

**A LONGITUDINAL STUDY OF THE INTELLECTUAL AND ACADEMIC
DEVELOPMENT OF CHILDREN ADOPTED FROM ROMANIAN
ORPHANAGES**

by

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**THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS FOR THE DEGREE OF MASTER OF ARTS**

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A Longitudinal Study of the Intellectual and Academic Development of Children Adopted from Romanian Orphanages

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ABSTRACT

This study examines the intellectual and academic development of Romanian orphans adopted by Canadian families approximately 8 years ago. It is part of a larger longitudinal study that addresses the overall development of these children following severe early deprivation in Romanian institutions. The present study has three main objectives: to compare the intellectual and academic performance of the Romanian orphans ($n = 36$; 17 boys; mean age at assessment = 10 ½ years) to non-adopted Canadian born children and Early-adopted Romanian children who were destined for orphanages had they not been adopted in infancy; to examine predictive variables from Phase 1 and 2; and to compare the academic self-perceptions of the Romanian orphans with their counterparts. The children completed standardized IQ and achievement tests in addition to a child self-report questionnaire. Parents and teachers also completed questionnaires regarding the children's school performance. The Romanian orphans (RO) had lower scores on all standardized intellectual and academic measures than their comparisons. Parent and teacher reports also indicated that the RO children had more school difficulties and a higher incidence of grade retention than CB and EA children. Significant negative correlations were found between the length of time spent in an institution prior to adoption and several intellectual and academic measures. Stimulation in the home and school readiness scores at age 4 ½ were predictive of intellectual and academic functioning at age 10 ½. The Romanian orphans' academic self-perceptions were as positive as their Canadian born peers. The EA children generally scored 'in between' the other two groups, with the exception of their academic self-perceptions, which were higher than the RO or CB groups.

DEDICATION

This thesis is dedicated to the children, parents, and teachers who kindly agreed to participate in this research.

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INTRODUCTION

This thesis is part of Phase 3 of a longitudinal study of the development of children adopted from Romanian orphanages between 1990 and 1991 (see Ames, 1997). My focus is on the intellectual and academic development of these children at approximately age 10 ½ years. The performance of the Romanian orphanage (RO) children, with extensive institutional experience early in life, was examined in relation to two comparison groups: a sample of Canadian born (CB) never-institutionalized children and a group of Early-adopted (EA) Romanian children who were adopted directly from hospitals or families, and therefore had no orphanage experience. My research is guided by three overarching questions: (1) What are the effects of institutional rearing on intellectual and academic development? (2) What are the predictors of intellectual and academic progress post-adoption? (3) How do the RO children's academic self-perceptions relate to their intellectual and academic performance?

To address the first of these questions, the intellectual and academic performance of the RO children was compared to that of the CB and EA children. In addition, family demographic characteristics (e.g., family income, parents' ages, and level of education), and total time in institution were assessed in relation to intellectual and academic performance. Second, potential predictors measured at 11 months post-adoption and when the children were age 4 ½, were examined in relation to intellectual and academic functioning at age 10 ½. These included: developmental delay, school readiness, and amount of stimulation in the home. Lastly, academic self-perceptions among the three groups were compared.

A Brief History of Romania and the Romanian Adoption Project

Strong family ties have been an integral component of Romanian life for centuries. However, a quarter of a century of rule under totalitarian dictator Nicolae Ceausescu decimated this once flourishing European culture and impoverished an entire people (Gilberg, 1990). Central to Ceausescu's economic plan were specific pronatal policies to increase the population from 23 to 30 million people. Contrary to other European countries that provided positive pronatal incentives, Ceausescu implemented negative constraints (Johnson & Edwards, 1993). Abortion was outlawed and doctors violating the law were jailed. Sex education was non-existent and birth control methods were banned. Women younger than age 45 were expected to have five children.

'Systemization', another one of Ceausescu's policies, eliminated rural villages and thousands of families were forced to move to crowded high-rise apartments. These accommodations were unsuitable to house large numbers of children (Johnson & Edwards, 1993).

Romania's 'full employment' policy was a further detriment to family caregiving. Women were required to return to work after 3-6 months of maternity leave. In addition, elderly persons who traditionally functioned as caregivers were often refused essential medical treatment because health care was targeted at only those who could contribute to the economic productivity of the country. Thus, many elderly relatives were not physically able to care for children. Many parents were forced to turn over their children to the state, which operated a large network of institutions for children up to 18 years of age (Marcovitch & Cesaroni, 1995).

Ceausescu's communist regime was overthrown late in 1989. Within a month, pictures of rooms full of children, apparently starving and emotionless, flooded television screens around the world (Ames, 1997). The rearing conditions in these orphanages represented an extreme of deprivation -- the children were under-stimulated and malnourished. Most were characterized as uninterested or unresponsive, spending most of their days lying or sitting immobile in their cribs (McMullan & Fisher, 1992). Child-to-caregiver ratios ranged from 10:1 to 20:1, allowing for minimal personal interactions, and limited opportunities for reinforcement or praise. Self-stimulatory activities such as rocking were a central and repetitive activity for many of these children simply because there was nothing else for them to do (Ames & Carter, 1992). Caregiving was conducted in an assembly line fashion (Ames & Carter, 1992).

It soon became known that it was possible for Canadians and others to 'save' these children by touring Romanian orphanages to seek out children who either had no parents or parents willing to sign papers releasing them for adoption. Some adoptive parents were able to adopt infants (that were destined for orphanage life) directly from hospitals or families (Ames, 1997); these are the EA children in the current study. Primarily families in British Columbia and Washington State adopted the Romanian children in the present study.

The present study is an integral component of the larger 'Romanian Adoption Project' in which the physical, cognitive, social, and emotional progress of a group of Romanian adoptees has been assessed at three time points. Elinor Ames, a developmental psychologist from Simon Fraser University, started the Romanian Adoption Project approximately 11 years ago. Ames conducted observations in several

Romanian orphanages shortly after the fall of Ceausescu's empire. She recognized the importance of studying a cohort of adopted children in order to examine the effects of early institutionalization as well as the influence of adoptive families on children's subsequent development. Children were first assessed when they had been in their adoptive families for approximately 11 months (Phase 1) and again when the majority of children were 4 ½ years old (Phase 2). In 1997, Elinor Ames retired and Dr. Lucy Le Mare, a developmental psychologist in the Faculty of Education, took over direction of the project. A third phase when the children were approximately 10 ½ years of age was subsequently conducted (Phase 3).

Results from earlier phases of this longitudinal study indicated that the RO children experienced more cognitive problems than did their EA and CB counterparts (McMullan, 1993; Morison, 1997). It was suggested that the deficits at age 4 ½ might interfere with the children's subsequent academic success once they reached school age. An evaluation of this prediction is central to the current study. It was also noted at Phase 2 that the RO group had made significant progress in the cognitive domain since Phase 1 (Morison, 1997), therefore analysis of Time 3 data should elucidate whether or not the RO children have continued their progress in this regard.

Effects of Institutional Rearing on Intellectual and Academic Development

The impact of institutionalization on children's intellectual and academic development has been the subject of academic inquiry and debate for many decades. John Bowlby (1951), a psychiatrist from the Tavistock Clinic in London, argued that institutionalized children are doomed to fail psychologically because of maternal deprivation. In other words, Bowlby believed that the mother-child bond was absolutely

critical to healthy psychological adjustment. Not surprisingly, he viewed staff turnovers in orphanages as a serious risk to the children because it made bonding with a single adult difficult.

Other researchers place less emphasis on the mother-child bond and argue instead that the institutional environment itself impacts on the cognitive development of children. For example, when comparing institutional environments to home environments, Yarrow (1961) describes how orphanages offer fewer opportunities for learning or practicing new skills, minimal variation or adaptation to children's individual needs or differences, and inadequate motivational conditions involving reinforcement or praise. Such conditions were certainly characteristic of the orphanages from which the Romanian children in the present study came, as described by previous researchers:

- (1) The orphanages were colorless and for the most part sterile and very quiet, with little visual or auditory stimulation available to the children. Half of the adoptive parents reported that toys were available, but all of these had been introduced since the revolution (Ames & Carter, 1992).
- (2) High child-to-caregiver ratios allowed for minimal personal interactions, and children had little opportunity for variety in life (Ames, 1990). Some children were described as dirty or soiled or as having insect bites or sores (McMullan & Fisher, 1992).

Morison and Ellwood (2000) argue that an unstimulating background, although impacting on intellectual and academic development, is most likely not the only explanation of the cognitive difficulties shown in postinstitutionalized children. The authors cite genetic influences and poor nutrition as other possible intervening factors.

Unfortunately, in terms of genetics, very little is known about the biological parents of the children in the current study. It is possible that the children adopted from Romanian orphanages would have had below average intellectual and academic functioning regardless of their institutional stay, however this is the main reason for including the Early-adopted group, who are assumed to come from similar families as the RO children.

With regard to nutrition, the children in the present study were extremely malnourished. Most adoptive parents described how the children did not have enough to eat or drink, and were usually fed a thickish soup and clear tea, so most children fell well below the normal weight curve for their ages (McMullan & Fisher, 1992). At Phase 2 of this longitudinal study, a measure of nutritional deprivation, weight percentile upon adoption, was examined in relation to the RO children's developmental status. Surprisingly, it was found that neither health of the child when parents first met them nor birthweight was related to children's IQ scores.

Schaffer (2000) proposes a dynamically oriented approach to research on the long-term outcomes of early deprivation. Such a method takes into account inherent characteristics of the individual, the social context both before and after the early experience, and the various turning points that the individual negotiates in traversing the developmental path to maturity. Schaffer emphasizes the need for prospective longitudinal studies to not only include accounts of the external early experiences encountered, but also assessments of the individual's internal representations resulting from early deprivation, as well as the modulating effects of intervening experiences. The longitudinal study, of which the present thesis is a part, includes clear observations of the deprivation experiences endured, considers children's individual differences, and

examines the modulating effects of intervening experiences (i.e. the impact of the adoptive home) on the children's later intellectual and academic development.

Research on the Intellectual and Academic Development of Postinstitutionalized Children

Many studies have examined the intellectual and/or academic development of postinstitutionalized children (Andresen, 1992; Dennis, 1973; Flint, 1978; Goldfarb, 1943, 1945; Goodman & Kim, 2000; Hodges & Tizard, 1989; Kaler & Freeman, 1994; Marcovitch et al, 1997; O'Connor, Rutter, Beckett & Keaveney, 2000; Provence & Lipton, 1962; Rutter & Team, 1998; Spitz, 1945; Tizard & Rees, 1974). Most of these studies have demonstrated that some cognitive deficiencies seem to persist even after the children have spent several years in adoptive homes.

Early research by Goldfarb (1943, 1945) compared 15 post-institutionalized children, who had been in an orphanage up to the age of 3 years (at which time they were transferred to foster homes), with 15 non-institutionalized foster children. At the age of 12 years the institution group scored lower than the foster home group on both verbal and nonverbal components of the Wechsler-Bellevue Intelligence Test. The mean full scale IQ of the institution group was approximately 72, which is in the borderline range while the mean IQ of the foster home group was approximately 95, which is in the normal range. In addition, all the institution children showed evidence of school difficulty; 80% of them were not performing at grade level for their age, and 73% were or had been in special classes for 'retarded children'. The average attainments of the foster home children in both reading and math, as measured by the Metropolitan Achievement,

Reading, and Arithmetic Tests, were significantly higher than those of the institution children.

Using a larger sample than Goldfarb, Spitz (1945) studied 164 children that were placed in institutions in their first year of life. They lived in extremely deprived conditions; Spitz equated it to solitary confinement. On the Hetzer-Wolf test, the children's Developmental Quotients (DQs) averaged 75 at 6 ½ months and 72 at 1 year of age. These scores were significantly lower than the average scores of their comparison groups: a nursery sample (DQ=105) and home reared sample (DQ=131). Spitz concluded that infants separated from their mothers for more than 6 weeks develop a syndrome of disorders he termed 'hospitalism' which is masked by tears, staring eyes, and other signs of depression. Spitz also reported that one third of the infants in his study died!

Almost two decades after Spitz's disquieting research, Provence and Lipton (1962) conducted a longitudinal study of 75 institutionalized infants who lived in deprived conditions (similar to the early environment of the RO children in the present study) and found that the children demonstrated declines in DQs with increased time spent in institutions. As measured by the Gesell Developmental Schedules and Hetzer-Wolf test, the institution-reared children displayed a mean DQ of 101 at 14-26 weeks; however at 27-39 weeks the DQ dropped to 87 and dropped again to 85 at 40-52 weeks. This was in sharp contrast to the DQs of comparison home-reared foster children. On average, they held a DQ of 111 in the early weeks and dropped slightly to 106 at 40-52 weeks.

However, Dennis (1973) concluded in his final report of a group of children adopted from institutions in Lebanon, that intellectual 'recovery' (as measured by scores on Stanford-Binet scales) from deprivation was possible if adoption occurred before the age of 2 years and was followed by normal, everyday cognitive experiences. The children adopted prior to 2 years of age in his study were able to overcome their earlier deficit and had attained 'normal' IQs (approximately 100) when measured at ages 10-14. On the other hand, those children who were adopted after 2 years of age remained approximately 2 years behind their counterparts in subsequent intellectual testing. Consistent with Dennis's results, at Time 2 the 29 younger RO children (adopted before 2 years of age) had a mean overall IQ in the low average range. The 11 older RO children (adopted after 2 years of age) did not fare as well with a mean IQ at the low end of the "slow learner" range (Morison, 1997). However, within both the younger and older RO groups IQ and time in institution were significantly correlated suggesting the relationship is linear and that there is no "magic" cut-off. Other studies are consistent in finding lower intellectual and academic performance in children who had longer stays in institutions (Provence & Lipton, 1962).

Another longitudinal study was conducted by Flint (1978) and her research team. They carefully documented and monitored the development of a group of 16 post-institutionalized children from infancy through early adolescence. Four children were observed at each of the following age levels: 0-6 months, 6-12 months, 12-18 months, and 18-24 months. The outcome of the mental health measurement revealed that the mental health scores of these babies decreased significantly as age increased and institutional care was prolonged. Flint (1978) observed marked improvement in the

intellectual functioning of the children from the time they were first tested to six years of age. She also monitored the children's adjustment to school. Whenever difficulties arose, the help of the teacher was enlisted to look at a child's strengths and weaknesses in an attempt to find the best way of overcoming the problems. The adoptive parents were also involved in the planning of appropriate strategies to help the child proceed through school and maximize her potential. Despite this 'extra attention', most of the children spent an extra year in kindergarten or grade 1. In the present study, parent reports of grade retention were examined in the RO, CB, and EA groups.

Andresen (1992) conducted a further study examining school performance of post-institutionalized children. Andresen studied the behavioral and school adjustment of 151 12-13 year old internationally adopted children in Norway, and found that twice as many adopted children as non-adopted had trouble with arithmetic (indicated on teacher reports of children's 'school adjustment'). However, the adopted children had no more problems with reading or writing than their Norwegian-born classmates. Andresen considered that the problems were reflective of language difficulties, as a good command of the language is necessary to do well in arithmetic at their grade level. However, this explanation seems unlikely since the direct evaluation of language behaviour in the adopted and non-adopted groups did not reveal any differences. In the present thesis, the Romanian orphans performance in specific subject areas (including mathematics) was examined in relation to their comparison groups.

The next few studies to be discussed incorporate a similar group of participants (in terms of Romanian institutional background) as the children in the present study.

Kaler and Freeman (1994) researched the cognitive and social development of a group of

25 children between the ages of 23 and 50 months living in Romanian orphanages. The group was compared with a non-orphanage sample of Romanian children between the ages of 21 and 63 months. Results indicated that all the orphanage children displayed cognitive deficits; the majority was severely delayed. As measured on the Bayley mental scales, none of the orphanage children were functioning at age level; 20 were functioning at levels less than half their chronological age. In the non-orphanage sample, cognitive scores were significantly higher, ranging from 2 months behind chronological age to four months above chronological age. However, in contrast to earlier studies (Goldfarb 1943, 1945; Spitz, 1945; Provence & Lipton, 1962) intellectual deficits were not found to be related to length of time in the orphanage.

Marcovitch et al. (1997) studied a cohort of 56 Romanian orphans adopted internationally into Ontario families between 1990 and 1991. The children were 3-5 years old at the time the research took place. Nineteen of these children had spent more than 6 months in orphanages, while 37 had spent less than 6 months in institutions during the first 6 months of life. The investigators found that all developmental quotients were in the average range but the comparison home group (i.e. children that had spent less than 6 months in orphanages in the first 6 months of life) scored within the high average range and the institution group scored within the low average range. In addition, time in institution was related to developmental status and to behaviour problems. In both cases, the home group had better outcomes than the institutional group.

A study currently underway in England is similar to the present thesis and the larger longitudinal study of which it is part. Rutter and the English and Romanian Adoptees Study Team (1998) examined the extent of developmental deficit and catch-up

of a sample of four-year-old Romanian orphanage children who were adopted into the U.K. before the age of 2 years (as compared to a sample of U.K. adopted children placed before the age of 6 months). The children from Romania were severely developmentally delayed at the time of adoption, with approximately half of them below the third percentile on a developmental quotient. The catch-up was described as 'impressive' but not complete, with the mean McCarthy General Cognitive Index (a widely used measure of intellectual functioning) scores at 92 compared with 109 for within U.K. adoptees (Rutter & Team, 1998). In a follow-up study conducted 2 years later, results indicated that there was considerable catch-up among late placed Romanian children from entry into the UK to age 6, but as a group they exhibited lower cognitive scores and general developmental impairment compared with earlier adopted Romanian children.

(O'Connor, Rutter, Beckett, Keaveney, Kreppner, & Team, 2000).

Differing from the last few studies discussed with regard to the research participants, Goodman and Kim (2000) studied a group of young adult adoptees that came to America from Mother Theresa's orphanages in India. Mean age at adoption was 3.2 years. The children's intellectual struggles were most evident in the elementary school years; 29% of children were reported to have special intellectual difficulties. In secondary school the number dropped slightly to 24%, and at the post-secondary level 18% of adoptees displayed intellectual difficulties. Thus, frequency of intellectual struggles decreased as the children grew older. Goodman and Kim (2000) argued that because most of the youths were not far beyond their schooling years, it was too early to know or predict how they would 'end up'.

Furthermore, Tizard and Rees (1974) compared the effects of adoption, restoration to the natural mother, and continued institutionalization (with improved conditions) on the cognitive development of four-year-old children. The mean age of adoption was 3 years. They found that the mean IQs of all groups were at least average and that the adopted children had significantly higher IQs, were friendlier, and less distractible than the other children. Hodges and Tizard (1989) followed these children longitudinally into mid-adolescence (approximately age 15), and again found no effect of early institutionalization on IQ. There was, however, some evidence of school difficulties. The 'academic attainments' of ex-institutional adolescents were lower than those of their matched comparisons.

Methodological problems are evident in some of these studies. As Morison (1997) revealed, Goldfarb (1943, 1945) studied children who were placed into multiple foster homes rather than stable adoptive homes; Dennis reported overall IQ on a language adapted version of the Stanford-Binet when children ranged from several months post-adoption to 16 years post-adoption; and Flint's (1978) longitudinal study implemented an intervention program that may have influenced children's overall outcome. In addition, McCall (1999) notes several criticisms of Spitz's (1945) work. One problem is Spitz's confusing description of his infant subjects and the testing procedures. It is unclear how many babies were studied at different stages, what the family backgrounds were, and the conditions upon institutional admission. In addition, Spitz's graph that appears to show a decrease in average DQs for the same infants at different months of age is actually based on overlapping groups at different ages. Hence, the study was not truly longitudinal.

Despite methodological problems, a commonality in these studies is that although many postinstitutionalized children make significant intellectual and academic advances after leaving the institution, most continue to display intellectual and/or academic difficulties. This is consistent with results from previous phases of the present longitudinal study.

Previous Cognitive Results on this Sample of Romanian Children

Time 1

At 11 months post-adoption, the majority of the Romanian orphanage children remained delayed in two or more areas of development according to parental report on the Revised Denver Prescreening Developmental Questionnaire (McMullan, 1993). In addition, Revised Gesell Developmental assessments on 23 of the 43 children in the orphanage sample revealed that developmental quotients in the area of gross motor, adaptive, personal-social, and language averaged in the borderline range (68-85) while fine motor abilities were in the low end of the average range (85+; McMullan, 1993).

Time 2

At approximately age 4 ½ RO children had significantly lower overall, verbal, and nonverbal IQs than did CB children as evidenced by scores on the Stanford-Binet. RO children also had significantly lower overall IQ and verbal IQ than EA children but did not differ on non-verbal IQ. CB children were performing at the high end of the average range, EA children were performing in the middle of the average range and RO children were at the low end of the average range. Older RO children were also significantly behind both their CB matches and the younger RO children, with overall IQs averaging in the Slow Learner range (Morison, 1997).

On the Bracken Basic Concept Scale, RO children had less understanding than CB children of basic concepts of letters, numbers, colors, and concepts related to direction, position, time, and sequence. RO children also scored lower than the CB children on the School Readiness Composite (Morison, 1997). An examination of Phase 3 academic data will reveal whether school readiness scores from Phase 2 predict academic achievement.

Number of developmental delays parents reported their children to have at Time 1 (on the Revised Denver Developmental Screening Questionnaire) was significantly related to RO children's cognitive scores, including IQ, with more delays related to lower cognitive scores. Stimulation in the home environment was also significantly related to children's cognitive scores. For the RO and EA children, correlations were all strongly positive. For the CB children there was little or no relationship between the amount of stimulation and support provided in their homes and how high their IQs were (Morison, 1997). Early developmental delay and stimulation in the home will be examined in relation to Phase 3 intellectual and academic performance in the present study.

At age 4 ½ RO children living in families of higher socio-economic status (SES) scored higher on the Stanford-Binet and the Bracken Basic-Concept Scale than children living with families of lower SES. Also at Time 2, length of institutional stay (with more extensive time in orphanage) related to lower cognitive scores (Morison, 1997).

Thus, earlier results of the current longitudinal study showed that at approximately age 4 ½, RO children scored significantly lower than CB and EA children on cognitive measures, including IQ. However, given that all RO children made gains in the cognitive domain between Time 1 and 2, an examination of Phase 3 cognitive data is

necessary to see if group differences in intellectual performance have persisted now that the RO children have spent considerably more time in their adoptive homes, and have entered the public school system. It will also help to determine the predictors of intellectual and academic development post-adoption.

Predictors of Intellectual and Academic Development Post-Adoption

There are a limited number of studies that have examined predictors of intellectual and academic progress after children have left the unstimulating environment of institutions. Three factors that have been linked to intellectual and academic development in general include early developmental delay, degree of school readiness, and stimulation in the home. As discussed earlier, the amount of time spent in orphanages prior to adoption is also a factor that has been found to be important specifically to the cognitive development of Romanian orphans. Developmental delay, school readiness, and stimulation in the home are discussed in the following sections.

Developmental Delay

Developmental delay, as measured by the Revised Denver Developmental Screening Test (RDDST) has been shown to be related to IQ and academic achievement. Diamond (1990) researched the efficacy of the RDDST as a prekindergarten screening measure in a 5-year follow-up study of 78 kindergarten children. Her results show significant relationships between RDDST performance and special class placement, remedial reading program assignments, an IQ test, reading achievement scores, and classroom grades. In the present study, scores on the RDDST were examined in relation to IQ and academic achievement at age 10.5.

School Readiness

A child's readiness to learn, as measured by the Bracken Basic Concept Scale (BBCS) has been shown to be related to academic development. Sterner and McCallum (1988) conducted a stepwise regression on data from a group of 80 kindergarten graduates. The Bracken Basic Concept Scale accounted for the greatest amount of variance in arithmetic (31%), reading (25%), and spelling (36%) scores from the Wide Range Achievement Test-Revised. Sterner and McCallum (1988) argued that if the goal is to predict academic achievement from a current estimate of readiness, the BBCS is a good choice. In the present study, it will be interesting to observe if school readiness (as measured by the BBCS at age 4.5) predicts IQ and academic progress at age 10.5.

Stimulation in the Home

Stimulation in the home, as measured by the HOME Inventory, refers to the quality of stimulation and support available to a child in the home environment (e.g., stimulation of academic behaviour, language stimulation, and encouragement of maturity). Several studies have linked stimulation in the home with intellectual and academic development (Iverson & Walberg, 1982; Bradley, Caldwell, Rock, & Harris, 1986).

Iverson and Walberg (1982) conducted a quantitative synthesis of research on home environment and school learning. They evaluated 18 studies of 5,831 school-aged students on the correlation of home environment and learning in 8 countries over 19 years. Correlations of intelligence and achievement with indices of parent stimulation of student in the home were considerably higher than those with indices of socioeconomic status. The results of this study suggest that intelligence and achievement are more likely

linked to stimulation in the home environment than they are to parental socioeconomic status indicators such as parent's level of education.

In a shorter longitudinal study, Bradley et al. (1986) conducted an 11-year project on the link between early home environment and the development of competence. Research participants included 174 infants who were subsequently assessed at different ages up to 11 years with 1 or more tests including, but not limited to: the HOME Inventory, the Stanford-Binet Intelligence Test, and the Science-Research Associates Achievement Test battery. Results revealed that preschool HOME scores correlated significantly with measures of cognitive development during early childhood and the primary grades. Achievement scores were also related to scores on a number of HOME subscales.

The common finding in these studies is a significant relationship between stimulation in the home and intellectual and academic performance. In the present study, stimulation in the home (including academic stimulation) at Time 2 was examined in relation to intellectual and academic performance at Time 3.

Children's Academic Self-Perceptions

How children feel about themselves in general and their academic ability in particular has increasingly been reported in research literature over the last quarter century. The focus of many studies is on the relation between academic self-concept (ASC) and achievement. For example, Chapman, Tunmer, and Prochnow (2000) examined academic self-concept and reading-related performance in 60 beginning school children that, after 2 years of schooling, were assessed as having positive, negative, or typical ASCs. Data were collected soon after school entry, toward the end of Years 1 and

2, and during the middle of year 3. It was revealed that children with negative ASCs performed more poorly on reading-related tasks than did children with positive or typical ASCs.

On a much larger scale, Anderman, Lexington, Anderman, and Griesinger (1999) conducted two studies examining the relation of present and possible future academic self-concept with grade point average and achievement goals. In the first study, the relations between present and future self-concepts and changes in grade point average between the 6th and 7th grades were examined. Data were gathered from a sample of 315 7th grade students. Results showed that positive present and future academic self-concepts were related to positive changes in grade-point average. Also, when students' present perceived academic self-concepts were higher than future perceived self-concepts, GPA increased. In their second study, Anderman et al. (1999) collected data from a different sample of 220 6th, 7th, and 8th graders. The relations between present and future self-concepts, and mastery and performance-approach achievement goals were examined. Results indicated that a present good-student self-concept was related positively to both performance and mastery goals, whereas a future good-student self-concept was related positively only to performance goals.

Gose, Wooden, and Muller (1980) examined the relative potential of self-concept and intelligence as predictors of achievement. Two self-concept tests, an intelligence test, and an achievement test battery were administered to 47 male and 49 female grade six students. The results showed that achievement was related to academic success self-concept. Achievement in reading, language, and arithmetic, was most directly related to self-concept measures that were specifically reflective of academic success in these

content areas. In fact, in each of these areas, the combination of intelligence and the related academic success self-concept measure accounted for more achievement variance than did intelligence alone.

Although varying in age of participants and size of sample, all three of the aforementioned studies found positive relationships between academic self-concept and achievement. In the present study, children's academic self-concept (as measured by the Self-Description Questionnaire) will be examined in order to determine if group differences and/or concurrent relations exist between self-concept and intellectual and academic development.

The Present Study

In summary, the first aim of this thesis was to compare the intellectual and academic performance of Romanian orphanage (RO) children who experienced severe early deprivation to a Canadian born (CB) non-adopted sample and a group of Early-adopted (EA) Romanian children that were destined for orphanage life, but were adopted prior to 4 months of age. Several specific questions about the nature of the intellectual and academic development of the Romanian orphans were addressed such as: Has IQ remained stable over time? How does the intellectual and academic performance of the RO children compare with the CB and EA groups? Do the Romanian orphans have lower academic self-concepts and a greater incidence of grade retention than their counterparts?

Next, I looked within the RO group for possible explanatory factors such as family demographic data and length of time spent in the Romanian institutions because these have proven to be relevant in the previous research conducted on this group of

children (Ames, 1997; Thompson, 2001). For example, Romanian orphans with older parents were found to be generally doing better cognitively than those who have younger parents (Morison, 1997). This may be because the older parents have the maturity and confidence to advocate for much needed resources for their children (Thompson, 2001).

The second aim of the present study was to examine predictors of intellectual and academic progress post-adoption including early developmental delay, school readiness, and stimulation in the home. These were conceptually relevant factors measured at 11 months post-adoption and when the children were age 4 ½. Several hypotheses were formulated based on the previous review:

1. The Romanian orphanage children would display lower intellectual and academic performance than their comparison groups.
2. Within the RO group, parent's ages, level of education, and family income would be positively correlated with intellectual and academic performance.
3. Length of time in institution would be negatively correlated with RO children's intellectual and academic performance.
4. Developmental delay at 11 months post-adoption would be negatively correlated with intellectual and academic performance at age 10.5.
5. School readiness at age 4 ½ would be positively correlated with intellectual and academic performance at age 10.5.
6. Stimulation in the home at age 4 ½ would be positively correlated with intellectual and academic performance at age 10.5.
7. The Romanian orphanage children would have lower academic self-concepts than their comparison groups.

METHOD

Participants

Results reported in this thesis are based on data from 36 Romanian orphanage (RO) children (17 boys), each of whom had lived in an orphanage for a minimum of 9 months (range 9 to 53 months) prior to adoption. Total time in institution and age at adoption were almost perfectly correlated at .97, demonstrating that most children had been in orphanage since birth (Fisher et al., 1997). Data are also evaluated for a Canadian born (CB) non-adopted, never-institutionalized comparison group ($n = 42$), 35 of which were individually matched to RO children on sex and age at assessment (± 3 months) and an Early-adopted (EA) comparison group ($n = 25$) individually matched to the younger RO and CB children. The early-adopted group was used as a control for the pre- and peri-natal nutritional environment that the orphanage-reared children endured as well as a control for unknown backgrounds, including genetic backgrounds. The EA children were abandoned and potentially came from similar types of parents as the orphanage group (Morison & Ellwood, 2000). There are a larger number of Canadian born children than Romanian orphanage children because although some RO families chose not to participate in this phase of the study, the Canadian born children were required as matches for the Early-adopted group. The EA children, also born in Romania, were adopted before 4 months of age and came directly from hospitals, orphanages, or their birth parents. These children have similar birth family histories, and pre- and peri-natal experiences as the RO children and were destined to be raised in institutions comparable to those from which the RO children were adopted. However, because the

EA children were adopted early in infancy they do not share the extensive deprivation experience of the RO children.

Attrition from Phase 2 to Phase 3 took place for several reasons. Some families decided not to participate in Phase 3 because they believed the research was no longer of assistance to them while others reported that they wanted to get on with their lives and put the adoption issue behind them. One family dropped out because a parent was extremely ill. Another family discontinued participation because the parents had not informed their child that she was adopted. Some families had relocated to other cities or countries and were not accessible for this phase, while others could not be found. In total 11 RO families, 5 CB families, and 5 EA families who were involved at Phase 2 did not participate during Phase 3. Five new CB families were added in Phase 3 in order to supply matches for EA children who were without RO matches.

Procedures

As a first step in Phase 3 an introductory letter was mailed to the parents of all previous participants to describe the research and request continued participation (See Appendix B). The letters were followed up with phone calls to guarantee that the correspondence had been received and to discuss any questions the parents had about the current study. The parents were asked for verbal confirmation that they and their children would take part (written consent was obtained later) and appointments were scheduled with the families for home visits, which began in February 1999 and concluded in July 2001 (See Appendix C). Permission was requested from parents for the researchers to contact the children's instructors and school personnel in order to gather data from them regarding the children's academic and social behaviour. The purpose of

the school visits was explained to the parents so that they could make an informed decision about whether to grant their consent. The principals, and in some cases school district administrators, were then reached in order to obtain their permission to approach teachers and enter the classrooms of the study participants. The administrators, principals and teachers provided written consent for research in the schools (See Appendices D and E). The visits to both homes and classrooms took place approximately mid way through the school year, typically between January and June in each of the three years. This was to ensure that both teachers and classmates had sufficient time to get to know the target children and establish relationships.

Child assessments, which took an average of four to five hours, were conducted during the home visits. These visits were typically scheduled for 2 to 3 hours on two separate days at the end of the school day or on the weekend. In some cases, due to parent schedules, assessments took place in one day but this was avoided whenever possible because it was believed that four continuous hours of completing questionnaires and intelligence tests was too tiring for 10-year-old children. Two-hour sessions were deemed to be short enough to ensure that the children continued to be engaged in the activities and perform optimally.

A female graduate student in the Counselling Psychology program who has many years of experience working with children with a wide range of developmental and special needs, conducted the assessments. Upon arrival at the homes, she spent several minutes talking to the children informally to establish rapport. She took time to explain why she was there, what the children were expected to do and to find out what they knew about the visits. The examiner provided the children with concentrated individual

attention, and gave positive feedback throughout the assessment. If the children appeared fatigued, restless or bored, the examiner inquired if they needed a break. The examiner sat with the children to make sure that they understood how to complete the questionnaires and assisted by reading the questions when necessary. Attempts were made to eliminate potential researcher bias by ensuring that the examiner had no prior contact with the family before the assessments were done. Standardized questionnaires ensured that the exact questions were asked of all participants. It is hoped that these methods were successful in counteracting any preconceived ideas the researcher had about outcomes based on previous phases of the study.

In addition to the child assessments, parent interviews were conducted during the home visits to determine how the parents felt their children were progressing and whether there were any continuing problems from earlier phases of the study (e.g. eating or sleeping problems, stereotyped behaviours). These interviews typically lasted approximately one hour and were audio taped with the consent of the parents. The parents were also asked to complete a package of questionnaires regarding their children's intellectual, social, emotional, and physical development and return it by mail in stamped, self-addressed envelopes. Finally, teachers were asked to complete three short questionnaires on our target children's academic performance and social behaviour (Questions from the teacher measure of academic performance were analyzed for this thesis and are described below). The measures were given to the teachers in stamped, self-addressed envelopes to be mailed to the research team upon completion.

All participants in the study were informed that their participation was voluntary and that they could withdraw at any time. They were also told that if they had any

questions or concerns about the research they could contact the principal researcher or the Dean of the Faculty of Education at Simon Fraser University by telephone or email.

Measures

Data reported in this study were gathered from three sources: the children, their parents, and their teachers.

Demographic Information

Parents completed a 21-item questionnaire to report on their demographic characteristics. The following items were analyzed for this thesis: highest level of education of parents', age of parents' and annual family income (See Appendix F). Mothers and fathers were asked to indicate their highest level of education using a 6-point scale where one equaled elementary school and six equaled graduate or professional school. The ages of the parents were calculated by subtracting their birth dates from the dates their children were assessed. Their birth dates were obtained using information from earlier phases of the current study and/or parents were telephoned and asked their dates of birth. Annual family income was gathered using a 10-point scale where one equaled less than \$20,000 and 10 was equal to above \$100,000.

Intelligence and Academic Performance Measures

Child Measures

Stanford-Binet Intelligence Scale, 4th Edition (SB4; Thorndike, Hagen, & Sattler, 1986).

The SB4 was used to assess the overall intellectual development of the children. It is well standardized, and has good internal reliability (Thorndike, R.M., Thorndike, R.L., Cunningham, George, K., & Hagen, E.P, 1991). The SB4 evaluates children from 2-23 years of age. Vocabulary and Comprehension subscales were used to assess concept

formation and language development. Memories for Sentences, Bead Memory and Quantitative subscales were used to assess concentration abilities and short-term memory. Pattern Analysis, Copying and Matrices were used to assess abstract and visual reasoning. A composite score, along with subscale scores in Verbal Reasoning, Abstract-Visual Reasoning, Quantitative Reasoning and Short-Term Memory can be derived for the age range of our sample. All tasks were introduced using the standard procedures provided in the test manual. As described earlier, in Phase 2, the RO children on average scored lower than their comparison groups on this test (Morison, 1997). These Time 2 data were examined in relation to intellectual and academic performance currently. (An additional 'absurdities' subscale was used at Phase 2.)

Canada Quick Individual Educational Test (Canada QUIET; Wormeli & Carter, 1990).

The Canada QUIET is a standardized test that measures the academic achievement of students from grades 2 to 12. It consists of four subtests; spelling, arithmetic, word identification and passage comprehension. The Canada QUIET is considered a valid measure of the achievement of students instructed in English. It was normed on students who were enrolled in English instructed schools across Canada, has good reliability for screening achievement in that population and was built from materials used in language arts and arithmetic instruction in Canadian programs (Wormeli & Carter, 1990).

School Questionnaire (NLSYC; Statistics Canada-HRDC, 1997)

Children completed a questionnaire from the National Longitudinal Survey of Children and Youth (NLSYC) regarding how much they like school, the importance they attach to academic achievement, and the support they perceive from parents and teachers

concerning their schoolwork. Examples of items include ‘How well do you think you are doing in your schoolwork?’ (see Appendix G).

The Self-Description Questionnaire. (SDQ-1, Marsh, Smith, & Barnes, 1983; Marsh, 1988)

This is a widely used multidimensional measure of children’s self-concept designed for utilization with middle to later elementary school children. It is a 56-item self-report measure that assesses a child’s self-concept in five domains: academic, athletic, appearance, relations with peers, and relations with parents. It also has a separate subscale that assesses feelings of general self-worth. Data from one of these subscales are reported in this thesis: academic self-concept. The academic self-concept subscale consists of 10 items (e.g. I’m good at school subjects; I enjoy doing work in school subjects). All items were responded to on a 5-point rating scale. Scores were calculated by adding all items with higher scores indicating more positive self-regard (See Appendix H).

The SDQ-1 has excellent psychometric properties of reliability, validity (construct, convergent, and discriminative) and utility with the age group in the present study. The construct validity of the measure has been checked across various studies and verified by confirmatory factor analysis (Byrne & Schneider, 1988; Marsh, 1990; Marsh & MacDonald-Holmes, 1990). Marsh and MacDonald-Holmes provided support for convergent and discriminative validity by using multi-trait, multi-method analyses. The SDQ-1 scales have high internal consistency (coefficient alpha = .82 to .93) and high test-retest reliability (Hymel, Ditner, Le Mare & Woody, 1999).

Parent Measures

Child's Education (NLSYC; Statistics Canada - HRDC, 1997)

Parents completed a questionnaire from the NLSYC that includes items concerning involvement in their child's education, the importance they place on academic achievement, and how much their child enjoys school. Examples of items include: 'Based on your knowledge of your child's schoolwork, including his/her report card, how is your child doing in mathematics?' and 'How is your child doing overall?' Parents reported on their level of satisfaction with their child's quality of schooling, and their expectations regarding how far their child would go in school. Information on grade retention was also obtained (see Appendix I).

Teacher Measures

Student's Education (NLSYC; Statistics Canada – HRDC, 1997)

Teachers completed a questionnaire from the NLSYC on children's academic achievement in reading, math, and written work. Examples of items include: 'How would you rate this student's current academic achievement in written work (i.e., spelling and composition). How would you rate this student's current academic achievement across all areas of instruction?' (See Appendix J).

Measures for Predictive Correlates of Intellectual and Academic Performance

This study employed relevant data from Phase 1 and Phase 2 of the longitudinal study in order to determine whether time in institution, developmental delay at 11 months post adoption, school readiness, and stimulation in the home at age 4 ½ predicted intellectual and academic functioning of the RO children at age 10 ½.

Time in Institution

At age 4 ½ it was found that length of time in institution was correlated with cognitive performance, such that extensive time in the orphanage related to lower cognitive scores (Morison, 1997). In the present study, this variable was examined as a predictor of intellectual and academic performance at age 10 ½.

Developmental Delay

Revised Denver Prescreening Developmental Questionnaire (R-DPDQ; Frankenburg, 1986)

The R-DPDQ was designed as a first step screening device in a two-step process to evaluate developmental progress in children aged 3 weeks to 6 years. The questionnaire is made up of 105 tasks or items within the range of accomplishments of children in the age span. Items are arranged in chronological order according to the age at which 90% of children in the standardization sample could accomplish them. Items are categorized in four domains: (1) Personal-Social, (2) Fine Motor-Adaptive, (3) Language, and (4) Gross Motor. In the present study, a parent report of the Denver (parental report of the number of delays the RO children exhibited at 11 months post-adoption) was examined in relation to intellectual and academic performance at age 10 ½.

School Readiness

Bracken Basic Concept Scale (BBCS; Bracken, 1984)

The BBCS was used in Phase 2 to evaluate knowledge of concepts that most children acquire during preschool and early elementary school years. The test comprises 11 subtests, the first 5 of which (color, letter identification, numbers, comparisons, and shape) combine to form a School Readiness Composite, while the remaining 6

(direction/position, social/emotional, connotations, size, texture, quantity, and time/sequence) are used to compute individual standard scores. Due to time constraints only the first 5 subtests and the direction/position and time/sequence subtests were administered to children (Morison, 1997). Scores on the school readiness composite were examined in relation to IQ and academic achievement in the current study.

Stimulation in the Home

The Home Observation for Measurement of the Environment Inventory (HOME; Caldwell & Bradley, 1984)

The HOME Inventory is designed to assess the quality of stimulation and support available to a child in the home environment. In Phase 2 the Preschool version was used with the 4-½ year old children and the Elementary school version was used with the older children. The Preschool version contains 55 items clustered into eight subscales: (a) toys and learning materials, (b) language stimulation, (c) physical environment, (d) pride and affection, (e) stimulation of academic behaviour, (f) encouragement of maturity, (g) variety of stimulation, and (h) acceptance (use of punishment). The Elementary School Version contains 59 items clustered into eight subscales: (a) emotional and verbal responsibility, (b) encouragement of maturity, (c) emotional climate, (d) growth fostering materials and experiences, (e) provision for active stimulation, (f) family participation in developmentally stimulating experiences, (g) paternal involvement, and (h) aspects of the physical environment. In the present study, scores from the academic stimulation subscale and the total HOME score at Time 2 were examined in relation to intellectual and academic performance at Time 3.

RESULTS

Statistical analyses were conducted using data from three sources: standardized child measures (i.e. standardized IQ and achievement tests) and child self-reports, parent reports, and teacher reports. Findings are presented in the following order: 1) preliminary analyses that include an evaluation of demographic variables across groups, validity correlations among measures within and among informant sources and stability correlations between Phase 2 and Phase 3 measures; 2) a comparison across groups on current indices of intellectual and academic functioning; 3) concurrent correlations between Phase 3 demographic variables and intellectual and academic performance, as well as predictive correlations between total time in institution, developmental delay (at 11 months post-adoption), school readiness, and stimulation in the home (when the children were age 4 ½ years) and indices of intellectual and academic functioning at age 10 ½; 4) multiple regression analyses to address the relative importance of Phase 1 and 2 variables, including time in institution, home stimulation, and school readiness, in predicting Phase 3 IQ and achievement; 5) a comparison across groups on academic self-perceptions.

Preliminary Analyses

Demographic Information

Means and standard deviations and the results of one-way ANOVAS comparing demographic characteristics across the RO, CB, and EA groups can be found in Table 1. There were significant differences between the three groups on age at assessment ($F [2, 98] = 4.08, p < .05$), mother's age ($F [2, 100] = 3.87, p < .05$) and father's age ($F [2, 96] = 3.37, p < .05$). Tukey B post hoc comparison tests revealed that the EA children were,

on average, slightly younger than the RO and CB children when they were assessed. This is explained by the fact that the EA children were matched to the youngest RO children while the CB group contained matches for all the RO children. Hence these latter two groups included children in a broader range of age. The parents of the Early-adopted children were the oldest, the RO parents were the next oldest and the CB parents were the youngest. In terms of gender composition, each group of children had approximately equal numbers of boys and girls. The groups did not differ on other demographic characteristics such as parents' education, marital status, and annual family income and generally speaking, despite factors such as time and attrition, the three groups remain comparable.

In terms of sex differences within groups on intellectual and academic measures, there were very few. In the RO group, significant differences emerged on Stanford-Binet verbal reasoning ($F [1,30] = 4.43, p < .05$) and quantitative reasoning ($F [1,30] = 4.49, p < .05$). Boys performed slightly higher than girls on both these measures. In the CB group, sex differences were present on the parent report of performance in written work and composition ($F [1,39] = 4.48, p < .05$) and the teacher report of achievement in written work ($F [1,37] = 7.61, p < .01$). Girls performed higher than boys on both the parent report of written work and the teacher report of written achievement. There were no sex differences on intellectual and academic measures in the EA group.

Correlations Within Child, Parent, and Teacher Reports on Intellectual and Academic

Competence Indices

To determine the validity of measures and agreements across sources regarding the RO children's intellectual and academic competence, correlations were computed

among all variables related to indices of intellectual and academic functioning. Many significant correlations were found within and between intellectual and academic measures completed by children, parents, and teachers.

Concerning standardized child measures the Stanford-Binet composite score was significantly correlated with all the Stanford-Binet subscales. Significant correlations ranged from .57 to .91. The Canada-QUIET composite score was also significantly correlated with the Canada-QUIET subscales for the RO children. Significant correlations ranged from .73 to .94. All subscales on both the Stanford-Binet and Canada-QUIET were significantly intercorrelated. Results are reported in Table 2 and 3. There were slightly fewer significant correlations in the CB and EA groups (see Appendix K).

Most of the parent report measures assessing academic functioning were also significantly intercorrelated for the RO group. Significant correlations ranged between .70 and .92 (see Table 4). A similar pattern of results was found for the CB and EA groups. Results for these groups can be found in Appendix L.

For the RO group, all of the teacher measures were significantly and positively related with correlations ranging from .80 to .91 (see Table 5). The same pattern was repeated in the CB and EA groups. Results are depicted in Appendix M.

The pattern of consistent correlations found among intellectual and academic measures within the three sources supports the validity of those measures. For further verification, correlation analyses were conducted to assess agreement among informants.

Correlations Between Child, Parent, and Teacher Reports on Intellectual and Academic Competence Indices

There were many significant correlations between child, parent, and teacher reports of academic functioning. Concerning standardized child measures, the Canada-QUIET composite score was significantly correlated with the Stanford-Binet composite score for the RO ($r = .80, p < .001$), CB ($r = .65, p < .001$), and EA ($r = .66, p < .01$) groups. The Canada-QUIET was significantly and positively correlated with the child self-report measure of school performance in the CB group ($r = .39, p < .05$) but not in the RO or EA groups. The Stanford-Binet was not significantly correlated with the child measure for any of the three groups.

In the RO group significant correlations emerged between the composite score on the Stanford-Binet and the parent measure of overall performance ($r = .66, p < .0001$) as well as between the Canada-QUIET and parent measure ($r = .73, p < .0001$). Many of the subscales on the Canada-QUIET and Stanford-Binet were also significantly correlated with the parent measure subscales (see Table 6). There were significant correlations in the CB group between the Stanford-Binet and parent measure of overall performance ($r = .59, p < .001$) as well as the Canada-QUIET and parent measure ($r = .58, p < .001$) and many subscales. EA children's performance on Canada-QUIET spelling was significantly correlated with the overall parent measure ($r = .43, p < .05$). There were fewer subscale correlations in the EA group. Results for the CB and EA groups are depicted in Appendix N.

In the RO group there was a significant correlation between the Stanford-Binet and the teacher measure of overall school performance ($r = .71, p < .0001$), as well as

between the Canada-QUIET and teacher measure ($r = .83, p < .0001$). Results are reported in Table 7. In the CB group the Canada-QUIET was significantly related to the teacher measure ($r = .41, p < .01$), however the Stanford-Binet was not. In the EA group, the Stanford-Binet was significantly correlated to the teacher measure ($r = .73, p < .0001$) but the Canada-QUIET was not significantly related (see Appendix O).

The child self-report measure of school performance was related to the parent ($r = .45, p < .01$) and teacher measure of school performance ($r = .43, p < .01$) only in the CB group.

The parent measure of overall performance was significantly correlated with the teacher measure of overall performance for the RO ($r = .75, p < .0001$) (see Table 8) and CB groups ($r = .72, p < .0001$), but not for the EA group (refer to Appendix P).

In general, these correlational results indicate that there was substantial concurrence across informants regarding the intellectual and academic performance of the Romanian orphanage children. Overall, there were a greater number of significant correlations within the RO group compared to the CB and EA groups.

Stability Correlations

Correlations were computed between intelligence scores at Phase 2 and Phase 3 to determine if scores were stable over time.

Stability of Intelligence

The correlation between RO intelligence composite scores at Phase 2 and Phase 3 was significant ($r = .90, p < .0001$) indicating that intelligence scores were stable over time. Significant stability correlations were also obtained in the CB ($r = .70, p < .0001$) and EA ($r = .87, p < .0001$) groups. In addition, a one-way ANOVA was computed on

IQ difference scores (i.e. scores obtained by subtracting Phase 2 Total IQ scores from Phase 3 Total IQ scores) in order to determine if IQ scores in all three groups had fluctuated between age 4.5 and age 10.5. Differences did not reach statistical significance ($F [2, 82] = .51, p = .60$), further indicating that IQ scores have remained relatively stable over time.

Group Differences

A central objective of the present study was to determine if and how the RO children differed from the CB and EA children in terms of intellectual and academic development. To address my hypothesis that on average the RO children would show lower intellectual and academic performance than their comparison groups, one-way analyses of variance (ANOVA) were computed to assess differences among the groups. Means, standard deviations, and results from one-way ANOVAs for measures related to current intellectual and academic functioning are found in Table 9.

Group Differences on the Stanford-Binet

Significant differences were found among the groups on Total IQ ($F (2, 94) = 29.58, p < .0001$) and all Stanford-Binet subscale scores. On Total IQ, RO children tended to score in the Low Average range ($M = 84.47; SD = 13.68$). The mean score for CB children was in the high end of the Average range ($M = 107.95; SD = 11.76$), and the EA children scored in the middle of the Average range ($M = 97.26; SD = 14.23$). On further examination of individual scores, it was apparent that 4 (13%) of the RO children's IQ's were within the 'mental retardation' range (< 67), and 7 (22%) children scored in the 'slow learner' range (between 68 and 78). In the CB group 1 (2%) child scored in the 'slow learner' range and no children were in the mental retardation range.

Of the EA children, 2 (9%) scored in the ‘mental retardation’ range, and none were in the ‘slow learner’ range. On a more positive note, there were 2 (6%) Romanian orphanage children with scores in the High Average range, at 115 and 116, respectively. A breakdown of Stanford-Binet scores by ranges is found in Table 10.

Group Differences on the Canada-QUIET

Significant differences between groups were found on the composite score and the four subscales of the Canada QUIET: composite ($F [2, 93] = 12.19, p < .001$), spelling ($F [2, 93] = 6.75, p < .01$); arithmetic ($F [2, 93] = 9.75, p < .001$); word identification ($F [2, 93] = 10.83, p < .001$); and passage comprehension ($F [2, 93] = 10.61, p < .001$). Tukey-b post-hoc comparison tests revealed that RO and EA children scored lower than CB children on the composite score and all subscales. Although RO children scored lower than EA children on all subscales, the differences did not reach statistical significance.

Group Differences on Child Self-Reports

Significant differences were revealed between the three groups on the child measure of school performance ($F (2, 92) = 3.61, p < .05$). Tukey-b post-hoc tests showed that on child performance the RO group was significantly different from the EA group, but not from the CB group. The CB and EA groups also did not significantly differ. The RO children scored the lowest on the measure and the EA children scored the highest. Group differences on other child self-report measures were statistically significant: how much the child likes school ($F [2, 94] = 3.24, p < .05$), and whether parents’ encourage the child to do well at school ($F [2, 94] = 3.79, p < .05$). Post-hoc tests revealed that the RO children significantly differed from the EA children on both measures. On the ‘like

school' measure, the RO children did not significantly differ from the CB children. Interestingly, the EA children reported liking school the most, followed by the CB children. The RO group liked school the least. On the 'parent encouragement' measure, RO children did not significantly differ from CB children, nor did CB children differ from EA children. RO children reported receiving the most encouragement from parents, followed by the CB group. EA children reported the least amount of parent encouragement (see Table 11).

Group Differences on Parent Reports of Academic Performance

With regard to parent reports of academic achievement, results revealed significant differences among the groups on overall performance ($F [2,94] = 13.9, p < .0001$) and all subscales as follows: performance in reading ($F [2,96] = 15.6, p < .0001$), math ($F [2,96] = 15.1, p < .0001$), written work and composition ($F [2,96] = 13.3, p < .0001$), and science ($F [2,90] = 22.2, p < .0001$). Tukey-b post hoc comparisons revealed significant differences between RO and CB children on all scales. EA and CB children also significantly differed on all parent scales. RO and EA children did not significantly differ on any of the scales. Generally, RO children scored the lowest, CB children scored highest, and EA children scored in the middle on the parent report of academic performance (see Table 12).

The relatively poor academic performance of the RO children was despite the fact that, according to parents, 26% of the RO children had repeated at least one grade in school. In comparison, not one of the CB children was reported to have repeated a grade and only 1 EA child had repeated a grade. There was variation in the specific grades that were repeated. A breakdown of these is reported in Table 13.

There were also significant differences between groups on ‘special resource help’ ($F [2,96] = 14.43, p < .0001$). RO children received more special resource help in school (i.e. learning assistance) than their CB and EA counterparts. There were also significant differences in terms of the importance to parents of good grades ($F [2,95] = 3.84, p < .05$). Generally speaking, RO parents were least concerned with grades, EA parents scored in the middle, and CB parents were most concerned with grades, although post-hoc tests revealed significant differences only between the RO and CB groups. In terms of level of schooling hoped for by parents, significant differences emerged between groups ($F [2,86] = 9.05, p < .0001$). The RO parents had significantly lower expectations for their children than both CB and EA parents. CB and EA parents did not significantly differ. There were no differences between groups on the indices of ‘parent satisfaction with schooling quality’ and ‘parent satisfaction with school ability to meet child needs’ (see Table 14).

Group Differences on Teacher Reports of Academic Performance

Differences between groups were statistically significant on four subscales of the teacher report of academic achievement as follows: child’s achievement in reading ($F [2, 92] = 11.63, p < .001$); math ($F [2, 92] = 7.69, p < .01$); written work ($F [2, 92] = 5.66, p < .01$); and overall achievement ($F [2, 91] = 6.99, p < .01$). Tukey-b post-hoc tests showed that RO children scored significantly lower than CB children on all four subscales. RO children did not significantly differ from EA children on any subscales. EA children scored significantly lower than CB children on the reading subscale only (see Table 15).

Correlations with Demographic Variables

Table 16 shows several significant relationships between demographic variables and intellectual and academic performance. In the RO group there were significant correlations between father's age and the following measures: Canada-QUIET spelling ($r = .39, p < .05$), Canada-QUIET word identification ($r = .39, p < .05$), Canada-QUIET passage comprehension ($r = .52, p < .01$), and Parent overall ($r = .39, p < .05$). Higher age of fathers corresponded to higher intellectual and academic performance on the preceding measures. Mother's age was correlated with the Canada-QUIET arithmetic scale ($r = .36, p < .05$) such that higher ages were related to higher arithmetic performance.

In the CB group, father's education was correlated with the Stanford-Binet Quantitative Reasoning score ($r = .34, p < .05$) and mother's education was related to achievement on Canada-QUIET spelling ($r = .32, p < .05$). In addition, gross annual family income was related to Total IQ ($r = .33, p < .05$). In the EA group, mother's age was correlated with the Stanford-Binet Abstract/Visual score ($r = .56, p < .01$) (See Appendix Q).

Predictive Analyses

Correlations were computed to address several hypotheses related to the predictive value of Phase 1 and Phase 2 measures in explaining the current intellectual and academic performance of the Romanian orphanage children. Correlational analyses were run to test the hypothesis that time in institution would be significantly related to current intellectual and academic performance with longer institutional stay linked to poorer performance. Correlations were also conducted to investigate the hypothesis that developmental delay at 11 months post adoption would be predictive of current

intellectual and academic development, whereby more delays would be associated with lower IQ and poorer academic performance. Further correlations were computed to test the hypothesis that school readiness at age 4 ½ would be predictive of intellectual and academic performance at age 10 ½ such that higher school readiness scores would correspond to higher intellectual and academic competence. In addition, correlational analyses were computed to test the hypothesis that stimulation in the home at Phase 2 would be predictive of intellectual and academic development at Phase 3 with greater stimulation in the home associated with higher cognitive scores.

Predictive Correlations

Time in Institution

In the RO group, length of institutional stay was significantly related to both intellectual and academic performance, with more extensive time in orphanage related to lower scores on Total IQ ($r = -.46$, $p < .01$), and most Stanford-Binet subscales (shown in Table 17), as well as lower performance in arithmetic ($r = -.37$, $p < .05$) as measured by the Canada-QUIET. The parent, teacher and child measures of school performance were not significantly correlated with time in institution.

Developmental Delay

RO children's scores on the Denver Prescreening Questionnaire (measured at 11 months post-adoption) were significantly and negatively related to their scores on the Canada-QUIET arithmetic scale ($r = -.46$, $p < .05$), Parent overall ($r = -.39$, $p < .05$), and parent report of performance in Physical Education ($r = -.42$, $p < .05$) but not to the Stanford-Binet or Canada-QUIET composite scores, child report or teacher report.

School Readiness

As displayed in Table 18, the Bracken School Readiness Composite was significantly related to RO children's scores on Total IQ ($r = .74, p < .001$), most Stanford-Binet subscales, the Canada-QUIET composite score ($r = .76, p < .001$) and all Canada-QUIET subscales, and the teacher ($r = .60, p < .01$) and parent ($r = .55, p < .01$) measures of overall performance. CB children's BSRC scores were only significantly positively related to the composite score ($r = .39, p < .05$) and spelling subscale ($r = .45, p < .05$) of the Canada-QUIET. There was a significant positive correlation between school readiness and Canada-QUIET passage comprehension for the EA children (see Appendix R).

Stimulation in the Home

As shown in Table 18, for the RO children total stimulation in the home at age 4 ½ was significantly correlated to Total IQ at age 10 ½ ($r = .67, p < .0001$), performance on all Stanford-Binet factor scales, the Canada-QUIET composite score ($r = .52, p < .01$) and all Canada-QUIET subscales, and the overall parent measure ($r = .52, p < .01$) and teacher measure ($r = .44, p < .05$). For the RO children, the academic stimulation subscale of the HOME inventory was significantly and positively related to several intellectual and academic performance measures including: Stanford-Binet Abstract/Visual score, and the Canada-QUIET spelling, arithmetic, passage comprehension and composite scores. Significant correlations ranged from .44 to .57.

For the CB children, the total HOME score was related to Total IQ ($r = .42, p < .05$) and the parent measure ($r = .48, p < .01$). Interestingly, there were no significant relations between the HOME and the Canada-QUIET. However, academic stimulation

was significantly and positively related to the following measures: Stanford-Binet Abstract/Visual score, Canada-QUIET spelling, arithmetic, passage comprehension and composite score, and parent overall performance. Correlations ranged between .41 and .56. EA children's total HOME scores were significantly related to the Stanford-Binet Abstract/Visual score, and Canada-QUIET passage comprehension (see Appendix R). There were no significant relations between academic stimulation and the child self-report for the EA children.

Regression Analyses

In order to determine the relative importance of Phase 1 and 2 variables as predictors of Phase 3 intelligence and achievement, two multiple regression analyses were conducted. The analyses were performed in the RO group only because one of the predictor variables, time in institution, was not relevant to CB or EA children.

Three predictor variables were chosen from Phases 1 and 2: time in institution, home stimulation, and school readiness. All of these variables were significantly correlated with the IQ composite scores at Phase 3. Total stimulation in the home and school readiness were also significantly related to the Canada-QUIET composite score of academic achievement. Developmental delay at Phase 1 was not included as a predictor because it was not significantly related to Total IQ or Total achievement.

The first regression analysis included Total IQ as an outcome and time in institution, total home stimulation, and school readiness as predictors. The order of entry of predictor variables into the regression equation was based on the following reasoning. Time in institution was entered first because it constituted the Romanian orphans earliest experiences. Secondly, home stimulation was entered because it occurred after the

children were adopted. The final predictor entered was school readiness because it was decided that after children receive home stimulation (including academic stimulation) they would likely be better equipped to begin school; this would theoretically be reflected in their school readiness scores.

The second regression analysis included Total achievement (i.e. composite score on the Canada-QUIET) as an outcome and home stimulation and school readiness as predictors. These predictor variables were entered in the same order described above. The results of the regression analyses are depicted in Table 19.

In the first regression analysis, time in institution was significantly related to Total IQ, (R^2 change = .26, F change = 6.65, $p < .02$). Home stimulation did not make a significant contribution to the prediction of Total IQ beyond that predicted by time in institution, however it was approaching significance, and would likely have reached significance with a larger sample size. School readiness contributed to the prediction of IQ beyond the contribution of time in institution and home stimulation, (R^2 change = .20, F change = 8.16, $p < .02$) and accounted for a further 20 percent of the variance in the outcome. Together, all three variables accounted for 58 percent of the variance.

In the second regression analysis, home stimulation predicted Total achievement (R^2 change = .26, F change = 6.69, $p < .02$). School readiness further contributed to the prediction of Total achievement (R^2 change = .32, F change = 13.82, $p < .01$) accounting for a further 32 percent of the variance. The total amount of variance accounted for by the model was 58 percent.

Academic Self-Perceptions

Significant differences emerged between groups on academic self-concept ($F [2, 93] = 5.42, p < .01$). Tukey-b post-hoc tests showed that on academic self-concept the RO group was significantly different from the EA group, but not from the CB group. The CB and EA groups also did not significantly differ. The EA children had the highest academic self-perceptions of all 3 groups.

In the RO group, there were several significant correlations between academic self-concept and the following intellectual and achievement measures: Stanford-Binet Quantitative Reasoning ($r = .36, p < .05$), Canada-Quiet composite score ($r = .37, p < .05$), overall parent measure of school performance ($r = .50, p < .01$) and overall teacher measure of school performance ($r = .42, p < .05$). There were also significant positive correlations between academic self-concept and the child measure of school performance ($r = .40, p < .05$), as well academic self-perceptions and the child's report of how much he/she 'likes school' ($r = .77, p < .0001$) and 'likes math' ($r = .40, p < .05$; see Table 20).

In the CB group academic self-concept was significantly related to the overall parent measure ($r = .54, p < .0001$), overall teacher measure ($r = .39, p < .05$), overall child measure ($r = .41, p < .01$), child 'like school' measure ($r = .76, p < .0001$), and child 'does homework' measure ($r = .35, p < .05$; see Appendix S).

In the EA group there was only one significant correlation between academic self-concept and the child 'like school' measure ($r = .58, p < .01$).

DISCUSSION

The purpose of the present longitudinal study was to investigate the intellectual and academic development of a group of early-deprived children adopted from Romanian

orphanages into Canadian homes. The performance of the 10 ½ year old Romanian orphanage (RO) children was compared to two other groups of children: a sample of Canadian born (CB) never-institutionalized children and a group of Early-adopted (EA) Romanian children who were adopted prior to four months of age. My research was aimed at investigating the effects of institutional rearing on intellectual and academic development, the predictors of intellectual and academic progress post-adoption, and the academic self-perceptions of the RO children.

Many comparisons among the three groups of children were conducted in this study, thus it was of key importance to first evaluate the equality of the RO, CB, and EA groups on a variety of demographic indices. At the commencement of this longitudinal study approximately 10 years ago, children in the CB and EA groups were individually matched to the RO children for age, sex, parents' education and ages, as well as family income. This matching procedure was completed in order to ensure a control for socio-demographic differences between the groups that may have contributed to disparities in developmental outcomes among them. At this stage of the research the RO, CB, and EA groups were found to continue to be comparable in terms of parent's education, marital status, and family income, increasing the possibility that differences among them were not related to demographic factors. In addition, sex differences among groups on all intellectual and academic measures were examined. The few differences that emerged were limited to subscale scores, and were likely just a peculiarity of the sample rather than being indicative of true gender differences.

Preliminary analyses assessing correlations among the measures both within and between child, parent, and teacher reports were found to support the validity of the

measures used to examine the intellectual and academic performance of the RO children. In general, there was consistent agreement among measures completed by the same informants (child, parent, or teacher) as well as between sources.

In the RO group, scores on the Stanford-Binet and Canada-QUIET child reports were generally significantly correlated with parent and teacher measures of academic performance. A similar trend was revealed in the CB and EA groups, with slightly fewer significant correlations. There were also mainly significant relations between parent and teacher measures for all three groups with the exception of the EA group.

Interestingly, the child self-report of school performance was not significantly related to the Canada-QUIET (for the RO and EA groups), or the Stanford-Binet for all three groups. The child self-report was only significantly related to the parent and teacher measure of overall performance for the CB children. It appears that the RO and EA children's subjective interpretation of their academic ability is not consistent with standardized intelligence and academic achievement measures as well as with parent and teacher performance appraisals. This may be due to factors such as parent and teacher encouragement or children's academic self-concept. These potential influences will be discussed later.

Stability correlations between intelligence scores from Phase 2 to Phase 3 indicated that intelligence (as measured by the Stanford-Binet Intelligence Scale) has remained stable over time for the RO, CB, and EA groups. In other words, the children's IQ scores did not fluctuate to a significant degree between age 4 ½ and age 10 ½. This is a positive finding for the children with average or above average IQ's and a negative result for the children who were falling behind their counterparts at age 4 ½.

Effects of Institutional Rearing on Intellectual and Academic Development

On average, the Romanian orphanage children had lower Total IQs than the Canadian born and Early-adopted children. Generally, the CB children scored in the high average range, the EA children scored in the average range, and the RO children scored in the low average range. The differences were consistent across intelligence subscales. According to these findings, it appears that the Romanian orphans, as a group, have not made gains in IQ from age 4 ½ to age 10 ½, despite approximately six more years in their adoptive homes. This is not a surprising finding since IQ is generally considered relatively stable over time. Locurto (1990) argues that there are limits to the extent to which even the most significant environmental changes can affect IQ. He cites four of the most prominent adoption studies of contrasted environments in which the adopted child's biological parents are clearly more socio-economically disadvantaged than the adoptive family, and there is virtually no evidence of IQ malleability. However, it is important to note that there was a fair amount of individual variation in IQ scores within the Romanian orphanage group. Of particular concern was the finding that 35% of the RO children scored in either the 'mental retardation' or 'slow learner' ranges. There were far fewer CB (2%) and EA (9%) children scoring in these clinically significant ranges. On a more positive note, 2 of the RO children had IQs in the high average range (115 and 116), scoring approximately 30 points higher than the average for their group. It would be fascinating to conduct case studies on these 2 children to gain some more insight regarding the potential psychosocial and familial factors contributing to their resiliency.

The Canada-QUIET achievement results were consistent with the intelligence findings. RO children scored significantly lower than CB children on all Canada-QUIET subscales including: spelling, arithmetic, word identification, and passage comprehension. Although the Romanian orphanage children scored lower than the Early-adopted children on all the Canada-QUIET subscales, these differences did not reach statistical significance.

The child self-report provided a unique insight into how the RO children felt they were doing in school. This is the first time we have collected data concerning the children's subjective interpretations of their performance since they were too young for self-report in earlier phases of this longitudinal study. Interestingly, the RO and CB children did not differ on their opinions of how they were doing in school, however both groups scored lower than the EA children. Early-adopted children were the most positive about their academic performance, and also reported liking school to a greater extent than the Romanian orphans and Canadian born children. RO children's scores did not significantly differ from CB children's scores on the school performance or 'like school' measure. Although we might speculate that higher levels of parental encouragement accounted for the EA children's beliefs about their school performance, this was not the case. RO children reported more parent encouragement than CB and EA children. CB and EA children did not significantly differ on levels of parent encouragement. Given that RO children perceive a lot of parent encouragement, they are probably receiving much praise for what they are able to achieve, and therefore feel they are doing just as well in school and like school as much as other children their age. A positive indication of the commitment of parents in this study is that the children who seemed to be having

the most trouble in school were generally receiving high levels of parental encouragement.

The parent report provided a further dimension to the assessment of the RO children's academic performance. RO parents reported lower scores than CB parents on their children's overall school performance and performance in all subject areas. The RO and EA groups did not significantly differ on any of the parent scales, however CB and EA children differed on all scales. In addition, parents reported on the incidence of grade retention for their children. Slightly more than one-quarter of the RO group had repeated a grade, whereas only one EA child and no CB children had been held back. Counter to Flint's (1978) findings that many of the children spent an extra year in kindergarten or grade 1 there was a fair amount of variation in the grades that the RO children repeated, ranging from kindergarten to grade 4. Perhaps academic difficulties for some of the children did not become apparent until the middle primary years when teachers noticed the children were falling behind their classmates on basic concepts of reading and mathematics. At this point it does not appear that grade retention has exerted an ameliorative influence that has allowed the children to fully 'catch up' to their counterparts. However it is possible that being held back in school may have benefited the children in other developmental areas (e.g., socially).

The Romanian orphanage children received more special resource help than both the Canadian born and Early-adopted children, a further indication that the post-institutionalized children were experiencing more academic difficulties. However, there is a positive aspect to this finding; it is encouraging to know that the RO children were receiving the special help they needed within their schools. This will hopefully serve to

leverage them academically as they move toward high school. Significant differences were also evident on the parent report of importance of good grades and level of schooling they hoped their children would attain. Again, RO parents had lower expectations than CB parents. On the level of schooling hoped for measure RO parents also reported lower expectations than EA parents. CB and EA parents did not differ on this measure. There were no differences between groups on parent satisfaction with schooling quality or the school's ability to meet the child's needs. Thus, it appears that the parents of Early-adopted children had higher expectations than RO parents of their child's school ability, regardless of the quality of schooling. This may be because the EA parents, as a group, are slightly older and more educated than RO parents. Many of the EA parents were likely aware that adopting a young infant rather than a toddler or child would minimize the chance of subsequent problems, and therefore these parents made every effort to adopt as young a child as possible, and anticipated few academic challenges. Also, due to their higher educational attainment, EA parents may expect their children to 'live up to their own standards', and perform 'on par' with CB children their age.

Teacher reports of academic performance were similar to parent reports in that RO children scored lower than CB children on all scales including: reading, math, written work, and overall achievement. RO children did not differ from EA children on the teacher report nor did CB children differ from EA children, with the exception of the EA group scoring lower on reading.

The aforementioned school achievement results are similar to findings by Andresen (1992), Goodman & Kim (2000), and Hodges & Tizard (1989) who all found

evidence of academic difficulties in post-institutionalized children. Akin to Andresen's observation, the Romanian orphanage children generally exhibited lower scores than their counterparts on all mathematics measures. However, unlike Andresen's findings, the RO children's academic challenges were not strictly limited to arithmetic. Struggles with reading, writing, spelling, and comprehension were just as apparent.

On the majority of intellectual and academic performance measures, the Early-adopted children consistently scored between the Romanian orphanage and Canadian born children. At Phase 2, Morison (1997) reported a similar trend in the EA children's cognitive scores, and postulated that the pre- and perinatal backgrounds and environments of these children had an influence on their cognitive performance. It seems that such early influences may now be impacting on the EA children's school performance, generally resulting in lower achievement than their CB counterparts.

Analyses of group differences on intellectual and academic measures supported the hypothesis that the Romanian orphanage children would display lower intellectual and academic performance than their comparison groups. This was evident in the standardized child IQ and achievement measures, as well as in parent and teacher reports. Only the child-self report was counter to this trend, and as discussed earlier, this may be related to unconditional positive encouragement from parents.

These Phase 3 findings are similar to results from previous phases of this longitudinal study. At Phase 1, when the children had been in their adoptive homes for approximately 11 months, over half the Romanian orphanage children were performing in the borderline range in the areas of gross-motor, adaptive, personal-social, and language development. At Phase 2, when most of the orphanage children were 4 ½ years

of age, RO children had lower IQs than their counterparts. Most of them scored in the low end of the average range, however this was a marked cognitive improvement over their Phase 1 results. Now at Phase 3 the majority of Romanian orphanage children are still scoring in the low average range on IQ, and exhibiting more academic challenges than the CB and EA children. However, the positive self-report of the RO children's school performance is indicative of the positive aspects of several more years in adoptive homes. Further study of the RO children in high school and adulthood may reveal a similar pattern to Goodman and Kim's (2000) research participants. These researchers found that postinstitutionalized Indian children's intellectual challenges were most evident in elementary school, and that they had progressively fewer problems in high school and college/university. Findings such as these provide hope for the academic future of the Romanian orphanage children.

As hypothesized, several family demographic variables were related to intellectual and academic performance. However, within the RO group only mothers' and father's ages were positively related to intellectual and academic measures. In the CB group, mothers' and father's education and family income related to some of the intellectual and academic measures. However, in the EA group mother's age was only related to one IQ subscale score. These findings contrast with results from Phase 2, when socioeconomic status related to cognitive scores. Perhaps the influence of being at school among teachers and same age peers (where the children are treated relatively equally and have access to the same classroom resources) has made a difference in the RO and EA children's lives, such that their socioeconomic status no longer exerts as much influence on their intellectual and academic performance.

It is interesting that within the RO group, parent's ages (rather than education or income) was linked to intellectual and academic measures. Perhaps older parents possess greater maturity and life experience that enables them to make a significant contribution to their child's learning, regardless of the intellectual and academic setbacks faced by many of the Romanian orphans.

Predictors of Intellectual and Academic Development Post-Adoption

Consistent with other researchers (O'Connor et al, 2000; Provence & Lipton, 1962) the amount of time RO children spent in orphanage was related to Total IQ, several intelligence subscale scores, the Canada-QUIET arithmetic scale and the overall parent measure of school performance. However, the present study does not support Dennis' contention that children adopted prior to 2 years of age will function relatively well in the cognitive domain, whereas those children adopted after age 2 may never fully 'recover' from their deficits. There were no abrupt intellectual and academic differences between children adopted before or after 2 years of age. Rather, a linear relationship was evident, whereby the more time spent in orphanage related with more serious intellectual challenges (i.e. lower IQs). There were a couple of exceptions to this relationship; as noted earlier, there were 2 Romanian orphanage children that performed as well as the CB children and better than the majority of EA children despite the early deprivation experience. However, in general this thesis supports the commonly held belief among developmental psychologists that it is very important to adopt institutionalized children as young as possible to increase their chances of developing in cognitively healthy ways.

My hypothesis that developmental delay at 11 months post-adoption would be negatively related to intellectual and academic performance received partial support. One

subscale on the Canada-QUIET and the overall parent report negatively related to developmental delay. In addition, the parent report of performance in physical education was negatively correlated with developmental delay. Therefore, it seems that the fine motor and gross motor delays reported by parents at Phase 1 are still exerting an influence on children's physical abilities at age 10 ½. Surprisingly however, developmental delays reported at 11 months post-adoption in the RO group did not relate to IQ at age 10 ½. This is in sharp contrast to Morison's (1997) findings when the children were age 4 ½; developmental delays at Phase 1 were significantly predictive of IQ at Phase 2. That this is no longer the case may indicate that an additional 6 years in adoptive homes has been highly beneficial for the children in overcoming early setbacks. In other words, positive intervening experiences of the children (both at home and at school) have likely made significant contributions in the children's cognitive development, such that their early developmental delays are no longer predictive of their intellectual performance.

In order to assess the relative effects of Phase 1 and Phase 2 measures on Phase 3 outcomes, two regression analyses were conducted. Only the RO group was used in the analysis because one of the variables, time in institution, was not relevant to the CB and EA children. Regressions were run on two important outcome variables: total IQ (measured by the Stanford-Binet) and total achievement (measured by the Canada-QUIET).

In the first analysis three predictor variables were examined from Phases 1 and 2 (time in institution, home stimulation, and school readiness) with total IQ as the outcome. In the second analysis home stimulation and school readiness were predictors and total

achievement was the outcome. Time in institution was not included in the second analysis because it did not significantly relate to total achievement. Developmental delay was not examined as a predictor because it did not significantly correlate with either of the outcome variables.

The predictor variables were entered in the regression analyses based on when each of these occurred chronologically in the children's lives. Time spent in institutions constituted the children's earliest experiences and therefore it was deemed to be appropriate to enter it first in the analyses. After the children were adopted, parents provided stimulation in the home, so this variable was entered next. School readiness was entered last because it was thought that after children receive stimulation in the home, they would likely be more ready to begin school.

As mentioned earlier, time in institution was predictive of intellectual functioning at Phase 2 and continues to be relevant when looking at intellectual functioning in Phase 3. In general, the Romanian children with longer stays in orphanage had lower IQ's and lower arithmetic achievement than children with shorter institutional stays. Time in institution was not related to academic achievement in any other subjects. This finding is hopeful and demonstrates that success in school may not be as strongly linked to early experiences as intelligence, and thus has the potential for greater malleability. On the other hand, it is possible that this finding is related to the fact that scores on the Stanford-Binet are age referenced whereas scores on the Canada-QUIET are grade referenced. Since many of the RO children repeated a grade, their achievement scores may not be reflective of their grade-adjusted performance. If their scores were considered in relation

to the grade they would be in if they had not been retained, time in institution might be negatively correlated with achievement.

Stimulation in the home was not related to IQ (although it was approaching significance), but it was related to academic achievement in the Romanian orphanage group, therefore my hypothesis received partial support. Higher home stimulation scores corresponded to higher achievement scores. This finding is consistent with earlier research by Iverson and Walberg (1982) and Bradley et al. (1986) who found that stimulation in the home predicted academic achievement. It is encouraging to know that parents truly can make a difference in their children's academic performance. Thus, it is important that regardless of their children's early cognitive setbacks, adoptive parents should be encouraged to provide a lot of stimulation in the home.

As hypothesized, school readiness was related to both IQ and achievement in the RO group. Higher school readiness scores were related to higher IQs and academic achievement scores. This finding provides additional support for the validity and usefulness of the Bracken Basic Concept School Readiness Composite, as well as is consistent with earlier research by Sterner and McCallum (1988).

In the Canadian born group, fewer relations were evident between Phase 2 predictors and total IQ or total achievement. However, home stimulation did correlate positively with IQ and school readiness positively correlated with achievement. In the Early-adopted group, no significant relations existed. It is interesting that stimulation in the home predicts academic achievement only in the Romanian orphanage group. This may be due to the fact that the RO children had the most cognitive setbacks early in life therefore any developmentally stimulating experiences thereafter (including home

stimulation) make a significant contribution to their school success. On the other hand, the CB and EA children had more fortunate early experiences, and therefore have less (if any) developmental 'catching up' to do. It seems that stimulation in the home, although very beneficial for them, does not make a crucial difference to their success in school.

Children's Academic Self-perceptions

The Romanian orphanage children did not significantly differ from the Canadian born children on academic self-concept. This is another indication of the compensatory effects of adoptive homes. As mentioned earlier, adoptive parents likely provide support and positive encouragement to their children regardless of grades attained, thus exerting an influence on children's perceptions of academic abilities. The EA children scored significantly higher than the RO children, in fact, the EA group had the highest academic self-perceptions of all 3 groups (although they did not significantly differ from the CB children). This finding is consistent with the EA children's positive self-report of school performance discussed earlier. Therefore, my hypothesis that the RO group would exhibit lower academic self-perceptions than their counterparts received only partial support.

With the exception of the Stanford-Binet quantitative subscale score, there were no significant relations between the RO children's academic self-perceptions and IQ. However, similar to other researchers (Anderman et al., 1999; Chapman et al., 2000; Gose et al., 1980), I found that the RO children's academic self-concepts did relate to achievement on the Canada-QUIET, the child, parent, and teacher measures of performance, and the child 'like school'; and 'like math' measures. Similar relations existed in the CB group with the exception of no relationship between academic self-

concept and Canada-QUIET achievement. In the Early-adopted group, academic self-concept related only to the child 'like school' report.

It would be interesting to conduct further research to determine how the Romanian orphanage children compare to their counterparts on 'content-specific' academic self-concept, as discussed by Gose et al (1980). I also wonder if the RO children's positive perceptions of their abilities will continue in high school and serve to help them in their studies? Will their positive self-perceptions protect them from school dropout? Conversely, it is also possible that the RO children may experience a 'reality check' as they mature and compare their school performance with their peers on more difficult subject matter, with lower self-concept ensuing. An assessment of academic self-concept and intellectual and academic performance in adolescence may yield such important insights.

Contributions of the Present Study and Suggestions for Future Research

The findings of the current study demonstrate that as a group the Romanian orphans continue to have intellectual difficulties, and now that they are in school, they are having more academic problems than the Canadian born and Early-adopted children. However, the RO children's academic self-perceptions leave room for optimism. In fact, the Romanian orphans feel as positively about their school performance and like school as much as their Canadian born counterparts. It is hoped that their positive self-perceptions will help them as they enter high school.

Unfortunately, there is the potential for these children to be 'at risk' for continued academic challenges and possible dropout in high school. As they progress into higher grades they will face heavier workloads, more abstract and conceptual assignments, and a

faster paced curriculum. Their positive academic self-perceptions may suffer amid an adolescent culture focused on peer comparisons and approval. Therefore, it is absolutely essential that parents, teachers, and counsellors who have played a pivotal role in supporting these children thus far, continue to intervene in accommodating ways. Given the presence of individual variability among the Romanian orphans, it is pertinent that interventions are designed with the children's individual needs in mind.

School interventions may include one-on-one support in the classroom with teacher aids or other educational assistants. The expertise of a school psychologist could be enlisted to conduct psychoeducational assessments in order to identify children's specific areas of weakness; individualized educational plans could subsequently be developed for the children. There may be need for special exam accommodations for students with particular challenges. In addition, outside classroom help may include continued special resource centre visits or tutoring from learning specialists in specific subject areas.

Parent assistance could include continued praise and encouragement of the children's performance and celebration of their academic successes, big or small. In addition, continuing to stimulate the child in the home with growth fostering materials and resources will likely serve to leverage them academically. It is critically important that parents also continue to advocate for the much needed resources for their children.

Counsellors can provide a positive support to these children as they mature and potentially come to terms with the reality of their school challenges. In an effort to continue to foster the learning enthusiasm of the children, counsellors can help identify the individual needs of each child, and work collaboratively with children, parents, and

teachers on a plan of action. Counsellors can provide emotional support to the children through empathic and non-judgmental listening. Other interventions may include helping the child enhance time management and organizational skills to manage school deadlines, exams, and workload in an effective manner.

Although it has been difficult for the RO parents to respond to the many unexpected intellectual and academic challenges faced by their children, three quarters of adoptive parents reported that they would be 'very likely' or 'extremely likely' to repeat the experience (Le Mare & Kurytnik, 2002). This is positive news for parents contemplating international adoption. However, it is essential that prospective adoptive parents of early-deprived children be educated about the potential intellectual and academic difficulties their children may face so that they can be as prepared as possible, financially and emotionally.

There are many directions for further research on the intellectual and academic lives of post-institutionalized Romanian children, however first a limitation of the current study must be addressed. An obvious problem was the small sample size among the RO and EA children. The numbers were higher in previous phases of this longitudinal study but attrition has reduced the sample, as mentioned earlier. This is a concern for future phases of this study unless new participants are located. In preparation for a fourth phase of the Romanian Adoption Project, researchers should work hard to seek out new Romanian adoptees and their families in British Columbia and across Canada.

Future research should include an extended interview with children as they enter their high school years because they will be older and likely better able to articulate their feelings about their intellectual and academic experiences. Additional factors that may

be exerting an influence on the Romanian orphanage children's intellectual and academic performance should also be examined. Such variables could include: attention, behaviour, peer relationships, attachment, and parenting stress. In addition, extensive case studies of the RO children who exhibited high intellectual and academic performance may yield important insights regarding the beneficial factors contributing to their resiliency.

In conclusion, it is evident that the Romanian orphans have more intellectual and academic challenges than the Canadian born and Early-adopted children. These children will continue to need academic and socio-emotional supports in place as they mature and face new challenges throughout their secondary and post-secondary educations. However, it is encouraging to see the diminishing role of early developmental delays and the increasing role of intervening experience. It appears that the home environment does have an impact particularly on academic achievement therefore nurturing adoptive families can play a significant role in fostering the children's school achievement and subsequent life success.

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APPENDICES

APPENDIX A*

SIMON FRASER UNIVERSITY

OFFICE OF RESEARCH ETHICS

BURNABY, BRITISH COLUMBIA
CANADA V5A 1S6
Telephone: 604-291-3447
FAX: 604-268-6785

July 10, 2003

Ms. Karen Kurytnik
Graduate Student
Faculty of Education
Simon Fraser University

Dear Ms. Kurytnik:

**Re: A Longitudinal Study of the Intellectual and Academic
Development of Children Adopted from Romanian Orphanages**

The above-titled ethics application has been granted approval by the Simon Fraser Research Ethics Board, in accordance with Policy R 20.01, "Ethics Review of Research Involving Human Subjects".

Sincerely,

Dr. Hal Weinberg, Director
Office of Research Ethics

Appendix B:

Introductory Letter to Parents

December 1, 1998

Dear parents of children in the Romanian Adoption Study:

In September you received a letter from Dr. Elinor Ames letting you know that she has retired and that I, Dr. Lucy Le Mare, will now be directing the Romanian Adoption Study. I am honored to be part of such an important project and to have the opportunity to work with you and your children. I have recently been granted funding from the Hospital for Sick Children Foundation to conduct a "Time 3" visit with you and I am writing to request your continued participation in the Study.

We plan to begin the Time 3 visits in February 1999 starting with the oldest children first. We will be assessing your child's development in many of the areas that were assessed in previous visits. These areas include attachment, behaviour problems, intellectual development, physical development and health, and parenting stress. In addition, as your child is now of school age, we are very interested in how he/she is doing at school, both academically and socially.

For the Time 3 visits we would ask if we can make a visit to your home and a visit to your child's school. During the home visit we would like to interview you, do a number of tasks with your child, and leave a package of questionnaires for you to complete and mail back to us. On either the day before or after the home visit, we would like to visit your child's classroom and leave questionnaires for his or her teacher to complete and send back to us. During the classroom visit we also hope to collect information from the entire class about the social dynamics in the classroom. The

children in the class will be told that we are interested in how children of their age get along with one another and you child will not be singled out in any way.

At present, our research team consists of myself and graduate students Linda Warford and Lynda Fernyhough. Both Linda and Lynda are in the counselling psychology Masters program. They both have a strong commitment to the well-being of children and share a great deal of experience working with families and youngsters of various backgrounds and abilities.

One of us will be telephoning you within the next couple of weeks to discuss your participation, any questions you may have, and to schedule a visit. In that phone call we will ask for the name of your child's teacher and school and permission to contact them.

With your help, the Romanian Adoption Study will become the most comprehensive research ever done on the lives of children adopted from orphanages. What we learn from this study will have important implications for policies related to infant, child, and youth services in the fields of education, health, and adoption. We are truly appreciative of your involvement and we look forward to speaking with you later this month.

With warm regards,

Lucy Le Mare, Ph.D.

Assistant Professor

Email:

Phone: 604 291-3272; Fax: 604 291-3203

Appendix C:
Consent form for Parents

Dear Parents:

Enclosed are a number of questionnaires concerning the health, social development, behaviour, academic achievement, and physical development of your child. Each of these questionnaires should be self-explanatory. Please note that there are two (2) copies of the Parenting Practices Questionnaire in the package. One is for the mother to complete and one is for the father. All other questionnaires can be completed by either or both parents. You may notice that there is some repetition of questions in this package. This is a function of there being some overlap in the measures we have selected. Please bear with us.

Of course your responses to these questionnaires are completely confidential and will only be used for research purposes. Your participation in this research is entirely voluntary and you can withdraw from the study at any time without penalty. When you have completed the questionnaires please put them and the signed consent form (attached) into the self-addressed stamp envelop provided and return it to us by mail.

I cannot stress enough how much I appreciate your help with this research. I am more than happy to share the results of this research with you and will send copies of any resulting written reports to all participating families.

If you have any questions or concerns about completing the questionnaires or any other aspect of the research, please do not hesitate to call me at 291-3272 or the research office at 291-5687. Again, thank you so much for your help.

Sincerely,

Dr. Lucy Le Mare

I, (your name) _____ have agreed to participate in the research project being conducted by Dr. Lucy Le Mare of the Faculty of Education, Simon Fraser University. I understand that my involvement entails the completion of questionnaires concerning the health, social development, behaviour, academic achievement, and physical development of my child and that I can withdraw from the project at any time. Any complaint about the project may be brought to the chief researcher named above or to Dr. Robin Barrow, Dean, Faculty of Education, Simon Fraser University.

NAME (please print): _____

ADDRESS: _____

SIGNATURE: _____

DATE: _____

Appendix D:
Consent form for School Principals

Dear Principal:

Further to our recent phone conversation, I would like to thank you for your interest in our research on children's social and intellectual development. Attached is a consent form that we would ask you to sign to confirm your willingness to allow us to conduct this research in your school. As we have discussed, this will entail the teacher of _____ completing questionnaires on that student's social and academic progress and the administration of a peer sociometric rating scale in his/her classroom. This study is funded by the Hospital for Sick Children Foundation and has received approval from the University Ethics Board.

I cannot stress enough how much we appreciate your help with this research. If you have any questions or concerns about the research, please do not hesitate to contact me at 604 291-3272 or email at lemare@sfu.ca. Again, thank you so much for your help.

Sincerely,

Lucy Le Mare, Ph.D.

Assistant Professor

I (your name) _____ have agreed to allow the research on intellectual and social development being conducted by Dr. Lucy Le Mare of the Faculty of Education at Simon Fraser University to take place at my school. I understand that involvement entails the completion of questionnaires by the teacher of

the child named above and the administration of a peer sociometric rating scale in the child's class. Further I understand that we may withdraw from the project at any time. Any complaint about the project may be brought to the chief researcher named above or to Dr. Robin Barrow, Dean, Faculty of Education, Simon Fraser University.

Name (please print): _____ Date: _____

School: _____

Signature: _____

Appendix E:
Consent form for Teachers

Dear Teachers:

Further to our recent phone conversation, I would like to thank you for your interest in our research on children's social and intellectual development. Attached is a consent form that we would ask you to sign to confirm your willingness to participate in this study. Participation will involve completing 3 questionnaires concerning the academic, behavioural, and social adjustment of _____.

Your participation in this research is entirely voluntary and you may withdraw from the study at any time without penalty. Your responses to these questionnaires are completely confidential and will be used only for research purposes. Please read the directions carefully before beginning each questionnaire.

This study is funded by the Hospital for Sick Children Foundation and has received approval from the University Ethics Board.

I cannot stress enough how much we appreciate your help with this research. Dr. Lucy Le Mare, the project director, is more than happy to share the results of the research with you and will send copies of any resulting written reports to all participating teachers upon request.

If you have any questions or concerns about completing the questionnaires or any other aspect of the research, please do not hesitate to call us at 29103272 or send email to lemare@sfu.ca. Again, thank you so much for your help.

Sincerely,

Linda Warford
Research Assistant

I, (your name): _____ have agreed to participate in the research on intellectual and social development to be conducted by Dr. Lucy Le Mare of the Faculty of Education, Simon Fraser University. I understand that my involvement entails completion of questionnaires and that I can withdraw from the project at any time. Any complaint about the project may be brought to the chief researcher named above or to Dr. Robin Barrow, Dean, Faculty of Education, Simon Fraser University.

Name (please print): _____ Date: _____

School: _____

Signature: _____

Appendix F:
Demographic Questionnaire

5. Age at Adoption _____

9. Mother's highest level of education

___ elementary school

___ some high school

___ high school completion

___ vocational or some college/university

___ college or university graduate

___ graduate or professional school

13. Father's highest level of education

___ elementary school

___ some high school

___ high school completion

___ vocational or some college/university

___ college or university graduate

___ graduate or professional school

17. Please estimate your gross annual family income

___ Less than \$20,000

___ 50-60,000

___ 90-100,000

___ 20-30,000

___ 60-70,000

___ Above 100,000

___ 30-40,000

___ 70-80,000

___ 40-50,000

___ 80-90,000

Appendix G:
Child Measure of Education

Question 1: How do you feel about school?

- 5 I like school very much
- 4 I like school quite a bit
- 3 I like school a bit
- 2 I don't like school very much
- 1 I hate school

Question 2: How well do you think you are doing in your school work?

- 5 Very well
- 4 Well
- 3 Average
- 2 Poorly
- 1 Very poorly

Question 3: How important is it to you to get good grades in school?

- 5 Very important
- 4 Important
- 3 Somewhat important
- 2 Not very important
- 1 Not important at all

Question 4: I like mathematics

- 5 True
- 4 Mostly true

3 Sometimes false/Sometimes true

2 Mostly false

1 False

Question 11: If I need extra help, my teacher gives it to me.

5 All the time

4 Most of the time

3 Some of the time

2 Rarely

1 Never

Question 13: If I have problems at school, my parents are ready to help.

Question 14: My parents encourage me to do well at school.

Question 15: My parents expect too much of me at school.

Question 16: I have a place at home to do homework or study.

Question 17: When my teacher gives me homework, I do it.

Appendix H:
Self-Description Questionnaire
Academic Self-Concept Questions

Question 2: I'm good at school subjects.

- 1 Never True
- 2 Hardly Ever True
- 3 Sometimes True
- 4 Mostly True
- 5 Always True

Question 7: I enjoy doing work in school subjects.

Question 12: I get good marks in school subjects.

Question 17: I hate school subjects.

Question 23: I learn things quickly in school subjects.

Question 29: I am interested in school subjects.

Appendix I:

Parent Measure of Education

Q2. Has your child ever repeated a grade?

1. Yes
2. No (go to Q4)

Q3. What grade(s) has your child repeated? MARK ALL THAT APPLY

1. Kindergarten
2. Grade 1
3. Grade 2
4. Grade 3
5. Grade 4
6. Grade 5
7. Grade 6
8. Grade 7

Q9. Based on your knowledge of your child's schoolwork, including his/her report card, how is your child doing in Reading?

- 6 Not applicable
- 5 Very well
- 4 Well
- 3 Average
- 2 Below average
- 1 Well below average

Q10. Based on your knowledge of your child's schoolwork, including his/her report card, how is your child doing in Mathematics?

Q11. Based on your knowledge of your child's schoolwork, including his/her report card, how is your child doing in Written work and composition?

Q12. Based on your knowledge of your child's schoolwork, including his/her report card, how is your child doing in Science?

Q13. Based on your knowledge of your child's schoolwork, including his/her report card, how is your child doing in Physical Education?

Q14. Based on your knowledge of your child's schoolwork, including his/her report card, how is your child doing overall?

Q15. Based on your knowledge of your child's abilities, how satisfied or pleased are you with his/her academic achievement?

- 6 Extremely pleased or satisfied
- 5 Very pleased or satisfied
- 4 Somewhat pleased or satisfied
- 3 Somewhat displeased or unsatisfied
- 2 Very displeased or unsatisfied
- 1 Extremely displeased or unsatisfied

Q18. Since your child started school in the fall, has he/she received any help or tutoring outside of school?

- 1. Yes
- 2. No (go to Q20)

Q19. How often does your child receive academic help or tutoring outside of school?

1. Once a week or less often
2. Twice a week
3. More than twice a week

Q20. Does your child receive special/resource help because a physical, emotional, behavioural, learning, or some other problem limits the kind or amount of schoolwork he/she can do?

1. Yes
2. No

Q24. How important is it to you that your child gets good grades in school?

- 4 Very important
- 3 Important
- 2 Somewhat important
- 1 Not important

Q24a. How far do you hope your child will go in school?

- 1 Complete elementary school
- 2 Complete secondary or high school
- 3 Community college
- 4 Trade, technical or vocational school
- 5 University
- 6 Other (please specify)

Q32. How satisfied are you with the quality of your child's schooling?

- 6 Extremely satisfied
- 5 Very satisfied

- 4 Somewhat satisfied
- 3 Somewhat unsatisfied
- 2 Very unsatisfied
- 1 Extremely unsatisfied

Q33. How satisfied are you with the ability of your child's school to meet your child's needs?

- 6 Extremely satisfied
 - 5 Very satisfied
 - 4 Somewhat satisfied
 - 3 Somewhat unsatisfied
 - 2 Very unsatisfied
 - 1 Extremely unsatisfied
-

Appendix J:

Teacher Measure of Education

Q4. How would you rate this student's current achievement in reading?

- 6 I do not teach reading
- 5 Near the top of the class
- 4 Above the middle of the class, but not at the top
- 3 In the middle of the class
- 2 Below the middle of the class, but above the bottom
- 1 Near the bottom of the class

Q5. How would you rate this student's current academic achievement in mathematics/arithmetic?

Q6. How would you rate this student's current achievement in written work (i.e., spelling and composition)?

Q7. How would you rate this student's current academic achievement across all areas of instruction?

Appendix K:

Correlations within Child Measures for the CB and EA Groups

Stanford-BinetCB Group ($n = 42$)

	Abstract/Visual	Quantitative Reasoning	Short-Term Memory	Total IQ
Verbal Reasoning	.52***	.29+	.56***	.80***
Abstract/Visual	-	.27+	.43**	.74***
Quantitative Reasoning	-	-	.25	.60***
Short-term Memory	-	-	-	.80***

EA Group ($n = 23$)

	Abstract/Visual	Quantitative Reasoning	Short-Term Memory	Total IQ
Verbal Reasoning	.38+	.65**	.72***	.84***
Abstract/Visual	-	.46**	.62**	.72***
Quantitative Reasoning	-	-	.64**	.83***
Short-term Memory	-	-	-	.91***

Note. Verbal Reasoning = Verbal Reasoning sum of area score incorporating vocabulary and comprehension subscales; Abstract/Visual = Abstract/Visual sum of area score

incorporating pattern analysis, copying, and matrices subscales; Quantitative Reasoning = Quantitative Reasoning sum of area score incorporating quantitative subscale; Short-term Memory = Short-term memory sum of area score incorporating bead memory and memory for sentences subscales; Total IQ = Stanford-Binet Test Composite score.

[†]p < .10 *p < .05 **p < .01 ***p < .001.

Canada-Quiet

CB Group ($n = 41$)

	CQ arith	CQ word id	CQ passage	CQ composite
CQ spell	.43**	.64***	.46**	.79***
CQ arith	-	.54***	.44**	.74***
CQ word id		-	.71***	.88***
CQ passage			-	.82***

EA Group ($n = 23$)

	CQ arith	CQ word id	CQ passage	CQ composite
CQ spell	.78***	.87***	.82***	.96***
CQ arith	-	.74***	.50*	.83***
CQ word id		-	.78***	.94***
CQ passage			-	.87***

Note. CQ = Canada Quick Individual Educational Test; spell = CQ spelling standard score; arith = CQ arithmetic standard score; word id = CQ word identification standard

score; passage = CQ passage comprehension standard score; composite = CQ composite score.

⁺p < .10 *p < .05 **p < .01 ***p < .001.

Appendix L:

Correlations within Parent Measures for the CB and EA Groups

CB Group ($n = 41$)

	Math	Comp	Science	Overall
Read	.59***	.65***	.67***	.58***
Math	-	.59***	.78***	.76***
Comp		-	.66***	.85***
Science			-	.73***

EA Group ($n = 24$)

	Math	Comp	Science	Overall
Read	.79***	.74***	.80***	.88***
Math	-	.70***	.89***	.89***
Comp		-	.83***	.77***
Science			-	.88**

Note. Read = Parent report of performance in reading 1 = well below average 2 = below average 3 = average 4 = well 5 = very well 6 = not applicable; Math = Parent report of performance in math; Comp = Parent report of performance in written work and composition; Science = Parent report of performance in science; Overall = Parent report of overall school performance.

[†]p < .10 *p < .05 **p < .01 ***p < .001.

Appendix M:

Correlations within Teacher Measures for the CB and EA Groups

CB Group ($n = 39$)

	Math	Composition	Overall
Reading	.73***	.67***	.60***
Math	-	.70***	.73***
Composition		-	.88***

EA Group ($n = 22-23$)

	Math	Composition	Overall
Reading	.71***	.93***	.84***
Math	-	.74***	.63**
Composition		-	.81***

Note. Reading = Teacher report of performance in reading 1 = near the bottom of the class 2 = below the middle of the class 3 = in the middle of the class 4 = above the middle of the class 5 = near the top of the class 6 = does not teach reading; Math = Teacher report of performance in math; Composition = Teacher report of performance in written work, i.e. spelling/composition; Overall = Teacher report of overall school performance.

⁺p < .10 *p < .05 **p < .01 ***p < .001.

Appendix N:

Correlations between Child and Parent Measures for the CB and EA Groups

CB Group ($n = 40-41$)

	Read	Math	Comp	Science	Parent Overall
Verbal Reasoning	.55***	.33*	.32*	.49**	.39*
Abstract/Visual	.60***	.61***	.60***	.76***	.61***
Quantitative Reasoning	.32*	.19	.32*	.28+	.30+
Short-term Memory	.31+	.32*	.26	.38*	.42**
Total IQ	.59***	.49**	.50**	.65***	.59***
CQ spell	.66***	.46**	.57***	.55***	.51**
CQ arith	.43**	.62***	.44**	.58***	.55***
CQ word id	.62***	.53**	.41**	.56***	.46**
CQ passage	.63***	.35*	.38*	.42**	.38*
CQ composite	.73***	.60***	.56***	.64***	.58***
Child overall	.44**	.33*	.40*	.33*	.45**

EA Group ($n = 21-22$)

	Read	Math	Comp	Science	Parent Overall
Verbal Reasoning	.44*	.43*	.54**	.45*	.39+
Abstract/Visual	.10	-.04	.32	.05	.10
Quantitative Reasoning	.21	.26	.47*	.30	.22
Short-term Memory	.38+	.34	.54**	.30	.23

Total IQ	.35	.32	.57**	.35	.24
CQ spell	.46*	.50*	.32	.36	.43*
CQ arith	.26	.41+	.24	.32	.23
CQ word id	.46*	.50*	.35	.44*	.36
CQ passage	.54*	.39+	.39+	.39+	.40+
CQ composite	.48*	.50*	.36	.42+	.39+
Child overall	-.08	-.24	-.04	-.20	-.13

Note. Verbal Reasoning = Verbal Reasoning sum of area score incorporating vocabulary and comprehension subscales; Abstract/Visual = Abstract/Visual sum of area score incorporating pattern analysis, copying, and matrices subscales; Quantitative Reasoning = Quantitative Reasoning sum of area score incorporating quantitative subscale; Short-term Memory = Short-term memory sum of area score incorporating bead memory and memory for sentences subscales; Total IQ = Stanford-Binet Test Composite score; CQ = Canada Quick Individual Educational Test; spell = CQ spelling standard score; arith = CQ arithmetic standard score; word id = CQ word identification standard score; passage = CQ passage comprehension standard score; composite = CQ composite score; Child overall = Child report of how well he/she is doing in school 1 = very poorly 2 = poorly 3 = average 4 = well 5 = very well; Read = Parent report of performance in reading 1 = well below average 2 = below average 3 = average 4 = well 5 = very well 6 = not applicable; Math = Parent report of performance in math; Comp = Parent report of performance in written work and composition; Science = Parent report of performance in science; Overall = Parent report of overall school performance.

⁺p < .10 *p < .05 **p < .01 ***p < .001.

Appendix O:

Correlations between Child and Teacher Measures for the CB and EA Groups

CB Group ($n = 38-39$)

	Reading	Math	Composition	Teacher Measure Overall
Verbal Reasoning	.54***	.26	.19	.13
Abstract/Visual	.54***	.51**	.53***	.52**
Quantitative Reasoning	.23	.12	.28+	.26
Short-term Memory	.19	.13	.01	-.03
SB Total IQ	.52**	.34*	.35*	.31+
CQ spell	.43**	.44**	.54***	.42**
CQ arith	.29+	.58***	.41*	.41**
CQ word id	.31+	.46**	.21	.19
CQ passage	.39*	.35*	.27+	.18
CQ composite	.48**	.61***	.49**	.41*
Child overall	.49**	.50**	.47**	.43**

EA Group ($n = 19-22$)

	Reading	Math	Composition	Teacher Measure Overall
Verbal Reasoning	.57**	.45*	.58**	.50*
Abstract/Visual	.56**	.50*	.43+	.61*
Quantitative	.57**	.44*	.51*	.66*
Short-term Memory	.65**	.61**	.62**	.67*
Total IQ	.71***	.61**	.65**	.73***

CQ spell	.63**	.46*	.67**	.37
CQ arith	.41+	.47*	.43+	.19
CQ word id	.75***	.49*	.74***	.47*
CQ passage	.71***	.35	.66**	.52*
CQ composite	.70***	.49*	.70***	.44+
Child overall	.42+	.51*	.51*	.19

Note. Verbal Reasoning = Verbal Reasoning sum of area score incorporating vocabulary and comprehension subscales; Abstract/Visual = Abstract/Visual sum of area score incorporating pattern analysis, copying, and matrices subscales; Quantitative Reasoning = Quantitative Reasoning sum of area score incorporating quantitative subscale; Short-term Memory = Short-term memory sum of area score incorporating bead memory and memory for sentences subscales; Total IQ = Stanford-Binet Test Composite score; CQ = Canada Quick Individual Educational Test; spell = CQ spelling standard score; arith = CQ arithmetic standard score; word id = CQ word identification standard score; passage = CQ passage comprehension standard score; composite = CQ composite score; Child overall = Child report of how well he/she is doing in school 1 = very poorly 2 = poorly 3 = average 4 = well 5 = very well; Reading = Teacher report of performance in reading 1 = near the bottom of the class 2 = below the middle of the class 3 = in the middle of the class 4 = above the middle of the class 5 = near the top of the class 6 = does not teach reading; Math = Teacher report of performance in math; Composition = Teacher report of performance in written work, i.e. spelling/composition; Overall = Teacher report of overall school performance.

⁺p < .10 *p < .05 **p < .01 ***p < .001.

Appendix P:

Correlations between Parent and Teacher Measures for the CB and EA Groups

CB Group ($n = 38$)

	Reading	Math	Composition	Teacher Overall
Read	.68***	.52**	.58***	.46**
Math	.38*	.67***	.64***	.67***
Comp	.43*	.50**	.83***	.71***
Science	.43**	.50**	.50**	.58***
Parent Overall	.44**	.53**	.75***	.72***

EA Group ($n = 21-22$)

	Reading	Math	Composition	Teacher Overall
Read	.55**	.25	.46*	.39+
Math	.34	.38+	.33	.25
Comp	.64**	.58**	.59**	.73***
Science	.41+	.35	.34	.36
Parent Overall	.45*	.32	.45*	.34

Note. Read = Parent report of performance in reading 1 = well below average 2 = below average 3 = average 4 = well 5 = very well 6 = not applicable; Math = Parent report of performance in math; Comp = Parent report of performance in written work and composition; Science = Parent report of performance in science; Parent overall = Parent report of overall school performance; Reading = Teacher report of performance in reading 1 = near the bottom of the class 2 = below the middle of the class 3 = in the

middle of the class 4 = above the middle of the class 5 = near the top of the class 6 = does not teach reading; Math = Teacher report of performance in math; Composition = Teacher report of performance in written work, i.e. spelling/composition; Teacher overall = Teacher report of overall school performance.

[†]p < .10 *p < .05 **p < .01 ***p < .001.

Appendix Q:

Correlations between Phase 3 Demographic Characteristics and Intellectual and
Academic Performance for the CB and EA Groups

CB Group ($n = 38-42$)

	Momage	Momed	Dadage	Daded	Income
Verbal Reasoning	.18	.12	.07	.26	.23
Abstract/Visual	-.04	-.14	-.14	.06	.23
Quantitative Reasoning	.04	-.13	.04	.34*	.24
Short-term Memory	.21	.28+	.10	.11	.27+
Total IQ	.15	.07	.03	.24	.33*
CQ spell	-.03	-.32*	-.03	-.04	-.04
CQ arith	-.27+	-.22	-.27+	.05	.21
CQ word id	.10	-.05	-.01	.02	-.01
CQ passage	.27+	.01	.23	.20	-.02
CQ composite	.08	-.18	-.01	.07	.04
Child overall	.07	-.06	-.05	.01	.15
Parent overall	.21	-.01	-.11	.07	.14
Teacher overall	-.20	-.15	-.24	.15	.16

EA Group ($n = 22-23$)

	Momage	Momed	Dadage	Daded	Income
Verbal Reasoning	.07	-.42+	-.25	.16	-.21
Abstract/Visual	.56**	.08	.34	.12	-.15
Quantitative Reasoning	.16	-.24	-.11	-.14	-.32
Short-term Memory	.17	-.22	.02	.29	-.31
Total IQ	.27	-.26	-.02	.13	-.31
CQ spell	.10	-.17	-.16	.24	-.27
CQ arith	.24	-.38+	-.02	.03	-.26
CQ word id	.15	-.23	-.09	.13	-.38+
CQ passage	.34	.03	.16	.30	-.23
CQ composite	.23	-.20	-.03	.20	-.32
Child overall	-.01	-.26	-.11	.21	-.29
Parent overall	.09	.16	-.05	.34	.13
Teacher overall	.25	.25	.03	.08	-.33

Note. Verbal Reasoning = Verbal Reasoning sum of area score incorporating vocabulary and comprehension subscales; Abstract/Visual = Abstract/Visual sum of area score incorporating pattern analysis, copying, and matrices subscales; Quantitative Reasoning = Quantitative Reasoning sum of area score incorporating quantitative subscale; Short-term Memory = Short-term memory sum of area score incorporating bead memory and memory for sentences subscales; Total IQ = Stanford-Binet Test Composite score; CQ = Canada Quick Individual Educational Test; spell = CQ spelling standard score; arith =

CQ arithmetic standard score; word id = CQ word identification standard score; passage = CQ passage comprehension standard score; composite = CQ composite score; Child overall = Child report of how well he/she is doing in school 1 = very poorly 2 = poorly 3 = average 4 = well 5 = very well; Parent overall = Parent report of overall school performance 1 = well below average 2 = below average 3 = average 4 = well 5 = very well 6 = not applicable; Teacher overall = Teacher report of overall school performance 1 = near the bottom of the class 2 = below the middle of the class 3 = in the middle of the class 4 = above the middle of the class 5 = near the top of the class; Momage = Mother's age in years at time target child was assessed; Momed = mother's education level with 1 = elementary school, 2 = some high school, 3 = high school completion, 4 = vocational or some college/university, 5 = college or university graduate, 6 = graduate or professional school; Dadage = Father's age in years at time target child was assessed; Daded = father's education level with 1 = elementary school, 2 = some high school, 3 = high school completion, 4 = vocational or some college/university, 5 = college or university graduate, 6 = graduate or professional school; Income = gross annual income with 1 = less than \$20,000, 2 = \$21-30,000, 3 = \$31-40,000, 4 = 41,000-50,000, 5 = 51-60,000, 6 = 61,000-70,000, 7 = \$71,000-80,000, 8 = 81,000-90,000, 9 = 91,000, 10 = above \$100,000.

[†]p < .10 *p < .05 **p < .01 ***p < .001.

Appendix R:

Correlations between Phase 2 Measures and Phase 3 Intellectual and Academic Indices
for the CB and EA Groups

CB Group ($n = 24-34$)

	School Readiness	Home Total	Academic Stim
Verbal Reasoning	-.13	.31	.26
Abstract/Visual	.22	.32+	.52*
Quantitative Reasoning	.31	.22	.10
Short-term Memory	.35+	.35+	.30
Total IQ	.28	.42*	.39+
CQ spell	.45*	.12	.45*
CQ arith	.12	.34+	.41*
CQ word id	.30	.19	.38+
CQ passage	.16	.23	.43*
CQ composite	.39*	.27	.49*
Child overall	-.11	.01	.28
Parent overall	.04	.48**	.56**
Teacher overall	.21	-.12	.30

EA Group ($n = 17-22$)

	School Readiness	Home Total	Academic Stim
Verbal Reasoning	.22	.09	-.20

Abstract/Visual	.27	.44*	.32
Quantitative Reasoning	-.01	.11	-.31
Short-term Memory	.37	.28	.00
Total IQ	.28	.26	-.08
CQ spell	.35	.22	-.14
CQ arith	.40	-.02	-.22
CQ word id	.24	.23	-.09
CQ passage	.53*	.47*	.17
CQ composite	.43+	.26	-.07
Child overall	-.12	.05	-.42+
Parent overall	.33	.03	-.11
Teacher overall	-.08	.32	-.05

Note. Verbal Reasoning = Verbal Reasoning sum of area score incorporating vocabulary and comprehension subscales; Abstract/Visual = Abstract/Visual sum of area score incorporating pattern analysis, copying, and matrices subscales; Quantitative Reasoning = Quantitative Reasoning sum of area score incorporating quantitative subscale; Short-term Memory = Short-term memory sum of area score incorporating bead memory and memory for sentences subscales; Total IQ = Stanford-Binet Test Composite score; CQ = Canada Quick Individual Educational Test; spell = CQ spelling standard score; arith = CQ arithmetic standard score; word id = CQ word identification standard score; passage = CQ passage comprehension standard score; composite = CQ composite score; Child overall = Child report of how well he/she is doing in school 1 = very poorly 2 = poorly 3 = average 4 = well 5 = very well; Parent overall = Parent report of overall school

performance 1 = well below average 2 = below average 3 = average 4 = well 5 = very well 6 = not applicable; Teacher overall = Teacher report of overall school performance 1 = near the bottom of the class 2 = below the middle of the class 3 = in the middle of the class 4 = above the middle of the class 5 = near the top of the class; School Readiness = Composite score on the Bracken School Readiness Scale; Home Total = Composite score on The Home Observation for Measurement of the Environment Inventory; Academic Stim = Academic Stimulation subscale on The Home Observation for Measurement of the Environment Inventory.

[†]p < .10 *p < .05 **p < .01 ***p < .001.

Appendix S:

Correlations between Academic Self-perceptions and Intellectual and Academic Indices
for the CB and EA Groups

CB Group ($n = 38-42$)

Academic Self-Concept

Verbal Reasoning	.30+
Abstract/Visual	.29+
Quantitative Reasoning	-.08
Short-term Memory	.15
Total IQ	.23
CQ spell	.19
CQ arith	.21
CQ word id	.22
CQ passage	.24
CQ composite	.27+
Parent overall	.54***
Teacher overall	.39*
Child overall	.41**
Like school	.76***
Grades important	-.15
Like math	.08
Extra help from teacher	.29+
Parents help	.27

Parents encourage	.09
Parents expect too much	.21
Place for homework	-.07
Does homework	.35*
EA Group (n = 19-22)	

	Academic Self-Concept
Verbal Reasoning	.24
Abstract/Visual	.18
Quantitative Reasoning	-.04
Short-term Memory	.05
Total IQ	.15
CQ spell	-.11
CQ arith	-.28
CQ word id	-.02
CQ passage	-.01
CQ composite	-.11
Parent overall	.30
Teacher overall	.18
Child overall	.07
Like school	.58**
Grades important	.13
Like math	-.14

Extra help from teacher	-.20
Parents help	.19
Parents encourage	.13
Parents expect too much	.21
Place for homework	.19
Does homework	.08

Note. Verbal Reasoning = Verbal Reasoning sum of area score incorporating vocabulary and comprehension subscales; Abstract/Visual = Abstract/Visual sum of area score incorporating pattern analysis, copying, and matrices subscales; Quantitative Reasoning = Quantitative Reasoning sum of area score incorporating quantitative subscale; Short-term Memory = Short-term memory sum of area score incorporating bead memory and memory for sentences subscales; Total IQ = Stanford-Binet Test Composite score; CQ = Canada Quick Individual Educational Test; spell = CQ spelling standard score; arith = CQ arithmetic standard score; word id = CQ word identification standard score; passage = CQ passage comprehension standard score; composite = CQ composite score; Parent overall = Parent report of overall school performance 1 = well below average 2 = below average 3 = average 4 = well 5 = very well 6 = not applicable; Teacher overall = Teacher report of overall school performance 1 = near the bottom of the class 2 = below the middle of the class 3 = in the middle of the class 4 = above the middle of the class 5 = near the top of the class; Child overall = Child report of how well he/she is doing in school 1 = very poorly 2 = poorly 3 = average 4 = well 5 = very well; Like school = Child report of how much they like school 1 = hate school 2 = not very much 3 = a bit 4 = quite a bit 5 = very much; Grades important = Child report of the importance of grades

to him/her 1 = not important at all 2 = not very important 3 = somewhat important 4 = important 5 = very important; Likes math = child report of liking mathematics 5 = true 4 = mostly true 3 = sometimes false/sometimes true 2 = mostly false 1 = false; Extra help from teacher = Child report of how often he/she receives extra help from teacher 1 = never 2 = rarely 3 = some of the time 4 = most of the time 5 = all of the time; Parents help = Child report of how often he/she receives help with school work from parents; Parents encourage = Child report of how often parents encourage him/her with regard to school work; Parents expect too much = Child report of how often he/she feels that parents expect too much; Place for homework = Child report of how often he/she has a suitable place to do homework; Does homework = Child report of how often he/she does required homework.

[†]p < .10 *p < .05 **p < .01 ***p < .001.

TABLES

Table 1: Mean Scores and Standard Deviations for Demographic Characteristics of All Groups

	RO ^a			CB ^b			EA ^c		
	<u>M</u>	<u>SD</u>	<u>N</u>	<u>M</u>	<u>SD</u>	<u>N</u>	<u>M</u>	<u>SD</u>	<u>N</u>
Time in Institution	22.67	13.40	35	-	-	-	2.67	1.15	4
Age at Adoption	23.97	14.86	35	-	-	-	2.59	1.42	17
Age at Assessment	127.58	12.84	35	127.00	12.63	42	119.65 ^{a,b}	2.40	23
Mother's educ	4.26	1.04	35	4.30	.91	40	4.63	.82	24
Father's educ	4.28	1.42	32	4.51	1.07	39	4.67	1.09	24
Mother's age	44.2 ^c	6.13	35	43.1 ^{a,c}	4.54	42	47.0	6.44	25
Father's age	46.3 ^c	6.23	33	44.8 ^{a,c}	4.89	41	48.6	6.06	25
Income	6.03	2.46	35	6.88	2.24	40	6.67	2.62	24

Mother's employment

No. home full-time	13	11	8
Employed part-time	9	16	9
Employed full-time	15	13	7

Note:

Time in institution = time children spent in institutions in months; Age at adoption = age in months; Age at assessment = age in months; Mother's educ = mother's education level with 1 = elementary school, 2 = some high school, 3 = high school completion, 4 =

vocational or some college/university, 5 = college or university graduate, 6 = graduate or professional school.

Father's educ = father's education level with 1 = elementary school, 2 = some high school, 3 = high school completion, 4 = vocational or some college/university, 5 = college or university graduate, 6 = graduate or professional school.

Mother's age in years at time target child was assessed; Father's age in years at time target child was assessed. Income = gross annual income with 1 = less than \$20,000, 2 = \$21-30,000, 3 = \$31-40,000, 4 = 41,000-50,000, 5 = 51-60,000, 6 = 61,000-70,000, 7 = \$71,000-80,000, 8 = 81,000-90,000, 9 = 91,000, 10 = above \$100,000.

^{a, b, c} indicate means that differ significantly ($p < .05$) from one another.

Table 2: Correlations within Child Measures of Intellectual and Academic Functioning for the RO Group

Correlations within the Stanford-Binet

RO Group ($n = 32$)

	Abstract/Visual Reasoning	Quantitative Reasoning	Short-Term Memory	Total IQ
Verbal Reasoning	.70***	.63***	.65***	.86***
Abstract/Visual	-	.64***	.81***	.91***
Quantitative Reasoning	-	-	.57**	.80***
Short-term Memory	-	-	-	.89***

Note. Verbal Reasoning = Verbal Reasoning sum of area score incorporating vocabulary and comprehension subscales; Abstract/Visual = Abstract/Visual sum of area score incorporating pattern analysis, copying, and matrices subscales; Quantitative Reasoning = Quantitative Reasoning sum of area score incorporating quantitative subscale; Short-term Memory = Short-term memory sum of area score incorporating bead memory and memory for sentences subscales; Total IQ = Stanford-Binet Test Composite score.

⁺p < .10 *p < .05 **p < .01 ***p < .001.

Table 3: Correlations within the Canada-QUIET for the RO GroupRO Group: ($n = 32$)

	CQ arith	CQ word id	CQ passage	CQ composite
CQ spell	.76***	.90***	.82***	.94***
CQ arith	-	.73***	.80***	.89***
CQ word id		-	.80***	.93***
CQ passage			-	.93***

Note. CQ = Canada Quick Individual Educational Test; spell = CQ spelling standard score; arith = CQ arithmetic standard score; word id = CQ word identification standard score; passage = CQ passage comprehension standard score; composite = CQ composite score.

⁺p < .10 *p < .05 **p < .01 ***p < .001.

Table 4: Correlations within Parent Measures of Academic Functioning for the RO Group
 RO Group ($n = 28-34$)

	Math	Comp	Science	Overall
Read	.70***	.86***	.70***	.85***
Math	-	.75***	.79***	.83***
Comp		-	.74***	.92***
Science			-	.82***

Note. Read = Parent report of performance in reading 1 = well below average 2 = below average 3 = average 4 = well 5 = very well 6 = not applicable; Math = Parent report of performance in math; Comp = Parent report of performance in written work and composition; Science = Parent report of performance in science; Overall = Parent report of overall school performance.

[†]p < .10 *p < .05 **p < .01 ***p < .001.

Table 5: Correlations within Teacher Measures of Academic Functioning for the RO Group

RO Group ($n = 33$)

	Math	Composition	Teacher Overall
Reading	.80***	.85***	.90***
Math	-	.80***	.82***
Composition		-	.91***

Note. Reading = Teacher report of performance in reading 1 = near the bottom of the class 2 = below the middle of the class 3 = in the middle of the class 4 = above the middle of the class 5 = near the top of the class 6 = does not teach reading; Math = Teacher report of performance in math; Composition = Teacher report of performance in written work, i.e. spelling/composition; Overall = Teacher report of overall school performance.

⁺ $p < .10$ * $p < .05$ ** $p < .01$ *** $p < .001$.

Table 6: Correlations between Child and Parent Measures of Intellectual and Academic Performance for the RO Group

RO Group ($n = 27-30$)

	Read	Math	Comp	Science	Parent Overall
Verbal Reasoning	.19	.46*	.39*	.35+	.50**
Abstract/Visual	.35+	.54**	.48**	.45*	.56**
Quantitative Reasoning	.37*	.64***	.56**	.35+	.61***
Short-term Memory	.44*	.59**	.57**	.40*	.61***
Total IQ	.39*	.64***	.57**	.47*	.66***
CQ spell	.64***	.58**	.61***	.46*	.67***
CQ arith	.59**	.67***	.61***	.46*	.67***
CQ word id	.69***	.59**	.64***	.44*	.68***
CQ passage	.60**	.57**	.58**	.41*	.68***
CQ composite	.68***	.64***	.66***	.50**	.73***
Child overall	.11	.17	.16	.04	.08

Note. Verbal Reasoning = Verbal Reasoning sum of area score incorporating vocabulary and comprehension subscales; Abstract/Visual = Abstract/Visual sum of area score incorporating pattern analysis, copying, and matrices subscales; Quantitative Reasoning = Quantitative Reasoning sum of area score incorporating quantitative subscale; Short-term Memory = Short-term memory sum of area score incorporating bead memory and memory for sentences subscales; Total IQ = Stanford-Binet Test Composite score; CQ = Canada Quick Individual Educational Test; spell = CQ spelling standard score; arith = CQ arithmetic standard score; word id = CQ word identification standard score; passage

= CQ passage comprehension standard score; composite = CQ composite score; Child overall = Child report of how well he/she is doing in school 1 = very poorly 2 = poorly 3 = average 4 = well 5 = very well; Read = Parent report of performance in reading 1 = well below average 2 = below average 3 = average 4 = well 5 = very well 6 = not applicable; Math = Parent report of performance in math; Comp = Parent report of performance in written work and composition; Science = Parent report of performance in science; Overall = Parent report of overall school performance.

⁺p < .10 *p < .05 **p < .01 ***p < .001.

Table 7: Correlations between Child and Teacher Measures of Intellectual and Academic Performance for the RO Group

RO Group ($n = 31$)

	Reading	Math	Composition	Teacher Overall
Verbal Reasoning	.27	.46**	.42*	.39*
Abstract/Visual	.59**	.68***	.66***	.69***
Quantitative Reasoning	.54**	.59***	.60***	.66***
Short-term Memory	.67***	.75***	.75***	.75***
Total IQ	.59***	.71***	.70***	.71***
CQ spell	.76***	.77***	.75***	.73***
CQ arith	.67***	.73***	.69***	.78***
CQ word id	.82***	.77***	.79***	.81***
CQ passage	.71***	.69**	.68***	.74***
CQ composite	.80***	.80***	.79***	.83***
Child overall	.11	.04	.01	.03

Note. Verbal Reasoning = Verbal Reasoning sum of area score incorporating vocabulary and comprehension subscales; Abstract/Visual = Abstract/Visual sum of area score incorporating pattern analysis, copying, and matrices subscales; Quantitative Reasoning = Quantitative Reasoning sum of area score incorporating quantitative subscale; Short-term Memory = Short-term memory sum of area score incorporating bead memory and memory for sentences subscales; Total IQ = Stanford-Binet Test Composite score; CQ = Canada Quick Individual Educational Test; spell = CQ spelling standard score; arith = CQ arithmetic standard score; word id = CQ word identification standard score; passage

= CQ passage comprehension standard score; composite = CQ composite score; Child overall = Child report of how well he/she is doing in school 1 = very poorly 2 = poorly 3 = average 4 = well 5 = very well; Reading = Teacher report of performance in reading 1 = near the bottom of the class 2 = below the middle of the class 3 = in the middle of the class 4 = above the middle of the class 5 = near the top of the class 6 = does not teach reading; Math = Teacher report of performance in math; Composition = Teacher report of performance in written work, i.e. spelling/composition; Overall = Teacher report of overall school performance.

[†]p < .10 *p < .05 **p < .01 ***p < .001.

Table 8: Correlations between Parent and Teacher Measures of Academic Performance for the RO Group

RO Group ($n = 28-31$)

	Reading	Math	Composition	Teacher Overall
Read	.77***	.62***	.69***	.71***
Math	.68***	.74***	.62***	.75***
Comp	.74***	.64***	.67***	.71***
Science	.53**	.57**	.63***	.63***
Parent Overall	.76***	.68***	.71***	.75***

Note. Read = Parent report of performance in reading 1 = well below average 2 = below average 3 = average 4 = well 5 = very well 6 = not applicable; Math = Parent report of performance in math; Comp = Parent report of performance in written work and composition; Science = Parent report of performance in science; Overall = Parent report of overall school performance; Reading = Teacher report of performance in reading 1 = near the bottom of the class 2 = below the middle of the class 3 = in the middle of the class 4 = above the middle of the class 5 = near the top of the class 6 = does not teach reading; Math = Teacher report of performance in math; Composition = Teacher report of performance in written work, i.e. spelling/composition; Overall = Teacher report of overall school performance.

[†]p < .10 *p < .05 **p < .01 ***p < .001.

Table 9: Descriptive information for Child Indices of Intellectual and Academic Performance for All Groups

	Standardized Child Measures								
	RO ^a			CB ^b			EA ^c		
	<u>M</u>	<u>SD</u>	<u>N</u>	<u>M</u>	<u>SD</u>	<u>N</u>	<u>M</u>	<u>SD</u>	<u>N</u>
Verbal Reasoning	96.3 ^{b,c}	14.3	32	113.9	12.5	42	106.2 ^b	14.6	23
Abstract/Visual	81.1 ^{b,c}	12.4	32	102.9	12.8	42	91.3 ^b	12.8	23
Quantitative Reasoning	86.7 ^{b,c}	11.9	31	103.8	13.9	42	95.2 ^b	14.7	23
Short-term Memory	81.7 ^{b,c}	16.1	32	107.4	16.2	42	98.1	18.0	23
Total IQ	84.5 ^{b,c}	13.7	32	108.0	11.8	42	97.3 ^b	14.2	23
CQ spell	90.9 ^b	17.1	32	103.6	15.5	41	93.0 ^b	13.9	23
CQ arith	85.0 ^b	15.6	32	100.3	14.7	41	91.9 ^b	13.8	23
CQ word id	92.3 ^b	16.9	32	107.4	12.5	41	96.1 ^b	13.8	23
CQ passage	83.2 ^b	18.0	32	101.2	16.4	41	91.3 ^b	15.2	23
CQ composite	87.8 ^b	15.6	32	103.1	11.9	41	93.1 ^b	12.8	23
Child overall	3.8 ^c	.99	32	4.2	.85	41	4.5	.60	23

Note. Verbal Reasoning = Verbal Reasoning sum of area score incorporating vocabulary and comprehension subscales; Abstract/Visual = Abstract/Visual sum of area score incorporating pattern analysis, copying, and matrices subscales; Quantitative Reasoning = Quantitative Reasoning sum of area score incorporating quantitative subscale; Short-term Memory = Short-term memory sum of area score incorporating bead memory and memory for sentences subscales; Total IQ = Stanford-Binet Test Composite score; CQ =

Canada Quick Individual Educational Test; spell = CQ spelling standard score; arith = CQ arithmetic standard score; word id = CQ word identification standard score; passage = CQ passage comprehension standard score; composite = CQ composite score; Child overall = Child report of how well he/she is doing in school 1 = very poorly 2 = poorly 3 = average 4 = well 5 = very well

^{a, b, c,} indicate means that differ significantly ($p < .05$) from one another.

Table 10: Percentage Breakdown of Stanford-Binet Composite Scores by Range for All Groups

	RO (n = 32)	CB (n = 42)	EA (n = 23)
Gifted (132 and above)	0%	2%	0%
Superior (121-131)	0%	10%	0%
High Average (111-120)	6%	33%	13%
Average (89-110)	38%	50%	74%
Low Average (79-88)	22%	2%	4%
Slow Learner (68-78)	22%	2%	0%
Mentally Retarded (67 and below)	13%	0%	9%

Table 11: Descriptive Information for the Child Self Report Measures for All Groups

	RO ^a			CB ^b			EA ^c		
	<u>M</u>	<u>SD</u>	<u>N</u>	<u>M</u>	<u>SD</u>	<u>N</u>	<u>M</u>	<u>SD</u>	<u>N</u>
Child overall	3.8 ^c	.99	32	4.2	.85	41	4.5	.60	23
Like school	3.7 ^c	1.3	32	3.7 ^c	1.2	42	4.4	.58	23
Grades important	4.2	1.1	32	3.9	1.2	42	4.0	1.0	23
Like math	3.6	1.5	32	3.4	1.5	42	3.2	1.5	23
Extra help from teacher	3.9	.94	32	4.0	1.0	42	3.7	.10	23
Parents help	4.4	.73	29	4.4	.76	38	4.5	.67	23
Parents encourage	5.0 ^c	.00	32	4.8	.37	42	4.7	.54	23
Parents expect too much	3.5	1.5	32	3.7	1.2	41	3.1	1.5	23
Place for homework	4.6	.98	32	4.6	.50	41	4.5	.73	23
Does homework	4.2	.10	31	4.4	.83	41	4.5	.60	22

Note. Child overall = Child report of how well he/she is doing in school 1 = very poorly 2 = poorly 3 = average 4 = well 5 = very well; Like school = Child report of how much they like school 1 = hate school 2 = not very much 3 = a bit 4 = quite a bit 5 = very much; Grades important = Child report of the importance of grades to him/her 1 = not important at all 2 = not very important 3 = somewhat important 4 = important 5 = very important; Likes math = child report of liking mathematics 5 = true 4 = mostly true 3 = sometimes false/sometimes true 2 = mostly false 1 = false; Extra help from teacher = Child report of how often he/she receives extra help from teacher 1 = never 2 = rarely 3 = some of the time 4 = most of the time 5 = all of the time; Parents help = Child report of how often

he/she receives help with school work from parents; Parents encourage = Child report of how often parents encourage him/her with regard to school work; Parents expect too much = Child report of how often he/she feels that parents expect too much; Place for homework = Child report of how often he/she has a suitable place to do homework; Does homework = Child report of how often he/she does required homework.

^{a, b, c,} indicate means that differ significantly ($p < .05$) from one another.

Table 12: Descriptive Information for Parent Indices of School Performance for All Groups

	RO ^a			CB ^b			EA ^c		
	<u>M</u>	<u>SD</u>	<u>N</u>	<u>M</u>	<u>SD</u>	<u>N</u>	<u>M</u>	<u>SD</u>	<u>N</u>
Read	2.6 ^b	1.4	34	4.2	1.1	41	3.3 ^b	1.5	24
Math	2.6 ^b	1.4	34	4.1	1.0	41	3.1 ^b	1.3	24
Comp	2.4 ^b	1.4	34	3.9	1.2	41	3.0 ^b	1.2	24
Science	2.7 ^b	1.0	29	4.2	.89	41	3.3 ^b	1.1	23
Parent Overall	2.8 ^b	1.3	32	4.2	1.1	41	3.2 ^b	1.3	24

Note. Read = Parent report of performance in reading 1 = well below average 2 = below average 3 = average 4 = well 5 = very well 6 = not applicable; Math = Parent report of performance in math; Comp = Parent report of performance in written work and composition; Science = Parent report of performance in science; Parent Overall = Parent report of overall school performance

^{a, b, c.} indicate means that differ significantly ($p < .05$) from one another.

Table 13: Incidence of Grade Retention for All Groups

	RO	CB	EA
	(n = 35)	(n = 38)	(n = 23)
Kindergarten	2	-	
Grade 1	3	-	
Grade 2	2	-	1
Grade 3	1	-	
Grade 4	2	-	
Total	10	-	1

Table 14: Descriptive Information from Parent Satisfaction Measures for All Groups

	RO ^a			CB ^b			EA ^c		
	<u>M</u>	<u>SD</u>	<u>N</u>	<u>M</u>	<u>SD</u>	<u>N</u>	<u>M</u>	<u>SD</u>	<u>N</u>
Satisfaction with achievement	3.3	1.2	34	3.8	1.2	41	3.4	.87	21
Help outside school	1.7	.46	34	1.9	.26	41	1.8	.41	24
Special resource help	1.5 ^{b,c}	.50	35	2.0	.16	41	1.9	.34	23
Grades important	2.6 ^b	.86	34	3.1	.88	41	2.8	.89	23
Level of school hoped for	3.6 ^{b,c}	1.2	29	4.6	1.0	38	4.7	.89	22
Satisfied with schooling	4.5	1.0	35	4.7	.93	41	4.5	1.4	23
School ability to meet needs	4.3	1.1	35	4.6	.99	41	24.3	1.5	23

Note. Satisfaction with achievement = Parent report of satisfaction with their child's academic achievement 1 = extremely displeased or unsatisfied 2 = very displeased or unsatisfied 3 = somewhat displeased or unsatisfied 4 = somewhat pleased or satisfied 5 = very pleased or satisfied 6 = extremely pleased or satisfied; Help outside school = Parent report of whether or not child receives academic help outside school 1 = yes 2 = no; Special resource help = Parent report of whether child receives special resource help (i.e. learning assistance) 1 = yes 2 = no; Grades important = Parent report of the importance of their children getting good grades 1 = not important 2 = somewhat important 3 = important 4 = very important; Level of school hoped for = Parent report of how far they hope their child will go in school 1 = complete elementary school 2 = complete secondary or high school 3 = community college 4 = trade, technical or vocational school 5 = university 6 = other (please specify); Satisfied with schooling = Parent report of

satisfaction with their child's quality of schooling 1 = extremely unsatisfied 2 = very unsatisfied 3 = somewhat unsatisfied 4 = somewhat satisfied 5 = very satisfied 6 = extremely satisfied; School ability to meet needs = Parent report of satisfaction with the school's ability to meet their child's needs.

^{a, b, c,} indicate means that differ significantly ($p < .05$) from one another.

Table 15: Descriptive Information from Teacher Report of School Performance for All Groups

	RO ^a			CB ^b			EA ^c		
	<u>M</u>	<u>SD</u>	<u>N</u>	<u>M</u>	<u>SD</u>	<u>N</u>	<u>M</u>	<u>SD</u>	<u>N</u>
Reading	2.5 ^b	1.3	33	4.0	1.1	39	3.2 ^b	1.4	23
Math	2.7 ^b	1.2	33	3.8	1.2	39	3.1	1.3	23
Composition	2.5 ^b	1.3	33	3.5	1.2	39	3.1	1.4	23
Teacher Overall	2.6 ^b	1.2	33	3.6	1.1	39	3.0	1.1	22

Note. Reading = Teacher report of performance in reading 1 = near the bottom of the class 2 = below the middle of the class 3 = in the middle of the class 4 = above the middle of the class 5 = near the top of the class 6 = does not teach reading; Math = Teacher report of performance in math; Composition = Teacher report of performance in written work, i.e. spelling/composition; Overall = Teacher report of overall school performance.

^{a, b, c,} indicate means that differ significantly ($p < .05$) from one another.

Table 16: Correlations between Demographic Characteristics at Phase 3 and Intellectual and Academic Performance for the RO Group

RO Group ($n = 28-34$)

	Momage	Momed	Dadage	Daded	Income
Verbal Reasoning	.11	-.30+	.26	-.09	.13
Abstract/Visual	.21	-.11	.27	-.05	.08
Quantitative Reasoning	.10	-.25	.10	-.30	.15
Short-term Memory	.14	-.22	.29	-.01	.01
Total IQ	.17	-.25	.27	-.11	.09
CQ spell	.27	-.24	.39*	-.18	.00
CQ arith	.36*	-.06	.37	-.02	-.15
CQ word id	.19	-.15	.39*	-.07	-.04
CQ passage	.21	-.25	.52**	.02	.14
CQ composite	.28	-.19	.46*	-.07	.07
Child overall	-.04	-.28	.03	-.03	.05
Parent overall	.35+	-.15	.39*	-.07	.12
Teacher overall	.05	-.17	.21	-.14	-.10

Note. Verbal Reasoning = Verbal Reasoning sum of area score incorporating vocabulary and comprehension subscales; Abstract/Visual = Abstract/Visual sum of area score incorporating pattern analysis, copying, and matrices subscales; Quantitative Reasoning = Quantitative Reasoning sum of area score incorporating quantitative subscale; Short-term Memory = Short-term memory sum of area score incorporating bead memory and memory for sentences subscales; Total IQ = Stanford-Binet Test Composite score; CQ =

Canada Quick Individual Educational Test; spell = CQ spelling standard score; arith = CQ arithmetic standard score; word id = CQ word identification standard score; passage = CQ passage comprehension standard score; composite = CQ composite score; Child overall = Child report of how well he/she is doing in school 1 = very poorly 2 = poorly 3 = average 4 = well 5 = very well; Parent overall = Parent report of overall school performance 1 = well below average 2 = below average 3 = average 4 = well 5 = very well 6 = not applicable; Teacher overall = Teacher report of overall school performance 1 = near the bottom of the class 2 = below the middle of the class 3 = in the middle of the class 4 = above the middle of the class 5 = near the top of the class; Momage = Mother's age in years at time target child was assessed; Momed = mother's education level with 1 = elementary school, 2 = some high school, 3 = high school completion, 4 = vocational or some college/university, 5 = college or university graduate, 6 = graduate or professional school; Dadage = Father's age in years at time target child was assessed; Daded = father's education level with 1 = elementary school, 2 = some high school, 3 = high school completion, 4 = vocational or some college/university, 5 = college or university graduate, 6 = graduate or professional school; Income = gross annual income with 1 = less than \$20,000, 2 = \$21-30,000, 3 = \$31-40,000, 4 = 41,000-50,000, 5 = 51-60,000, 6 = 61,000-70,000, 7 = \$71,000-80,000, 8 = 81,000-90,000, 9 = 91,000, 10 = above \$100,000.

[†]p < .10 *p < .05 **p < .01 ***p < .001.

Table 17: Correlations between Time in Institution and Intellectual and Academic Indices for the RO Group

RO Group ($n = 31-34$)

	Time in Institution
Verbal Reasoning	-.45**
Abstract/Visual	-.36*
Quantitative Reasoning	-.34+
Short-term Memory	-.46**
Total IQ	-.46**
CQ spell	-.22
CQ arith	-.37*
CQ word id	-.20
CQ passage	-.22
CQ composite	-.27
Child overall	-.26
Parent overall	-.31+
Teacher overall	-.31

Note. Verbal Reasoning = Verbal Reasoning sum of area score incorporating vocabulary and comprehension subscales; Abstract/Visual = Abstract/Visual sum of area score incorporating pattern analysis, copying, and matrices subscales; Quantitative Reasoning = Quantitative Reasoning sum of area score incorporating quantitative subscale; Short-term Memory = Short-term memory sum of area score incorporating bead memory and memory for sentences subscales; Total IQ = Stanford-Binet Test Composite score; CQ =

Canada Quick Individual Educational Test; spell = CQ spelling standard score; arith = CQ arithmetic standard score; word id = CQ word identification standard score; passage = CQ passage comprehension standard score; composite = CQ composite score; Child overall = Child report of how well he/she is doing in school 1 = very poorly 2 = poorly 3 = average 4 = well 5 = very well; Parent overall = Parent report of overall school performance 1 = well below average 2 = below average 3 = average 4 = well 5 = very well 6 = not applicable; Teacher overall = Teacher report of overall school performance 1 = near the bottom of the class 2 = below the middle of the class 3 = in the middle of the class 4 = above the middle of the class 5 = near the top of the class; Time in Institution = Time children spent in institutions in months.

[†]p < .10 *p < .05 **p < .01 ***p < .001.

Table 18: Correlations between Phase 2 Measures and Phase 3 Intellectual and Academic Functioning for the RO Group

RO Group ($n = 21-34$)

	Developmental Delay	School Readiness	Home Total	Academic Stim
Verbal Reasoning	-.18	.61**	.62***	.22
Abstract/Visual	-.13	.76***	.66***	.46*
Quantitative Reasoning	-.26	.31	.55**	.23
Short-term Memory	-.18	.80***	.55**	.38+
Total IQ	-.21	.74*	.67***	.40+
CQ spell	-.21	.68**	.48**	.52*
CQ arith	-.46*	.74***	.49**	.44*
CQ word id	-.26	.71***	.46*	.36
CQ passage	-.25	.70***	.53**	.57**
CQ composite	-.21	.76***	.52**	.52*
Child overall	-.28	.03	-.32+	.34
Parent overall	-.39*	.55*	.52**	.34
Teacher overall	-.30	.60**	.44*	.31

Note. Verbal Reasoning = Verbal Reasoning sum of area score incorporating vocabulary and comprehension subscales; Abstract/Visual = Abstract/Visual sum of area score incorporating pattern analysis, copying, and matrices subscales; Quantitative Reasoning = Quantitative Reasoning sum of area score incorporating quantitative subscale; Short-term Memory = Short-term memory sum of area score incorporating bead memory and

memory for sentences subscales; Total IQ = Stanford-Binet Test Composite score; CQ = Canada Quick Individual Educational Test; spell = CQ spelling standard score; arith = CQ arithmetic standard score; word id = CQ word identification standard score; passage = CQ passage comprehension standard score; composite = CQ composite score; Child overall = Child report of how well he/she is doing in school 1 = very poorly 2 = poorly 3 = average 4 = well 5 = very well; Parent overall = Parent report of overall school performance 1 = well below average 2 = below average 3 = average 4 = well 5 = very well 6 = not applicable; Teacher overall = Teacher report of overall school performance 1 = near the bottom of the class 2 = below the middle of the class 3 = in the middle of the class 4 = above the middle of the class 5 = near the top of the class; Developmental Delay = Composite Score on the Revised Denver Prescreening Developmental Questionnaire; School Readiness = Composite score on the Bracken School Readiness Scale; Home Total = Composite score on The Home Observation for Measurement of the Environment Inventory; Academic Stim = Academic Stimulation subscale on The Home Observation for Measurement of the Environment Inventory.

Note. Total IQ = Stanford-Binet Composite Score; Total Achievement = Canada-QUIET (Quick Individual Educational Test) Composite Score.

[†]p < .10 *p < .05 **p < .01 ***p < .001.

Table 19: Regression analyses using Predictor Variables at Time 1 and Time 2 and Intellectual and Academic Performance at Time 3 for the RO Group

RO Group ($n = 21$)

	T1 and T2 Predictors	F-Change	R ² Change	Cum R ²
T3 Dependent Variables				
Total IQ	Time in institution	6.65*	.26	.26
	Home stimulation	3.42+	.12	.38
	School readiness	8.16*	.20	.58
Total Achievement	Home stimulation	6.69*	.26	.26
	School readiness	13.82**	.32	.58

⁺p < .10 *p < .05 **p < .01 ***p < .001.

Table 20: Correlations Between Academic Self-Perceptions and Intellectual and Academic Indices for the RO Group

RO Group ($n = 29-32$)

	Academic Self-Concept
Verbal Reasoning	.16
Abstract/Visual	.20
Quantitative Reasoning	.36*
Short-term Memory	.24
Total IQ	.26
CQ spell	.31+
CQ arith	.31+
CQ word id	.40*
CQ passage	.34+
CQ composite	.37*
Parent overall	.50**
Teacher overall	.42*
Child overall	.40*
Like school	.77***
Grades important	.20
Like math	.40*
Extra help from teacher	.22
Parents help	.17
Parents encourage	.00
Parents expect too much	.33+

Place for homework	-.09
Does homework	.28

Note. Verbal Reasoning = Verbal Reasoning sum of area score incorporating vocabulary and comprehension subscales; Abstract/Visual = Abstract/Visual sum of area score incorporating pattern analysis, copying, and matrices subscales; Quantitative Reasoning = Quantitative Reasoning sum of area score incorporating quantitative subscale; Short-term Memory = Short-term memory sum of area score incorporating bead memory and memory for sentences subscales; Total IQ = Stanford-Binet Test Composite score; CQ = Canada Quick Individual Educational Test; spell = CQ spelling standard score; arith = CQ arithmetic standard score; word id = CQ word identification standard score; passage = CQ passage comprehension standard score; composite = CQ composite score; Parent overall = Parent report of overall school performance 1 = well below average 2 = below average 3 = average 4 = well 5 = very well 6 = not applicable; Teacher overall = Teacher report of overall school performance 1 = near the bottom of the class 2 = below the middle of the class 3 = in the middle of the class 4 = above the middle of the class 5 = near the top of the class; Child overall = Child report of how well he/she is doing in school 1 = very poorly 2 = poorly 3 = average 4 = well 5 = very well; Like school = Child report of how much they like school 1 = hate school 2 = not very much 3 = a bit 4 = quite a bit 5 = very much; Grades important = Child report of the importance of grades to him/her 1 = not important at all 2 = not very important 3 = somewhat important 4 = important 5 = very important; Likes math = child report of liking mathematics 5 = true 4 = mostly true 3 = sometimes false/sometimes true 2 = mostly false 1 = false; Extra help

from teacher = Child report of how often he/she receives extra help from teacher 1 = never 2 = rarely 3 = some of the time 4 = most of the time 5 = all of the time; Parents help = Child report of how often he/she receives help with school work from parents; Parents encourage = Child report of how often parents encourage him/her with regard to school work; Parents expect too much = Child report of how often he/she feels that parents expect too much; Place for homework = Child report of how often he/she has a suitable place to do homework; Does homework = Child report of how often he/she does required homework.

⁺p < .10 *p < .05 **p < .01 ***p < .001.