	.18	.03	.03	.49	.49
Full Equ.	Both	.18	.03	.03	.49	.49

(44) Multiple Regression Analysis for Subjects' SB Verbal Reasoning SAS with SEB and MSEB

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MSEB > SEB	.33	.11	.11	1.78	1.78
Full	Equ. Both	.33	.11	.11	1.78	1.78

(45) Multiple Regression Analysis for Subjects' SB Abstract/ Visual Reasoning SAS with SEB and MSEB

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MSEB > SEB	.23	.05	.05	.81	.81
Full	Equ. Both	.23	.05	.05	.81	.81

(46) Multiple Regression Analysis for Subjects' SB Quantitative Reasoning SAS with SEB and MSEB

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MSEB > SEB	.28	.08	.08	1.25	1.25
Full	Equ. Both	.28	.08	.08	1.25	1.25

(47) Multiple Regression Analysis for Subjects' SB Short-Term Memory SAS with SEB and MSEB

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MSEB > SEB	.14	.02	.02	.28	.28
Full	Equ. Both	.14	.02	.02	.28	.28

(48) Multiple Regression Analysis for Subjects' SB Verbal Comprehension Factor Scores with SEB and MSEB

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	SEB	.36	.13	.13	4.53*	4.53
2	MSEB	.36	.13	.00	2.20	.02
Full Equ.	Both	.36	.13	.13	2.20	2.20

Note. * - Significant at the .05 level

(49) Multiple Regression Analysis for Subjects' SB Nonverbal Reasoning/Visualization Factor Scores with SEB and MSEB

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MSEB > SEB	.08	.01	.01	.09	.09
Full Equ.	Both	.08	.01	.01	.09	.09

(50) Multiple Regression Analysis for Subjects' SB Test Composites with Studied Chinese Before (SCB) and Months of Studying Chinese Before (MSCB)

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MSCB	.02	.00	.00	.01	.01
Full Equ.	MSCB	.02	.00	.00	.01	.01

(51) Multiple Regression Analysis for Subjects' SB Verbal Reasoning SAS with SCB and MSCB

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MSCB	.02	.00	.00	.02	.02
Full Equ.	MSCB	.02	.00	.00	.02	.02

(52) Multiple Regression Analysis for Subjects' SB Abstract/ Visual Reasoning SAS with SCB and MSCB

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MSCB	.14	.02	.02	.62	.62
Full	Equ. MSCB	.14	.02	.02	.62	.62

(53) Multiple Regression Analysis for Subjects' SB Quantitative Reasoning SAS with SCB and MSCB

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MSCB	.19	.04	.04	1.10	1.10
Full	Equ. MSCB	.19	.04	.04	1.10	1.10

(54) Multiple Regression Analysis for Subjects' SB Short-Term Memory SAS with SCB and MSCB

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MSCB	.10	.01	.01	.31	.31
Full	Equ. MSCB	.10	.01	.01	.31	.31

(55) Multiple Regression Analysis for Subjects' SB Verbal Comprehension Factor Scores with SCB and MSCB

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MSCB	.08	.01	.01	.19	.19
Full	Equ. MSCB	.08	.01	.01	.19	.19

(56) Multiple Regression Analysis for Subjects' SB Nonverbal Reasoning/Visualization Factor Scores with SCB and MSCB

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MSCB	.02	.00	.00	.01	.01
Full	Equ. MSCB	.02	.00	.00	.01	.01

(57) Multiple Regression Analysis for Subjects' SB Test Composites with Frequency of Speaking Cantonese at Home (FSCH), Receiving Education in Chinese (RC), and Frequency of Studying Chinese (FREQSC)

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	FREQSC\ FSCH > RC/	.34	.12	.12	1.22	1.22
Full	Equ.All Three	.34	.12	.12	1.22	1.22

(58) Multiple Regression Analysis for Subjects' SB Verbal Reasoning SAS with FSCH, RC, and FREQSC

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	FSCH	.36	.13	.13	4.51*	4.51
2	RC > FREQSC	.41	.17	.04	1.90	.65
Full	Equ.All Three	.41	.17	.17	1.90	1.90

Note. * - Significant at the .05 level

(59) Multiple Regression Analysis for Subjects' SB Abstract/ Visual Reasoning SAS with FSCH, RC, and FREQSC

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	FREQSC\ FSCH > RC/	.30	.09	.09	.94	.94
Full	Equ.All Three	.30	.09	.09	.94	.94

(60) Multiple Regression Analysis for Subjects' SB Quantitative Reasoning SAS with FSCH, RC, and FREQSC

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	FREQSC\ FSCH > RC/	.13	.02	.02	.17	.17
Full	Equ.All Three	.13	.02	.02	.17	.17

(61) Multiple Regression Analysis for Subjects' SB Short-Term Memory SAS with FSCH, RC, and FREQSC

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	FREQSC\ FSCH > RC/	.32	.11	.11	1.10	1.10
Full	Equ.All Three	.32	.11	.11	1.10	1.10

(62) Multiple Regression Analysis for Subjects' SB Verbal Comprehension Factor Scores with FSCH, RC, and FREQSC

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	FREQSC\ FSCH > RC/	.34	.12	.12	1.23	1.23
Full	Equ.All Three	.34	.12	.12	1.23	1.23

(63) Multiple Regression Analysis for Subjects' SB Nonverbal Reasoning/Visualization Factor Scores with FSCH, RC, and FREQSC

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	FREQSC\ FSCH > RC/	.26	.07	.07	.66	.66
Full Equ.	All Three	.26	.07	.07	.66	.66

C. WLPB

(1) Multiple Regression Analysis for Subjects' WLPB Oral Language Standard Scores with Age on Arrival (AOA) and Length of Residence (LOR)

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	AOA > LOR	.33	.11	.11	1.71	1.71
Full Equ.	Both	.33	.11	.11	1.71	1.71

(2) Multiple Regression Analysis for Subjects' WLPB Reading Standard Scores with AOA and LOR

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	AOA	.38	.15	.15	5.21*	5.21
2	LOR	.38	.15	.00	2.52	.00
Full Equ.	Both	.38	.15	.15	2.52	2.52

Note. * - Significant at the .05 level

(3) Multiple Regression Analysis for Subjects' WLPB Written Language Standard Scores with AOA and LOR

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	AOA > LOR	.22	.05	.05	.70	.70
Full Equ.	Both	.22	.05	.05	.70	.70

(4) Multiple Regression Analysis for Subjects' WLPB Broad Language Standard Scores with AOA and LOR

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	AOA	.37	.14	.14	4.68*	4.68
2	LOR	.37	.14	.00	2.31	.09
Full Equ.	Both	.37	.14	.14	2.31	2.31

Note. * - Significant at the .05 level

(5) Multiple Regression Analysis for Subjects' WLPB Oral Language Standard Scores with Gender and Age of Child (AOC)

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	AOC > Gender	.25	.06	.06	.94	.94
Full Equ.	Both	.25	.06	.06	.94	.94

(6) Multiple Regression Analysis for Subjects' WLPB Reading Standard Scores with Gender and AOC

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	AOC > Gender	.33	.11	.11	1.75	1.75
Full Equ.	Both	.33	.11	.11	1.75	1.75

(7) Multiple Regression Analysis for Subjects' WLPB Written Language Standard Scores with Gender and AOC

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	AOC > Gender	.32	.10	.10	1.67	1.67
Full Equ.	Both	.32	.10	.10	1.67	1.67

(8) Multiple Regression Analysis for Subjects' WLPB Broad Language Standard Scores with Gender and AOC

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	AOC > Gender	.34	.12	.12	1.94	1.94
Full Equ.	Both	.34	.12	.12	1.94	1.94

(9) Multiple Regression Analysis for Subjects' WLPB Oral Language Standard Scores with School and Grade

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	Grade > School	.14	.02	.02	.27	.27
Full Equ.	Both	.14	.02	.02	.27	.27

(10) Multiple Regression Analysis for Subjects' WLPB Reading Standard Scores with School and Grade

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	Grade > School	.18	.03	.03	.46	.46
Full Equ.	Both	.18	.03	.03	.46	.46

(11) Multiple Regression Analysis for Subjects' WLPB Written Language Standard Scores with School and Grade

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	Grade > School	.07	.01	.01	.08	.08
Full Equ.	Both	.07	.01	.01	.08	.08

(12) Multiple Regression Analysis for Subjects' WLPB Broad Language Standard Scores with School and Grade

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	Grade > School	.18	.03	.03	.47	.47
Full Equ.	Both	.18	.03	.03	.47	.47

(13) Multiple Regression Analysis for Subjects' WLPB Oral Language Standard Scores with Father's Education (FE) and Mother's Education (ME)

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	ME > FE	.34	.12	.12	1.94	1.94
Full Equ.	Both	.34	.12	.12	1.94	1.94

(14) Multiple Regression Analysis for Subjects' WLPB Reading Standard Scores with FE and ME

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	ME > FE	.19	.03	.03	.53	.53
Full Equ.	Both	.19	.03	.03	.53	.53

(15) Multiple Regression Analysis for Subjects' WLPB Written Language Standard Scores with FE and ME

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	ME > FE	.32	.10	.10	1.69	1.69
Full Equ.	Both	.32	.10	.10	1.69	1.69

(16) Multiple Regression Analysis for Subjects' WLPB Broad Language Standard Scores with FE and ME

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	ME > FE	.23	.05	.05	.78	.78
Full Equ.	Both	.23	.05	.05	.78	.78

(17) Multiple Regression Analysis for Subjects' WLPB Oral Language Standard Scores with Father's Occupation in Hong Kong (FHKO) and Mother's Occupation in Hong Kong (MHKO)

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MHKO > FHKO	.05	.00	.00	.04	.04
Full Equ.	Both	.05	.00	.00	.04	.04

(18) Multiple Regression Analysis for Subjects' WLPB Reading Standard Scores with FHKO and MHKO

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MHKO > FHKO	.24	.06	.06	.92	.92
Full Equ.	Both	.24	.06	.06	.92	.92

(19) Multiple Regression Analysis for Subjects' WLPB Written Language Standard Scores with FHKO and MHKO

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MHKO > FHKO	.17	.03	.03	.42	.42
Full Equ.	Both	.17	.03	.03	.42	.42

(20) Multiple Regression Analysis for Subjects' WLPB Broad Language Standard Scores with FHKO and MHKO

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MHKO > FHKO	.18	.03	.03	.49	.49
Full Equ.	Both	.18	.03	.03	.49	.49

(21) Multiple Regression Analysis for Subjects' WLPB Oral Language Standard Scores with Father's Occupation in Canada (FCO) and Mother's Occupation in Canada (MCO)

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MCO > FCO	.22	.05	.05	.72	.72
Full Equ.	Both	.22	.05	.05	.72	.72

(22) Multiple Regression Analysis for Subjects' WLPB Reading Standard Scores with FCO and MCO

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MCO > FCO	.04	.00	.00	.03	.03
Full Equ.	Both	.04	.00	.00	.03	.03

(23) Multiple Regression Analysis for Subjects' WLPB Written Language Standard Scores with FCO and MCO

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MCO > FCO	.15	.02	.02	.34	.34
Full Equ.	Both	.15	.02	.02	.34	.34

(24) Multiple Regression Analysis for Subjects' WLPB Broad Language Standard Scores with FCO and MCO

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MCO > FCO	.12	.01	.01	.22	.22
Full Equ.	Both	.12	.01	.01	.22	.22

(25) Multiple Regression Analysis for Subjects' WLPB Oral Language Standard Scores with Studied English Before (SEB) and Months of Studying English Before (MSEB)

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	SEB	.36	.13	.13	4.60*	4.60
2	MSEB	.37	.13	.00	2.27	.08
Full Equ.	Both	.37	.13	.13	2.27	2.27

Note. * - Significant at the .05 level

(26) Multiple Regression Analysis for Subjects' WLPB Reading Standard Scores with SEB and MSEB

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MSEB > SEB	.27	.07	.07	1.11	1.11
Full Equ.	Both	.27	.07	.07	1.11	1.11

(27) Multiple Regression Analysis for Subjects' WLPB Written Language Standard Scores with SEB and MSEB

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MSEB > SEB	.30	.09	.09	1.46	1.46
Full Equ.	Both	.30	.09	.09	1.46	1.46

(28) Multiple Regression Analysis for Subjects' WLPB Broad Language Standard Scores with SEB and MSEB

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MSEB > SEB	.29	.08	.08	1.30	1.30
Full Equ.	Both	.29	.08	.08	1.30	1.30

(29) Multiple Regression Analysis for Subjects' WLPB Oral Language Standard Scores with Studied Chinese Before (SCB) and Months of Studying Chinese Before (MSCB)

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MSCB	.17	.03	.03	.86	.86
Full Equ.	MSCB	.17	.03	.03	.86	.86

(30) Multiple Regression Analysis for Subjects' WLPB Reading Standard Scores with SCB and MSCB

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MSCB	.27	.07	.07	2.40	2.40
Full Equ.	MSCB	.27	.07	.07	2.40	2.40

(31) Multiple Regression Analysis for Subjects' WLPB Written Language Standard Scores with SCB and MSCB

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MSCB	.09	.01	.01	.24	.24
Full Equ.	MSCB	.09	.01	.01	.24	.24

(32) Multiple Regression Analysis for Subjects' WLPB Broad Language Standard Scores with SCB and MSCB

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MSCB	.21	.04	.04	1.37	1.37
Full Equ.	MSCB	.21	.04	.04	1.37	1.37

(33) Multiple Regression Analysis for Subjects' WLPB Oral Language Standard Scores with Frequency of Speaking Cantonese at Home (FSCH), Receiving Education in Chinese (RC), and Frequency of Studying Chinese (FREQSC)

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	FREQSC\ FSCH > RC/	.23	.05	.05	.52	.52
Full Equ.	All Three	.23	.05	.05	.52	.52

(34) Multiple Regression Analysis for Subjects' WLPB Reading Standard Scores with FSCH, RC, and FREQSC

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	FREQSC\ FSCH > RC/	.11	.01	.01	.12	.12
Full Equ.	All Three	.11	.01	.01	.12	.12

(35) Multiple Regression Analysis for Subjects' WLPB Written Language Standard Scores with FSCH, RC, and FREQSC

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	FREQSC\ FSCH > RC/	.20	.04	.04	.38	.38
Full Equ.	All Three	.20	.04	.04	.38	.38

(36) Multiple Regression Analysis for Subjects' WLPB Broad Language Standard Scores with FSCH, RC, and FREQSC

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	FREQSC\ FSCH > RC/	.22	.05	.05	.47	.47
Full Equ.	All Three	.22	.05	.05	.47	.47

II. Stage 2:

A. HK-WISC

Since gender was the only significant predictor identified in Stage 1, it was not combined with any predictors for further analyses at this stage.

B. SB:FE

(1) Multiple Regression Analysis for Subjects' SB Test Composites with Length of Residence (LOR), Mother's Education (ME), and Mother's Occupation in Canada (MCO)

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	ME\ LOR > MCO/	.29	.09	.09	.89	.89
Full Equ.	All Three	.29	.09	.09	.89	.89

(2) Multiple Regression Analysis for Subjects' SB Verbal Reasoning SAS with LOR, ME, and MCO

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MCO	.37	.14	.14	4.73*	4.73
2	LOR > ME	.47	.22	.08	2.62	1.49
Full Equ.	All Three	.47	.22	.22	2.62	2.62

Note. * - Significant at the .05 level

(3) Multiple Regression Analysis for Subjects' SB Abstract/ Visual Reasoning SAS with LOR, ME, and MCO

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	ME\ LOR > MCO/	.34	.12	.12	1.24	1.24
Full Equ.	All Three	.34	.12	.12	1.24	1.24

(4) Multiple Regression Analysis for Subjects' SB Quantitative Reasoning SAS with LOR, ME, and MCO

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	ME\ LOR > MCO/	.08	.01	.01	.07	.07
Full Equ.	All Three	.08	.01	.01	.07	.07

(5) Multiple Regression Analysis for Subjects' SB Short-Term Memory SAS with LOR, ME, and MCO

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	ME\ LOR > MCO/	.29	.08	.08	.85	.85
Full Equ.	All Three	.29	.08	.08	.85	.85

(6) Multiple Regression Analysis for Subjects' SB Verbal Comprehension Factor Scores with LOR, ME, and MCO

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MCO	.39	.15	.15	5.40*	5.40
2	LOR > ME	.49	.24	.09	2.97*	1.63
Full Equ.	All Three	.49	.24	.24	2.97*	2.97

Note. * - Significant at the .05 level

(7) Multiple Regression Analysis for Subjects' SB Nonverbal Reasoning/Visualization Factor Scores with LOR, ME, and MCO

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	ME\ LOR > MCO/	.26	.07	.07	.68	.68
Full Equ.	All Three	.26	.07	.07	.68	.68

(8) Multiple Regression Analysis for Subjects' SB Test Composites with Length of Residence (LOR), Mother's Education (ME), and Studied English Before (SEB)

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	ME\ LOR > SEB/	.27	.07	.07	.74	.74
Full Equ.	All Three	.27	.07	.07	.74	.74

(9) Multiple Regression Analysis for Subjects' SB Verbal Reasoning SAS with LOR, ME, and SEB

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	ME\ LOR > SEB/	.46	.21	.21	2.51	2.51
Full Equ.	All Three	.46	.21	.21	2.51	2.51

(10) Multiple Regression Analysis for Subjects' SB Abstract/ Visual Reasoning SAS with LOR, ME, and SEB

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	ME\ LOR > SEB/	.39	.15	.15	1.65	1.65
Full Equ.	All Three	.39	.15	.15	1.65	1.65

(11) Multiple Regression Analysis for Subjects' SB Quantitative Reasoning SAS with LOR, ME, and SEB

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	ME\ LOR > SEB/	.14	.02	.02	.20	.20
Full	Equ. All Three	.14	.02	.02	.20	.20

(12) Multiple Regression Analysis for Subjects' SB Short-Term Memory SAS with LOR, ME, and SEB

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	ME\ LOR > SEB/	.14	.02	.02	.20	.20
Full	Equ. All Three	.14	.02	.02	.20	.20

(13) Multiple Regression Analysis for Subjects' SB Verbal Comprehension Factor Scores with LOR, ME, and SEB

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	ME	.37	.13	.13	4.68*	4.68
2	LOR > SEB	.49	.23	.10	2.87	1.84
Full	Equ. All Three	.49	.23	.23	2.87	2.87

Note. * - Significant at the .05 level

(14) Multiple Regression Analysis for Subjects' SB Nonverbal Reasoning/Visualization Factor Scores with LOR, ME, and SEB

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	ME\ LOR > SEB/	.23	.05	.05	.50	.50
Full	Equ. All Three	.23	.05	.05	.50	.50

(15) Multiple Regression Analysis for Subjects' SB Test Composites with Length of Residence (LOR), Mother's Education (ME), and Frequency of Speaking Cantonese at Home (FSCH)

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	ME\ FSCH > LOR/	.38	.15	.15	1.59	1.59
Full	Equ. All Three	.38	.15	.15	1.59	1.59

(16) Multiple Regression Analysis for Subjects' SB Verbal Reasoning SAS with LOR, ME, and FSCH

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	FSCH	.36	.13	.13	4.51*	4.51
2	LOR	.50	.25	.12	4.92*	4.77
3	ME	.57	.33	.08	4.57*	3.13
Full	Equ. All Three	.57	.33	.33	4.57*	4.57

Note. * - Significant at the .05 level

(17) Multiple Regression Analysis for Subjects' SB Abstract/ Visual Reasoning SAS with LOR, ME, and FSCH

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	ME\ FSCH > LOR/	.42	.18	.18	2.02	2.02
Full	Equ. All Three	.42	.18	.18	2.02	2.02

(18) Multiple Regression Analysis for Subjects' SB Quantitative Reasoning SAS with LOR, ME, and FSCH

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	ME\ FSCH > LOR/	.11	.01	.01	.12	.12
Full	Equ. All Three	.11	.01	.01	.12	.12

(19) Multiple Regression Analysis for Subjects' SB Short-Term Memory SAS with LOR, ME, and FSCH

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	ME\ FSCH > LOR/	.34	.11	.11	1.21	1.21
Full	Equ. All Three	.34	.11	.11	1.21	1.21

(20) Multiple Regression Analysis for Subjects' SB Verbal Comprehension Factor Scores with LOR, ME, and FSCH

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	ME	.37	.13	.13	4.68*	4.68
2	FSCH > LOR	.57	.32	.19	4.43*	3.86
Full Equ.	All Three	.57	.32	.32	4.43*	4.43

Note. * - Significant at the .05 level

(21) Multiple Regression Analysis for Subjects' SB Nonverbal Reasoning/Visualization Factor Scores with LOR, ME, and FSCH

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	ME\ FSCH > LOR/	.27	.07	.07	.76	.76
Full Equ.	All Three	.27	.07	.07	.76	.76

(22) Multiple Regression Analysis for Subjects' SB Test Composites with Length of Residence (LOR), Mother's Occupation in Canada (MCO), and Studied English Before (SEB)

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MCO\ LOR > SEB/	.28	.08	.08	.77	.77
Full Equ.	All Three	.28	.08	.08	.77	.77

(23) Multiple Regression Analysis for Subjects' SB Verbal Reasoning SAS with LOR, MCO, and SEB

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MCO	.37	.14	.14	4.73*	4.73
2	LOR > SEB	.46	.21	.07	2.47	1.29
Full Equ.	All Three	.46	.21	.21	2.47	2.47

Note. * - Significant at the .05 level

(24) Multiple Regression Analysis for Subjects' SB Abstract/ Visual Reasoning SAS with LOR, MCO, and SEB

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MCO\ LOR > SEB/	.25	.06	.06	.62	.62
Full Equ.	All Three	.25	.06	.06	.62	.62

(25) Multiple Regression Analysis for Subjects' SB Quantitative Reasoning SAS with LOR, MCO, and SEB

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MCO\ LOR > SEB/	.08	.01	.01	.06	.06
Full Equ.	All Three	.08	.01	.01	.06	.06

(26) Multiple Regression Analysis for Subjects' SB Short-Term Memory SAS with LOR, MCO, and SEB

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MCO\ LOR > SEB/	.28	.08	.08	.80	.80
Full Equ.	All Three	.28	.08	.08	.80	.80

(27) Multiple Regression Analysis for Subjects' SB Verbal Comprehension Factor Scores with LOR, MCO, and SEB

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MCO	.39	.15	.15	5.40*	5.40
2	LOR > SEB	.48	.23	.08	2.82	1.46
Full Equ.	All Three	.48	.23	.23	2.82	2.82

Note. * - Significant at the .05 level

(28) Multiple Regression Analysis for Subjects' SB Nonverbal Reasoning/Visualization Factor Scores with LOR, MCO, and SEB

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MCO\ LOR > SEB/	.11	.01	.01	.11	.11
Full Equ.	All Three	.11	.01	.01	.11	.11

(29) Multiple Regression Analysis for Subjects' SB Test Composites with Length of Residence (LOR), Mother's Occupation in Canada (MCO), and Frequency of Speaking Cantonese at Home (FSCH)

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MCO\ FSCH > LOR/	.38	.15	.15	1.60	1.60
Full	Equ. All Three	.38	.15	.15	1.60	1.60

(30) Multiple Regression Analysis for Subjects' SB Verbal Reasoning SAS with LOR, MCO, and FSCH

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MCO	.37	.14	.14	4.73*	4.73
2	FSCH > LOR	.52	.27	.13	3.45*	2.56
Full	Equ. All Three	.52	.27	.27	3.45*	3.45

Note. * - Significant at the .05 level

(31) Multiple Regression Analysis for Subjects' SB Abstract/ Visual Reasoning SAS with LOR, MCO, and FSCH

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MCO\ FSCH > LOR/	.38	.14	.14	1.57	1.57
Full	Equ. All Three	.38	.14	.14	1.57	1.57

(32) Multiple Regression Analysis for Subjects' SB Quantitative Reasoning SAS with LOR, MCO, and FSCH

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MCO\ FSCH > LOR/	.09	.01	.01	.07	.07
Full	Equ. All Three	.09	.01	.01	.07	.07

(33) Multiple Regression Analysis for Subjects' SB Short-Term Memory SAS with LOR, MCO, and FSCH

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MCO\ FSCH > LOR/	.37	.13	.13	1.44	1.44
Full	Equ. All Three	.37	.13	.13	1.44	1.44

(34) Multiple Regression Analysis for Subjects' SB Verbal Comprehension Factor Scores with LOR, MCO, and FSCH

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MCO	.39	.15	.15	5.40*	5.40
2	FSCH > LOR	.51	.26	.11	3.26*	2.00
Full	Equ. All Three	.51	.26	.26	3.26*	3.26

Note. * - Significant at the .05 level

(35) Multiple Regression Analysis for Subjects' SB Nonverbal Reasoning/Visualization Factor Scores with LOR, MCO, and FSCH

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MCO\ FSCH > LOR/	.22	.05	.05	.49	.49
Full Equ.	All Three	.22	.05	.05	.49	.49

(36) Multiple Regression Analysis for Subjects' SB Test Composites with Length of Residence (LOR), Studied English Before (SEB), and Frequency of Speaking Cantonese at Home (FSCH)

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	FSCH\ LOR > SEB/	.39	.15	.15	1.67	1.67
Full Equ.	All Three	.39	.15	.15	1.67	1.67

(37) Multiple Regression Analysis for Subjects' SB Verbal Reasoning SAS with LOR, SEB, and FSCH

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	FSCH	.36	.13	.13	4.51*	4.51
2	LOR	.50	.25	.12	4.92*	4.77
3	SEB	.54	.29	.04	3.91*	1.67
Full Equ.	All Three	.54	.29	.29	3.91*	3.91

Note. * - Significant at the .05 level

(38) Multiple Regression Analysis for Subjects' SB Abstract Visual Reasoning SAS with LOR, SEB, and FSCH

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	FSCH\ LOR > SEB/	.37	.14	.14	1.48	1.48
Full	Equ. All Three	.37	.14	.14	1.48	1.48

(39) Multiple Regression Analysis for Subjects' SB Quantitative Reasoning SAS with LOR, SEB, and FSCH

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	FSCH\ LOR > SEB/	.10	.01	.01	.10	.10
Full	Equ. All Three	.10	.01	.01	.10	.10

(40) Multiple Regression Analysis for Subjects' SB Short-Term Memory SAS with LOR, SEB, and FSCH

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	FSCH\ LOR > SEB/	.34	.12	.12	1.23	1.23
Full	Equ. All Three	.34	.12	.12	1.23	1.23

(41) Multiple Regression Analysis for Subjects' SB Verbal Comprehension Factor Scores with LOR, SEB, and FSCH

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	SEB	.36	.13	.13	4.53*	4.53
2	FSCH > LOR	.54	.29	.16	3.79*	3.10
Full Equ.	All Three	.54	.29	.29	3.79*	3.79

Note. * - Significant at the .05 level

(42) Multiple Regression Analysis for Subjects' SB Nonverbal Reasoning/Visualization Factor Scores with LOR, SEB, and FSCH

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	FSCH\ LOR > SEB/	.22	.05	.05	.49	.49
Full Equ.	All Three	.22	.05	.05	.49	.49

(43) Multiple Regression Analysis for Subjects' SB Test Composites with Mother's Education (ME), Mother's Occupation in Canada (MCO), and Studied English Before (SEB)

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	ME\ MCO > SEB/	.30	.09	.09	.96	.96
Full Equ.	All Three	.30	.09	.09	.96	.96

(44) Multiple Regression Analysis for Subjects' SB Verbal Reasoning SAS with ME, MCO, and SEB

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MCO	.37	.14	.14	4.73*	4.73
2	SEB > ME	.42	.18	.04	1.99	.67
Full Equ.	All Three	.42	.18	.18	1.99	1.99

Note. * - Significant at the .05 level

(45) Multiple Regression Analysis for Subjects' SB Abstract/ Visual Reasoning SAS with ME, MCO, and SEB

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	ME\ MCO > SEB/	.38	.14	.14	1.55	1.55
Full Equ.	All Three	.38	.14	.14	1.55	1.55

(46) Multiple Regression Analysis for Subjects' SB Quantitative Reasoning SAS with ME, MCO, and SEB

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	ME\ MCO > SEB/	.14	.02	.02	.18	.18
Full Equ.	All Three	.14	.02	.02	.08	.18

(47) Multiple Regression Analysis for Subjects' SB Short-Term Memory SAS with ME, MCO, and SEB

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	ME\ MCO > SEB/	.29	.08	.08	.86	.86
Full	Equ. All Three	.29	.08	.08	.86	.86

(48) Multiple Regression Analysis for Subjects' SB Verbal Comprehension Factor Scores with ME, MCO, and SEB

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MCO	.39	.15	.15	5.40*	5.40
2	SEB > ME	.45	.20	.05	2.37	.88
Full	Equ. All Three	.45	.20	.20	2.37	2.37

Note. * - Significant at the .05 level

(49) Multiple Regression Analysis for Subjects' SB Nonverbal Reasoning/Visualization Factor Scores with ME, MCO, and SEB

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	ME\ MCO > SEB/	.29	.09	.09	.87	.87
Full	Equ. All Three	.29	.09	.09	.87	.87

(50) Multiple Regression Analysis for Subjects' SB Test Composites with Mother's Education (ME), Mother's Occupation in Canada (MCO), and Frequency of Speaking Cantonese at Home (FSCH)

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MCO\ FSCH > ME/	.34	.12	.12	1.25	1.25
Full Equ.	All Three	.34	.12	.12	1.25	1.25

(51) Multiple Regression Analysis for Subjects' SB Verbal Reasoning SAS with ME, MCO, and FSCH

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MCO	.37	.14	.14	4.73*	4.73
2	FSCH > ME	.49	.24	.10	3.01*	2.00
Full Equ.	All Three	.49	.24	.24	3.01*	3.01

Note. * - Significant at the .05 level

(52) Multiple Regression Analysis for Subjects' SB Abstract/ Visual Reasoning SAS with ME, MCO, and FSCH

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MCO\ FSCH > ME/	.35	.12	.12	1.30	1.30
Full Equ.	All Three	.35	.12	.12	1.30	1.30

(53) Multiple Regression Analysis for Subjects' SB Quantitative Reasoning SAS with ME, MCO, and FSCH

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MCO\ FSCH > ME/	.12	.01	.01	.13	.13
Full	Equ. All Three	.12	.01	.01	.13	.13

(54) Multiple Regression Analysis for Subjects' SB Short-Term Memory SAS with ME, MCO, and FSCH

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MCO\ FSCH > ME/	.37	.13	.13	1.44	1.44
Full	Equ. All Three	.37	.13	.13	1.44	1.44

(55) Multiple Regression Analysis for Subjects' SB Veral Comprehension Factor Scores with ME, MCO, and FSCH

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MCO	.39	.15	.15	5.40*	5.40
2	FSCH > ME	.49	.24	.09	2.98*	1.65
Full	Equ. All Three	.49	.24	.24	2.98*	2.98

Note. * - Significant at the .05 level

(56) Multiple Regression Analysis for Subjects' SB Nonveral Reasoning/Visualization Factor Scores with ME, MCO, and FSCH

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MCO\ FSCH > ME/	.30	.09	.09	.92	.92
Full	Equ. All Three	.30	.09	.09	.92	.92

(57) Multiple Regression Analysis for Subjects' SB Test Composites with Mother's Education (ME), Studied English Before (SEB), and Frequency of Speaking Cantonese at Home (FSCH)

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	ME\ FSCH > SEB/	.36	.13	.13	1.38	1.38
Full	Equ. All Three	.36	.13	.13	1.38	1.38

(58) Multiple Regression Analysis for Subjects' SB Verbal Reasoning SAS with ME, SEB, and FSCH

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	FSCH	.36	.13	.13	4.51*	4.51
2	ME > SEB	.50	.25	.12	3.15*	2.28
Full	Equ. All Three	.50	.25	.25	3.15*	3.15

Note. * - Significant at the .05 level

(59) Multiple Regression Analysis for Subjects' SB Abstract/ Visual Reasoning SAS with ME, SEB, and FSCH

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	ME\ FSCH > SEB/	.42	.18	.18	2.03	2.03
Full	Equ. All Three	.42	.18	.18	2.03	2.03

(60) Multiple Regression Analysis for Subjects' SB Quantitative Reasoning SAS with ME, SEB, and FSCH

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	ME\ FSCH > SEB/	.16	.03	.03	.25	.25
Full	Equ. All Three	.16	.03	.03	.25	.25

(61) Multiple Regression Analysis for Subjects' SB Short-Term Memory SAS with ME, SEB, and FSCH

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	ME\ FSCH > SEB/	.34	.11	.11	1.18	1.18
Full	Equ. All Three	.34	.11	.11	1.18	1.18

(62) Multiple Regression Analysis for Subjects' SB Verbal Comprehension Factor Scores with ME, SEB, and FSCH

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	ME	.37	.13	.13	4.68*	4.68
2	FSCH > SEB	.50	.25	.12	3.14*	2.18
Full Equ.	All Three	.50	.25	.25	3.14*	3.14

Note. * - Significant at the .05 level

(63) Multiple Regression Analysis for Subjects' SB Nonverbal Reasoning/Visualization Factor Scores with ME, SEB, and FSCH

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	ME\ FSCH > SEB/	.31	.09	.09	.98	.98
Full Equ.	All Three	.31	.09	.09	.98	.98

(64) Multiple Regression Analysis for Subjects' SB Test Composites with Mother's Occupation in Canada (MCO), Studied English Before (SEB), and Frequency of Speaking Cantonese at Home (FSCH)

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MCO\ FSCH > SEB/	.35	.12	.12	1.29	1.29
Full Equ.	All Three	.35	.12	.12	1.29	1.29

(65) Multiple Regression Analysis for Subjects' SB Verbal Reasoning SAS with MCO, SEB, and FSCH

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MCO	.37	.14	.14	4.73*	4.73
2	FSCH > SEB	.49	.24	.10	2.89	1.84
Full	Equ. All Three	.49	.24	.24	2.89	2.89

Note. * - Significant at the .05 level

(66) Multiple Regression Analysis for Subjects' SB Abstract/ Visual Reasoning SAS with MCO, SEB, and FSCH

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MCO\ FSCH > SEB/	.30	.09	.09	.95	.95
Full	Equ. All Three	.30	.09	.09	.95	.95

(67) Multiple Regression Analysis for Subjects' SB Quantitative Reasoning SAS with MCO, SEB, and FSCH

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MCO\ FSCH > SEB/	.10	.01	.01	.10	.10
Full	Equ. All Three	.10	.01	.01	.10	.10

(68) Multiple Regression Analysis for Subjects' SB Short-Term Memory SAS with MCO, SEB, and FSCH

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MCO\ FSCH > SEB/	.37	.13	.13	1.44	1.44
Full	Equ. All Three	.37	.13	.13	1.44	1.44

(69) Multiple Regression Analysis for Subjects' SB Verbal Comprehension Factor Scores with MCO, SEB, and FSCH

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MCO	.39	.15	.15	5.40*	5.40
2	FSCH > SEB	.49	.24	.09	2.94	1.60
Full	Equ. All Three	.49	.24	.24	2.94	2.94

Note. * - Significant at the .05 level

(70) Multiple Regression Analysis for Subjects' SB Nonverbal Reasoning/Visualization Factor Scores with MCO, SEB, and FSCH

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MCO\ FSCH > SEB/	.22	.05	.05	.48	.48
Full	Equ. All Three	.22	.05	.05	.48	.48

(71) Multiple Regression Analysis for Subjects' SB Test Composites with Father's Education (FE), Father's Occupation in Hong Kong (FHKO), and Father's Occupation in Canada (FCO)

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	FCO\ FE > FHKO/	.22	.05	.05	.49	.49
Full	Equ. All Three	.22	.05	.05	.49	.49

(72) Multiple Regression Analysis for Subjects' SB Verbal Reasoning SAS with FE, FHKO, and FCO

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	FCO\ FE > FHKO/	.20	.04	.04	.38	.38
Full	Equ. All Three	.20	.04	.04	.38	.38

(73) Multiple Regression Analysis for Subjects' SB Abstract/ Visual Reasoning SAS with FE, FHKO, and FCO

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	FCO\ FE > FHKO/	.20	.04	.04	.40	.40
Full	Equ. All Three	.20	.04	.04	.40	.40

(74) Multiple Regression Analysis for Subjects' SB Quantitative Reasoning SAS with FE, FHKO, and FCO

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	FCO\ FE > FHKO/	.15	.02	.02	.22	.22
Full	Equ. All Three	.15	.02	.02	.22	.22

(75) Multiple Regression Analysis for Subjects' SB Short-Term Memory SAS with FE, FHKO, and FCO

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	FHKO	.42	.17	.17	6.36*	6.36
2	FE > FCO	.44	.19	.02	2.18	.25
Full	Equ. All Three	.44	.19	.19	2.18	2.18

Note. * - Significant at the .05 level

(76) Multiple Regression Analysis for Subjects' SB Verbal Comprehension Factor Scores with FE, FHKO, and FCO

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	FCO\ FE > FHKO/	.25	.06	.06	.62	.62
Full	Equ. All Three	.25	.06	.06	.62	.62

(77) Multiple Regression Analysis for Subjects' SB Nonverbal Reasoning/Visualization Factor Scores with FE, FHKO, and FCO

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	FCO\ FE > FHKO/	.35	.12	.12	1.28	1.28
Full	Equ. All Three	.35	.12	.12	1.28	1.28

(78) Multiple Regression Analysis for Subjects' SB Test Composites with Mother's Education (ME), Mother's Occupation in Hong Kong (MHKO), and Mother's Occupation in Canada (MCO)

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MCO\ MHKO > ME/	.33	.11	.11	1.17	1.17
Full	Equ. All Three	.33	.11	.11	1.17	1.17

(79) Multiple Regression Analysis for Subjects' SB Verbal Reasoning SAS with ME, MHKO, and MCO

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MCO	.37	.14	.14	4.73*	4.73
2	MHKO > ME	.44	.20	.06	2.28	1.04
Full	Equ. All Three	.44	.20	.20	2.28	2.28

Note. * - Significant at the .05 level

(80) Multiple Regression Analysis for Subjects' SB Abstract/ Visual Reasoning SAS with ME, MHKO, and MCO

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MCO\ MHKO > ME/	.28	.08	.08	.81	.81
Full	Equ. All Three	.28	.08	.08	.81	.81

(81) Multiple Regression Analysis for Subjects' SB Quantitative Reasoning SAS with ME, MHKO, and MCO

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MCO\ MHKO > ME/	.29	.08	.08	.83	.83
Full	Equ. All Three	.29	.08	.08	.83	.83

(82) Multiple Regression Analysis for Subjects' SB Short-Term Memory SAS with ME, MHKO, and MCO

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MCO\ MHKO > ME/	.29	.08	.08	.86	.86
Full	Equ. All Three	.29	.08	.08	.86	.86

(83) Multiple Regression Analysis for Subjects' SB Verbal Comprehension Factor Scores with ME, MHKO, and MCO

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MCO	.39	.15	.15	5.40*	5.40
2	MHKO > ME	.45	.20	.05	2.42	.94
Full Equ.	All Three	.45	.20	.20	2.42	2.42

Note. * - Significant at the .05 level

(84) Multiple Regression Analysis for Subjects' SB Nonverbal Reasoning/Visualization Factor Scores with ME, MHKO, and MCO

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MCO\ MHKO > ME/	.31	.10	.10	1.01	1.01
Full Equ.	All Three	.31	.10	.10	1.01	1.01

C. WLPB

(1) Multiple Regression Analysis for Subjects' WLPB Oral Language Standard Scores with Age on Arrival (AOA) and Studied English Before (SEB)

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	SEB	.36	.13	.13	4.60*	4.60
2	AOA	.44	.19	.06	3.45*	2.12
Full Equ.	Both	.44	.19	.19	3.45*	3.45

Note. * -Significant at the .05 level

(2) Multiple Regression Analysis for Subjects' WLPB Reading Standard Scores with AOA and SEB

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	AOA	.38	.15	.15	5.21*	5.21
2	SEB	.40	.16	.01	2.74	.37
Full Equ.	Both	.40	.16	.16	2.74	2.74

Note. * - Significant at the .05 level

(3) Multiple Regression Analysis for Subjects' WLPB Written Language Standard Scores with AOA and SEB

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	SEB > AOA	.32	.11	.11	1.71	1.71
Full Equ.	Both	.32	.11	.11	1.71	1.71

(4) Multiple Regression Analysis for Subjects' WLPB Broad Language Standard Scores with AOA and SEB

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	AOA	.37	.14	.14	4.68*	4.68
2	SEB	.42	.18	.04	3.09	1.43
Full Equ.	Both	.42	.18	.18	3.09	3.09

Note. * - Significant at the .05 level

III. Stage 3:

A. HK-WISC

(1) Multiple Regression Analysis for Subjects' HK Full Scale Scores with Age on Arrival (AOA), Length of Residence (LOR), and Gender

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	Gender\ LOR > AOA/	.33	.11	.11	1.13	1.13
Full Equ.	All Three	.33	.11	.11	1.13	1.13

(2) Multiple Regression Analysis for Subjects' HK Verbal Scale Scores with AOA, LOR, and Gender

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	Gender	.39	.16	.16	5.52*	5.52
2	LOR > AOA	.51	.26	.10	3.23*	1.92
Full Equ.	All Three	.51	.26	.26	3.23*	3.23

Note. * - Significant at the .05 level

(3) Multiple Regression Analysis for Subjects' HK Performance Scale Scores with AOA, LOR, and Gender

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	Gender\ LOR > AOA/	.15	.02	.02	.21	.21
Full Equ.	All Three	.15	.02	.02	.21	.21

B. SB: FE

(1) Multiple Regression Analysis for Subjects' SB Test Composites with Age on Arrival (AOA), Length of Residence (LOR), and Gender

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	Gender\ LOR > AOA/	.32	.10	.10	1.04	1.04
Full Equ.	All Three	.32	.10	.10	1.04	1.04

(2) Multiple Regression Analysis for Subjects' SB Verbal Reasoning SAS with AOA, LOR, and Gender

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	Gender\ LOR > AOA/	.38	.14	.14	1.54	1.54
Full Equ.	All Three	.38	.14	.14	1.54	1.54

(3) Multiple Regression Analysis for Subjects' SB Abstract/ Visual Reasoning SAS with AOA, LOR, and Gender

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	Gender\ LOR > AOA/	.35	.12	.12	1.28	1.28
Full Equ.	All Three	.35	.12	.12	1.28	1.28

(4) Multiple Regression Analysis for Subjects' SB Quantitative Reasoning SAS with AOA, LOR, and Gender

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	Gender	.45	.20	.20	7.64**	7.64
2	LOR > AOA	.47	.22	.02	2.61	.28
Full Equ.	All Three	.47	.22	.22	2.61	2.61

Note. ** - Significant at the .01 level

(5) Multiple Regression Analysis for Subjects' SB Short-Term Memory SAS with AOA, LOR, and Gender

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	Gender\ LOR > AOA/	.19	.04	.04	.36	.36
Full Equ.	All Three	.19	.04	.04	.36	.36

(6) Multiple Regression Analysis for Subjects' SB Verbal Comprehension Factor Scores with AOA, LOR, and Gender

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	LOR	.35	.13	.13	4.27*	4.27
2	Gender > AOA	.38	.15	.02	1.60	.35
Full Equ.	All Three	.38	.15	.15	1.60	1.60

Note. * - Significant at the .05 level

(7) Multiple Regression Analysis for Subjects' SB Nonverbal Reasoning/Visualization Factor Scores with AOA, LOR, and Gender

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	Gender\ LOR > AOA/	.26	.07	.07	.70	.70
Full Equ.	All Three	.26	.07	.07	.70	.70

(8) Multiple Regression Analysis for Subjects' SB Test Composites with Age on Arrival (AOA), Length of Residence (LOR), and Mother's Education (ME)

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	ME\ AOA > LOR/	.23	.05	.05	.53	.53
Full Equ.	All Three	.23	.05	.05	.53	.53

(9) Multiple Regression Analysis for Subjects' SB Verbal Reasoning SAS with AOA, LOR, and ME

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	ME\ AOA > LOR/	.49	.24	.24	2.97*	2.97
Full Equ.	All Three	.49	.24	.24	2.97*	2.97

Note. * - Significant at the .05 level

(10) Multiple Regression Analysis for Subjects' SB Abstract/ Visual Reasoning SAS with AOA, LOR, and ME

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	ME\ AOA > LOR/	.35	.13	.13	1.34	1.34
Full	Equ.All Three	.35	.13	.13	1.34	1.34

(11) Multiple Regression Analysis for Subjects' SB Quantitative Reasoning SAS with AOA, LOR, and ME

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	ME\ AOA > LOR/	.24	.06	.06	.58	.58
Full	Equ.All Three	.24	.06	.06	.58	.58

(12) Multiple Regression Analysis for Subjects' SB Short-Term Memory SAS with AOA, LOR, and ME

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	ME\ AOA > LOR/	.21	.05	.05	.45	.45
Full	Equ.All Three	.21	.05	.05	.45	.45

(13) Multiple Regression Analysis for Subjects' SB Verbal Comprehension Factor Scores with AOA, LOR, and ME

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	ME	.37	.13	.13	4.68*	4.68
2	AOA > LOR	.51	.26	.13	3.33*	2.43
Full	Equ.All Three	.51	.26	.26	3.33*	3.33

Note. * - Significant at the .05 level

(14) Multiple Regression Analysis for Subjects' SB Nonverbal Reasoning/Visualization Factor Scores with AOA, LOR, and ME

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	ME\ AOA > LOR/	.15	.02	.02	.23	.23
Full	Equ.All Three	.15	.02	.02	.23	.23

(15) Multiple Regression Analysis for Subjects' SB Test Composites with Age on Arrival (AOA), Length of Residence (LOR), and Father's Occupation in Hong Kong (FHKO)

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	FHKO\ LOR > AOA/	.32	.10	.10	1.03	1.03
Full	Equ.All Three	.32	.10	.10	1.03	1.03

(16) Multiple Regression Analysis for Subjects' SB Verbal Reasoning SAS with AOA, LOR, and FHKO

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	FHKO\ LOR > AOA/	.38	.14	.14	1.55	1.55
Full	Equ.All Three	.38	.14	.14	1.55	1.55

(17) Multiple Regression Analysis for Subjects' SB Abstract/ Visual Reasoning SAS with AOA, LOR, and FHKO

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	FHKO\ LOR > AOA/	.32	.10	.10	1.03	1.03
Full	Equ.All Three	.32	.10	.10	1.03	1.03

(18) Multiple Regression Analysis for Subjects' SB Quantitative Reasoning SAS with AOA, LOR, and FHKO

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	FHKO\ LOR > AOA/	.22	.05	.05	.47	.47
Full	Equ.All Three	.22	.05	.05	.47	.47

(19) Multiple Regression Analysis for Subjects' SB Short-Term Memory SAS with AOA, LOR, and FHKO

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	FHKO	.42	.17	.17	6.36*	6.36
2	LOR > AOA	.50	.25	.08	3.11*	1.40
Full	Equ.All Three	.50	.25	.25	3.11*	3.11

Note. * - Significant at the .05 level

(20) Multiple Regression Analysis for Subjects' SB Verbal Comprehension Factor Scores with AOA, LOR, and FHKO

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	LOR	.35	.13	.13	4.27*	4.27
2	FHKO > AOA	.43	.19	.06	2.15	1.08
Full	Equ.All Three	.43	.19	.19	2.15	2.15

Note. * - Significant at the .05 level

(21) Multiple Regression Analysis for Subjects' SB Nonverbal Reasoning/Visualization Factor Scores with AOA, LOR, and FHKO

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	FHKO\ LOR > AOA/	.25	.06	.06	.60	.60
Full	Equ.All Three	.25	.06	.06	.60	.60

(22) Multiple Regression Analysis for Subjects' SB Test Composites with Age on Arrival (AOA), Length of Residence (LOR), and Father's Occupation in Canada (FCO)

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	FCO\ LOR > AOA/	.34	.12	.12	1.23	1.23
Full	Equ.All Three	.34	.12	.12	1.23	1.23

(23) Multiple Regression Analysis for Subjects' SB Verbal Reasoning SAS with AOA, LOR, and FCO

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	FCO\ LOR > AOA/	.38	.14	.14	1.54	1.54
Full	Equ.All Three	.38	.14	.14	1.54	1.54

(24) Multiple Regression Analysis for Subjects' SB Abstract/ Visual Reasoning SAS with AOA, LOR, and FCO

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	FCO\ LOR > AOA/	.34	.12	.12	1.26	1.26
Full	Equ.All Three	.34	.12	.12	1.26	1.26

(25) Multiple Regression Analysis for Subjects' SB Quantitative Reasoning SAS with AOA, LOR, and FCO

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	FCO\ LOR > AOA/	.22	.05	.05	.48	.48
Full	Equ.All Three	.22	.05	.05	.48	.48

(26) Multiple Regression Analysis for Subjects' SB Short-Term Memory SAS with AOA, LOR, and FCO

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	FCO	.36	.13	.13	4.47*	4.47
2	AOA	.49	.24	.11	4.66*	4.34
3	LOR	.49	.24	.00	3.00*	.002
Full	Equ.All Three	.49	.24	.24	3.00*	3.00

Note. * - Significant at the .05 level

(27) Multiple Regression Analysis for Subjects' SB Verbal Comprehension Factor Scores with AOA, LOR, and FCO

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	LOR	.35	.13	.13	4.27*	4.27
2	FCO > AOA	.42	.17	.04	1.95	.82
Full	Equ.All Three	.42	.17	.17	1.95	1.95

Note. * - Significant at the .05 level

(28) Multiple Regression Analysis for Subjects' SB Nonverbal Reasoning/Visualization Factor Scores with AOA, LOR, and FCO

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	FCO\ LOR > AOA/	.32	.10	.10	1.04	1.04
Full	Equ.All Three	.32	.10	.10	1.04	1.04

(29) Multiple Regression Analysis for Subjects' SB Test Composites with Age on Arrival (AOA), Length of Residence (LOR), and Mother's Occupation in Canada (MCO)

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MCO\ AOA > LOR/	.29	.08	.08	.84	.84
Full	Equ.All Three	.29	.08	.08	.84	.84

(30) Multiple Regression Analysis for Subjects' SB Verbal Reasoning SAS with AOA, LOR, and MCO

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MCO	.37	.14	.14	4.73*	4.73
2	AOA > LOR	.47	.22	.08	2.63	1.50
Full	Equ.All Three	.47	.22	.22	2.63	2.63

Note. * - Significant at the .05 level

(31) Multiple Regression Analysis for Subjects' SB Abstract/ Visual Reasoning SAS with AOA, LOR, and MCO

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MCO\ AOA > LOR/	.32	.10	.10	1.05	1.05
Full	Equ.All Three	.32	.10	.10	1.05	1.05

(32) Multiple Regression Analysis for Subjects' SB Quantitative Reasoning SAS with AOA, LOR, and MCO

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MCO\ AOA > LOR/	.22	.05	.05	.48	.48
Full	Equ.All Three	.22	.05	.05	.48	.48

(33) Multiple Regression Analysis for Subjects' SB Short-Term Memory SAS with AOA, LOR, and MCO

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MCO\ AOA > LOR/	.34	.12	.12	1.24	1.24
Full	Equ.All Three	.34	.12	.12	1.24	1.24

(34) Multiple Regression Analysis for Subjects' SB Verbal Comprehension Factor Scores with AOA, LOR, and MCO

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MCO	.39	.15	.15	5.40*	5.40
2	AOA > LOR	.49	.23	.08	2.88	1.53
Full Equ.	All Three	.49	.23	.23	2.88	2.88

Note. * - Significant at the .05 level

(35) Multiple Regression Analysis for Subjects' SB Nonverbal Reasoning/Visualization Factor Scores with AOA, LOR, and MCO

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	MCO\ AOA > LOR/	.12	.01	.01	.13	.13
Full Equ.	All Three	.12	.01	.01	.13	.13

(36) Multiple Regression Analysis for Subjects' SB Test Composites with Age on Arrival (AOA), Length of Residence (LOR), and Studied English Before (SEB)

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	SEB\ AOA > LOR/	.26	.07	.07	.67	.67
Full Equ.	All Three	.26	.07	.07	.67	.67

(37) Multiple Regression Analysis for Subjects' SB Verbal Reasoning SAS with AOA, LOR, and SEB

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	SEB\ AOA > LOR/	.44	.20	.20	2.27	2.27
Full	Equ.All Three	.44	.20	.20	2.27	2.27

(38) Multiple Regression Analysis for Subjects' SB Abstract/ Visual Reasoning SAS with AOA, LOR, and SEB

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	SEB\ AOA > LOR/	.32	.10	.10	1.07	1.07
Full	Equ.All Three	.32	.10	.10	1.07	1.07

(39) Multiple Regression Analysis for Subjects' SB Quantitative Reasoning SAS with AOA, LOR, and SEB

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	SEB\ AOA > LOR/	.22	.05	.05	.48	.48
Full	Equ.All Three	.22	.05	.05	.48	.48

(40) Multiple Regression Analysis for Subjects' SB Short-Term Memory SAS with AOA, LOR, and SEB

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	SEB\ AOA > LOR/	.21	.04	.04	.43	.43
Full	Equ.All Three	.21	.04	.04	.43	.43

(41) Multiple Regression Analysis for Subjects' SB Verbal Comprehension Factor Scores with AOA, LOR, and SEB

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	SEB	.36	.13	.13	4.53*	4.53
2	AOA > LOR	.46	.21	.08	2.56	1.50
Full Equ.	All Three	.46	.21	.21	2.56	2.56

Note. * - Significant at the .05 level

(42) Multiple Regression Analysis for Subjects' SB Nonverbal Reasoning/Visualization Factor Scores with AOA, LOR, and SEB

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	SEB\ AOA > LOR/	.07	.00	.00	.05	.05
Full Equ.	All Three	.07	.00	.00	.05	.05

(43) Multiple Regression Analysis for Subjects' SB Test Composites with Age on Arrival (AOA), Length of Residence (LOR), and Frequency of Speaking Cantonese at Home (FSCH)

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	FSCH\ LOR > AOA/	.38	.15	.15	1.59	1.59
Full Equ.	All Three	.38	.15	.15	1.59	1.59

(44) Multiple Regression Analysis for Subjects' SB Verbal Reasoning SAS with AOA, LOR, and FSCH

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	FSCH	.36	.13	.13	4.51*	4.51
2	LOR	.50	.25	.12	4.92*	4.77
3	AOA	.51	.26	.01	3.30*	.30
Full	Equ.All Three	.51	.26	.26	3.30*	3.30

Note. * - Significant at the .05 level

(45) Multiple Regression Analysis for Subjects' SB Abstract/ Visual Reasoning SAS with AOA, LOR, and FSCH

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	FSCH\ LOR > AOA/	.40	.16	.16	1.81	1.81
Full	Equ.All Three	.40	.16	.16	1.81	1.81

(46) Multiple Regression Analysis for Subjects' SB Quantitative Reasoning SAS with AOA, LOR, and FSCH

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	FSCH\ LOR > AOA/	.22	.05	.05	.47	.47
Full	Equ.All Three	.22	.05	.05	.47	.47

(47) Multiple Regression Analysis for Subjects' SB Short-Term Memory SAS with AOA, LOR, and FSCH

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	FSCH\ LOR > AOA/	.35	.12	.12	1.30	1.30
Full	Equ.All Three	.35	.12	.12	1.30	1.30

(48) Multiple Regression Analysis for Subjects' SB Verbal Comprehension Factor Scores with AOA, LOR, and FSCH

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	LOR	.35	.13	.13	4.27*	4.27
2	FSCH > AOA	.49	.24	.11	2.95	2.12
Full	Equ.All Three	.49	.24	.24	2.95	2.12

Note. * - Significant at the .05 level

(49) Multiple Regression Analysis for Subjects' SB Nonverbal Reasoning/Visualization Factor Scores with AOA, LOR, and FSCH

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	FSCH\ LOR > AOA/	.22	.05	.05	.49	.49
Full	Equ.All Three	.22	.05	.05	.49	.49

C. WLPB

(1) Multiple Regression Analysis for Subjects' WLPB Oral Language Standard Scores with Age on Arrival (AOA), Length of Residence (LOR), and Studied English Before (SEB)

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	SEB	.36	.13	.13	4.60*	4.60
2	AOA > LOR	.44	.19	.06	2.25	1.07
Full Equ.	All Three	.44	.19	.19	2.25	2.25

Note. * - Significant at the .05 level

(2) Multiple Regression Analysis for Subjects' WLPB Reading Standard Scores with AOA, LOR, and SEB

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	AOA	.38	.15	.15	5.21*	5.21
2	SEB > LOR	.40	.16	.01	1.76	.18
Full Equ.	All Three	.40	.16	.16	1.76	1.76

Note. * - Significant at the .05 level

(3) Multiple Regression Analysis for Subjects' WLPB Written Language Standard Scores with AOA, LOR, and SEB

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	AOA\ SEB > LOR/	.38	.15	.15	1.62	1.62
Full Equ.	All Three	.38	.15	.15	1.62	1.62

(4) Multiple Regression Analysis for Subjects' WLPB Broad Language Standard Scores with AOA, LOR, and SEB

Step	Entered Variable(s)	Cum. MultR	Cum. Rsq	RsqCh	Cum. F	FCh
1	AOA	.37	.14	.14	4.68*	4.68
2	SEB > LOR	.43	.19	.05	2.14	.88
Full Equ.	All Three	.43	.19	.19	2.14	2.14

Note. * - Significant at the .05 level