Improving Reading Skills: Policy Sensitive Non-School and Family Factors

Final Report

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January 2006

SP-620-01-06E
(également disponible en français)

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This paper is available in French under the title *Améliorer le rendement en lecture : initiatives stratégiques portant sur les facteurs autres que scolaires et les facteurs familiaux.*

La version française du présent document est disponible sous le titre *Améliorer le rendement en lecture : initiatives stratégiques portant sur les facteurs autres que scolaires et les facteurs familiaux.*

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Paper
ISBN: 0-662-42212-0
Cat. No.: HS28-40/2006E

PDF
ISBN: 0-662-42213-9
Cat. No.: HS28-40/2006E-PDF

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Abstract

One of the major findings from the analysis of the Programme for International Student Assessment (PISA) and the Youth in Transition Survey (YITS) data for Canadian youth is that non-school and family factors are more related to reading skills than school characteristics. This finding raises an important policy research question about the processes within families and communities that provide opportunities for youth to successfully engage in reading. This report examines the relationship between Canadian students' literacy proficiency and non-school and family factors. This relationship is explored from a number of theoretical lenses including social capital, sociocultural and ecocultural perspectives in an attempt to link educational outcomes to families through social and cultural relations and networking within the family and within the community. The contention is that, these perspectives shape family routines, producing interactions between children and their family members that lead to literacy skills. Our analysis employed models within a multilevel framework to assess the key factors and the relative importance of these factors to variation in students' reading achievement levels. The analysis reveals gaps in reading achievement in favour of females, non-immigrants, and youth from high Socioeconomic Status (SES) families even with control for characteristics of schools youth attend. Family characteristics such as parental education expectation, family educational support, and parental academic interest are important predictors of reading achievement. These characteristics affect not only the quality of reading but also the equity of reading achievement, narrowing both the gender and socioeconomic gap and enlarging the gap in reading achievement between immigrants and non-immigrants. Our findings demonstrate that policy initiatives that encourage parents to motivate their youth to pursue higher education and provide opportunities for these youth to enjoy and read from diverse sources are likely to address both the quality and equity issues in reading.

1. Introduction

In the year 2000, thirty-two countries including Canada participated in an international comparative study--the Programme for International Student Assessment (PISA) to assess the literacy skills of 15-year-olds, most of whom were close to the end of compulsory schooling. The study had two main objectives: to assess how well 15-year-old youth apply three forms of literacy; mathematics, reading, and science in real life situations, and to discern the factors associated with high literacy levels. PISA is expected to provide data on the literacy levels of youth in the participating countries for every three years (2000, 2003, and 2006) with emphasis on reading in the 2000 survey. In 2003, the assessment emphasized mathematics literacy while the 2006 survey will provide a more comprehensive data on science literacy. The assessment collected information on student engagement in literacy, gender, family background, and characteristics of schools students attend. In Canada, PISA is supplemented with a Youth in Transition Survey (YITS) to provide more contextual data for longitudinal analysis. The analysis of PISA and YITS in a number of reports, have described the factors associated with literacy proficiency. A comprehensive analysis of factors affecting reading skills indicate that students' family background are much more related to reading skills than schooling characteristics (Bussière et al., 2001). This finding raises an important policy research question: what are the processes within families that provide opportunities for Canadian youth to successfully engage their reading skills in real life situations? This report employs data from PISA and YITS to address the following research questions:

- What are the key family factors, over and above school factors associated with high and low reading performance?
- What is the relative importance of income and socio-economic status compared to other factors affecting reading performance?
- Are there non-financial policy sensitive variables (such as parents' academic expectations and aspirations) that affect reading performance?

Given the increasing importance of reading skills in overall quality of life and the influence of family characteristics on the acquisition of these skills, we expect findings from this study to inform policy decisions for improving reading. This is because our analysis attempts to identify individual characteristics as well as family support systems and the processes within families that promote or hinder the acquisition of reading skills.

2. Theoretical Perspectives and Literature Review

2.1 Social capital

In the past, researchers have explained the effect of family characteristics on students' learning in terms of transmission of social capital. Social capital entails social relations and networks that provide opportunities for children with access to this capital to develop an identity that allow them to understand and value cognitive development processes. Coleman (1990) locates social capital within the family and also outside the family within a community so that when children are raised from families or communities with access to this capital, we expect them to have a better understanding of the learning processes.

Croll (2004) has noted different ways in which social capital has been conceptualized for understanding the family processes relating to educational transmission (eg. Horvat et al., (2003) and Schneider and Stevenson (1999) who relied on Coleman (1990) and, Ball (2003) who relied on the work of Bourdieu (1980, 1986)). In Croll's discussion of the results of an empirical study of family roles in relation to education, using the British Household Panel Survey, he concluded that, "the central point that emerges from this analysis is the importance of families" (p.412). He identified what parents do, through communication and other activities, both within and outside the family, as making a difference for young people educationally. Croll argued that, "[d]irect parental mentoring such as monitoring homework is associated with favourable educational outcomes, but also associated with such outcomes is more general parent-child communication and parental involvement in wider social networks"(p.412).

Further, Croll's analysis indicated that the impact of within-family processes were more self-contained. In contrast, the wider social involvement of the parents, "were associated with political participation (voting) and trust in other people and had weak but positive associations with feelings of well-being and satisfaction with life" (p. 413). Thus, social capital both within the family, and even more so within the community, has a positive effect on children's educational achievements.

2.2 Sociocultural lens

Recent research by Arzubiaga, Rueda and Monzo (2002) has viewed family influences on learning from the sociocultural lens where the learning context, particularly social features and cultural-historical factors, play significant roles in the acquisition of learning skills. In general, sociocultural perspectives ascribe successful learning and development to culturally organized and socially mediated practices during children's maturational processes. These perspectives shift the unit of analysis from the isolated individual to the individual in interaction with and within the larger sociocultural context. This shift is especially important as it offers an explanation to the variation in achievement patterns

within a learning environment in terms of differences in student interest, motivation, engagement and participation in activities within the setting.

Based on the sociocultural perspectives, we expect an individual's active participation and engagement in learning activities to be the driving force for success in acquiring reading skills in the context of school. Within schools, we will expect family experiences to play a critical role. Arzubiaga, Rueda and Monzo (2002) argue that, "the daily family practices in which children participate may affect their access to school-based literacy activities; their notions of engagement and the organization of literacy practices; their appreciation of and interest in reading; and their idea of what counts as meaningful literacy" (p. 5).

The complexities of family influence on literacy can further be unpacked from an ecological and cultural (ecocultural) perspective. This perspective suggests that ecological and cultural factors shape everyday family routines, producing "zones of proximal development" where interaction with expert others such as parents, older siblings, and grandparents leads to literacy skills (Gallimore & Goldenberg, 1993; Rogoff, 1990; Tharp & Gallimore, 1988, Weisner, 1984). Furthermore, from the ecocultural perspective, adaptation by any group, regardless of size, involves balancing ecology (resources, constraints), culture (beliefs, values, and schemata), and the needs and abilities of family members in the organization of daily routines (Gallimore, Weisner, Kaufman, & Bernheimer, 1989). Snow, Barnes, Chandler, Goodman, and Hemphill (1991) for instance, found that dinner conversations are related positively to the literacy-related language skills of children from low-income neighbourhoods. This finding demonstrates how a seemingly simple family routine lead to acquisition of literacy skills.

We also intend to adopt a perspective by Reynolds, Mavrogenes, Bezruczko, and Hafemann (1996) to characterize policy sensitive family factors in this proposed project. Central to their theoretical perspective is the argument that "family involvement in children's learning, and a positive supportive family atmosphere, will provide a critical source of education and social support that promotes children's development over time" (p. 1121). An important feature of this perspective is that it unites the fundamental theoretical constructs that are believed to reflect powerful family influences on children's learning: family support structure and parent education involvement.

2.3 Family Support Structure

The literature uses proximal processes to refer to the transactions between children and their family environment that promote the development of competence. Many family proximal factors have been found to influence children's learning, such as nutrition (Dunst, 1993), shelter (Dunst, 1993; Bradley et al., 1989), stimulation (Bernard, 1995; Bradley et al., 1989), support (Franz, McClelland, & Weinberger, 1991), attachment (Cohn, 1990; Easterbrooks & Lamb, 1979), and parenting style (Dekovic & Janssens, 1992; Pettit, Harrist, Bates, & Dodge, 1991). The specific linguistic and cultural practices of a family (e.g., the amount of time spent reading together as a family) can have significant effects on the development of individual language capacities (Bus, van IJzendoorn, & Pellegrini, 1995). Family

arrangements and constitution and the amount of contact with extended family can also affect child development through the kinds of interactive opportunities these arrangements provide (Hernandez, 1997).

The literature also uses distal processes to describe factors that affect a family's ability to provide support for children's learning. Common distal factors identified in the literature include social support for parents and access to community resources (McCubbin, McCubbin, & Thompson, 1993), employment and income (Lefebre & Merrigan, 1998), interpersonal relationships at home (Lindahl, 1998), and the family's ability to adjust to demands and stress (McCubbin et al., 1993).

2.4 Parent Education Involvement

A number of researchers have identified parents as a critical force, even more powerful and direct than teachers, in their children's education (e.g., Eccles & Jacobs, 1986). Parental involvement has positive effects on children's learning across a wide range of populations (e.g., Chavkin, 1993; Christenson, Rounds, & Gorney, 1992; Eccles & Harold, 1993; Edwards & Young, 1992; Epstein, 1991, 1994). Ascher (1988) stated that, "the more parents participate in a sustained way at every level — in advocacy, decision-making and oversight roles, as fund-raisers and boosters, as volunteers and paraprofessionals, and as home tutors — the better for student achievement" (p. 113). Edwards and Young (1992) summarized that "studies point to higher student achievement when parents participate in school activities, monitor children's homework, and otherwise support the extension into the home of the work and values of the school" (p. 73). In Canada, the Canadian Council on Social Development (1997) has clearly recognized that the level of parent involvement in children's education is related to children's educational achievement.

Grolnick and Slowiaczek (1994) theorized three categories of parental involvement; behavioural, personal and intellectual. Parents' *behavioural* involvement such as visiting school and participating in educational affairs provides information useful to help their child's schooling. Parents' involvement is often characterised as *personal* when this involvement leads to their child's affective experiences in and out school. This involvement helps refine the affective characteristics of the child in general and create a positive attitude toward schooling and self in particular. Parents' *intellectual* involvement exposes the child to cognitively stimulating activities such as reading books and discussing current events. All three types of parental involvement, not just the intellectual component, have a positive effect on children's school performance. The broader literature identifies five critical factors of parent involvement: home discussion, home supervision, home-school communication, volunteering work for school, and parent expectation.

Home discussion about school has been associated with students' higher academic achievement (Christenson *et al*., 1992; Keith, 1991; Walberg, 1986). High achieving students regularly communicate with their parents about school life (e.g., de Kanter, Ginsburg, & Milne, 1986). Parents of high achieving students have rich verbal interaction with their children, delivering verbal cues, directions, guidance, and encouragement

(e.g., Christenson *et al*., 1992; Gonzalez & Blanco, 1991). Ho and Willms (1996) concluded that "it was involvement at home, particularly in discussing school activities and helping children plan their programs, that had the strongest relationship to academic achievement" (p. 137). Chao and Willms (2002) in a study of the effects of parenting practices on children's outcome, based on analysis of Canada's National Longitudinal Survey of Children and Youth (NLSCY), found that "parenting practices have important effects on a child's social and cognitive outcomes"(p.164).

Home supervision often includes such things as parents' structuring children's time for homework, modelling children's learning, encouraging children to read at home, and limiting the time children watch television (see Christenson *et al*., 1992). Overall, parents setting standards, enforcing rules, and encouraging discussion, negotiation, and independence is associated with students' higher academic outcomes (Christenson *et al*., 1992).

A positive home-school connection is related to higher academic outcomes (Redding, 1991). Both school to home communication (teachers inform parents about school programs and children's progress) and home to school communication (parents contact teachers about their children's school life) have been considered important (e.g., Epstein, 1987; Muller, 1993).

Parents of high achieving students also actively participate in parent-teacher organizations (Jencks, 1972). Corner and Haynes (1991) described a pattern that is often referred to as meaningful parental participation, in which parents actively get involved at all levels of their children's school life, from providing general support for schools' educational goals, to participating regularly in social and academic activities, to offering suggestions to school planning and management.

A number of researchers have also emphasized the positive effects of parental expectation on a range of educational outcomes (e.g., Astone & McLanahan, 1991; Fehrmann, Keith, & Reimers, 1987). Students from a home environment that values academic achievement and promotes intellectual activities achieve better academically (Fraser, Welch, & Walberg, 1986; Kurdek & Sinclair, 1988). Parents with high expectations for their children cooperate actively with teachers and schools, thus improving their children's educational opportunities and attainment (e.g., Fehrmann et al., 1987; Lareau, 1987; Stevenson & Baker, 1987).

One theoretical explanation of how parental involvement works for children is that it improves children's cognitive skills and that makes them more likely to succeed in academic work. For example, Epstein (1988) argued that parental involvement makes a child realize the importance of education, which leads to more responsible efforts in school. Parental involvement also has effects on school performance through helping the child with schoolwork and providing resources for skill development.

2.5 Equity in Reading Achievement

One of the major concerns among policy makers in their task to achieve equity in reading is the persistent reading achievement gap between boys and girls. The results of assessments undertaken at various levels of government in Canada indicate that gender is a significant factor in reading achievement—boys tend to have weaker reading skills than girls.

Various reasons have been given for boys having poorer literacy skills than girls: the fact that individuals have different views about themselves and about reading and this might explain why some students choose not to read (Beers, 1996, pp.31-33); the characteristics of reading programs in school may discourage boys from reading (Millard, 1997, p.1); lack of understanding of boys' learning styles (Wilson, 2003, p.12), the lack of highly structured lessons more suited to boys (West, 2000, p.4; Booth, 2002, p.61), boys viewing reading and writing as a mystery that teachers, women and girls are more able to decipher (Pirie, 2002, p.52), the lack of effectiveness of performance assessments (Cohen, P., 1995, p.6; McTighe, J., 1996/1997, p.9) and the level of parental involvement (OFSTED, 2003).

Immigration is another important factor that affects equity in reading. Arzubiaga, Rueda and Monzo (2002) examining the relationship between ecocultural features of Latina/o families and their children's motivation to read identified five salient ecocultural features: immigration, culture and language, nurturance, instrumental, and workload. In explaining the immigration feature they stated that, "[i]mmigrant families undergo processes of adaptation that differ from those experienced by non-immigrant families."(p.7) Their study considered, "the effect of immigration on subsistence base, the effect of maintaining a home in the country of origin, the acculturation of couples, the effect of bringing up children in a host country, and families' views on and goals for integration"(p.7). Consequently, they interpreted a high score on immigration as indicating that, "the family was adapting to the host country and held positive views on their adaptation." Their findings indicated that immigration did not relate either to the children's self-concept or their value reading and, neither did instrumental knowledge. However, the ecocultural factors of workload, nurturance and culture and language related to the children's reading motivation (p.8).

Rueda, MacGillivray, Monzo, and Arzubiaga (2001) also concluded, in a study of reading engagement among Spanish-speaking children and families in Southern California, that immigration as a family ecocultural factor does not relate to children's motivation to read. The result of their study indicated that, immigration was related to the teacher's view of the child as a writer (p. 14) and the teacher's perception of the child's reading achievement and reading grade (p.15). Thus, where the teacher viewed the child as a writer and perceived the child's reading achievement and reading grade as high, it was more likely that the family would "make changes to adapt and hold a positive view about the adaptations they were making to live in the host country" (p.15).

Studies of the academic achievement of immigrant students in the United States have shown that proficiency in English is a significant predictor of academic achievement of immigrant students (Adams, Astone, Nunes-Wormack, and Smodlaka, 1994). Consequently, low proficiency in English has been identified as a critical factor for low achievement and school failure among immigrant students (Bhattacharya, 2000). Tungmala (1999) found that in the United States, immigrant students with a home environment that was richer in English literacy showed higher competence in reading and writing in English. Further, the same study found that factors such as immigrant students' attitudes, parental expectations, and home culture have significant effects on the academic performance of immigrant students in the United States regardless of socioeconomic background. The American studies noted above have so far ruled out immigration as a significant factor in children's reading motivation. However, as far as academic performance is concerned these studies have shown that low proficiency in English is a critical influential factor in immigrant students' academic achievement.

In the Canadian context, Ma (2003)'s study of the Canadian sample from Programme for International Student Assessment (PISA) examined the effects of student and school characteristics on academic achievement of immigrant and non-immigrant students. He found no difference in mathematics achievement, but non-immigrant students outperformed immigrant students in both reading and science achievement. In another Canadian study, Worswick (2004) assessed the school performance of the children of immigrants in the Canadian school system from 1994 to 1998 using data from the National Longitudinal Survey of Children and Youth (NLSCY). He found, analyzing data on children aged 15 or younger, that children of immigrant parents, whose first language was not English or French, started school with less developed skills in reading, writing and mathematics than their classmates whose parents were born in Canada. However, the gap between the two groups of children disappeared by the end of elementary school. McMullen (2004) has noted that the 2000 PISA results are consistent with Worswick's findings.

Analyzing the educational attainment of immigrant children in Canada in the long term, Hansen and Kucera (2003) used data from the 2000 wave of Statistics Canada's Survey of Labour and Income Dynamics (SLID) to compare children of immigrants (second-generation immigrants) aged between 26 and 65 and similarly-aged children of Canadian-born parents in terms educational attainment. They stated their results thus: "[i]n contrast with previous studies, our results suggest that the children of immigrants do better in terms of educational attainment than their native Canadian counterparts even after the effects of selected individual characteristics are controlled for" (p.16). These results were the same whether a second-generation immigrant was defined as an individual with at least one parent born outside Canada or more strictly as an individual whose parents are both foreign-born.

On the Canadian front, Ma (2003), in an observation similar to that noted in the American studies stated, “the challenge for immigrant students whose mother tongue is neither English nor French to do well in language arts is obvious, and the tremendous effect associated with home language in the current analysis indicates that these immigrant students were not adequately successful in mastering language arts in their new country” (p.566). However, the Canadian studies by Worswick (2004) and, Hansen and Kucera (2003) suggest that the challenges immigrant children face in school in the early stages is not reflected in their long term educational outcomes. In this study, we note the early challenges identified in the literature as confronting immigrant children as they adapt to education in their new countries and, focus our analysis on the immigration factor in relation to equity in reading from the Canadian context.

3. Method

3.1 Data

Our analysis is based on the Canadian sample from Programme for International Student Assessment/Youth in Transition Survey (PISA/YITS). The sample consists of 29,687 youth aged 15 years who were selected from 1,117 schools across the ten provinces through stratified random sampling procedures. YITS and PISA have the same sample of students and schools. To assess students' reading skills, participants in the study responded to a standardized reading achievement test. Students and school administrators responded to questionnaires that provided contextual information describing the student, their family and school characteristics. The PISA/YITS data had sampling weights for students and schools. These weights were used at the student and school levels in the multilevel analysis.

3.2 Variables and Measures

The dependent variable in our analysis is student reading achievement indicated by a scaled score adjusted for reliability, difficulty, and guessing using Item Response Theory (IRT) statistical procedures. The scale is such that the international mean is 500 with a standard deviation of 100. PISA employed matrix sampling procedures where students responded to reading achievement items from different booklets. Because of the matrix sampling, the estimates of students' reading achievement levels are complex. The estimates are based on the IRT statistical procedures that produce a distribution of estimates for a student. For the PISA data, five estimates referred to as five plausible values were randomly selected for each student. These plausible values were combined in the current study as the dependent variable for the data analysis.

The independent variables included student (individual and family)-level and school-level characteristics derived from the questionnaires and selected on the basis of our theoretical and conceptual framework. A total of 18 student level variables were selected. These student-level variables were classified into individual and family characteristics. Individual characteristics included gender, SES, single parent (single parent versus other), immigration status (born in Canada or not). Reading engagement variables include enjoyment of reading, diversity of reading while the student education expectation variable included self-expectation of highest education; university, college and below college. Students school engagement variables include time spent on homework (on all subjects), and sense of belonging. The family characteristics include variables describing the home environment. This environment is characterized by home educational resources, home cultural communication, home social communication, home possessions related to classical culture, and home activities related to classical culture. Family educational support was used as a parental involvement variable. The family characteristics also include parental educational expectation (whether parent sees education as important for child).

Following the same process, 9 school-level variables were selected; school SES, disciplinary climate, student behavior, teacher behavior, teacher-student relationship, teacher shortage, teacher moral and commitment, school instructional resources, and school material resources.

Most of the variables in our analysis are index variables created by PISA staff using a number of questionnaire items and shown to have good psychometric properties. We rescaled these index variables into quartiles in such a way that a higher value indicates a more positive response. In the multilevel analysis these variables were centered at the third quartile. For a comprehensive detail of these variables, see appendix attached to this report.

3.3 Statistical Procedures

We employed multilevel statistical technique as our main analytical framework for a number of reasons. The first, and most obvious, is that the PISA/YITS data are multilevel in nature. PISA/YITS data are at two main levels; students (including families), and schools (i.e., students nested within schools). This data hierarchy must be taken into account in any statistical analysis (e.g., Raudenbush & Bryk, 2002). Statisticians contend that even though one level is not among the interests of research, that level (if present in the data) has to be considered in data analysis in order to produce reliable statistical estimates for variables at other levels (e.g., Snijders & Bosker, 1999). Therefore, it is critical to apply multilevel models in analyzing educational data (Raudenbush & Bryk, 2002; Snijders & Bosker, 1999).

The multilevel analysis program (HLM) has the option of using the five plausible values as outcome (dependent) variables to provide more reliable estimates of effects of independent variables on reading achievement. Other common statistical packages, such as SPSS, cannot easily handle plausible values and statistical packages that can handle plausible values, such as WesVar, do not allow advanced statistical analysis. Furthermore, the multilevel statistical package (HLM) we used in our analysis allows for weightings in the analysis. The PISA/YITS sampling entails complex sampling procedures therefore weights are included in this analysis to ensure reliable estimates of parameters for the statistical models.

3.4 Multilevel models

Our analysis seeks to understand the family processes that influence reading achievement for students attending schools of similar characteristics. To control for school characteristics, we employed a two-level (student and school levels) multilevel analysis where the null model (model with no independent variables) partitioned the total variation on the dependent variable (student's achievement in reading) into within and between schools. This partition allowed for a number of complex analyses including: estimate of the proportion of the total variation attributable to differences in schools, the extent of the effect of individual and family characteristics on reading achievement controlling for school characteristics, and how much of the total variation as well as the

within and between variation are explained by individual and family characteristics. We included weights at the individual and school levels.

The null model was followed by four subsequent comparative models with the objective of assessing the impact of individual, family factors on reading while controlling for differences in school characteristics. The first of these four models included variables describing the gender of students, their immigration status, their socio-economic status, and their family structure (whether they reside in a single family household). We describe these variables as exogenous individual variables defining the characteristics of students who are at risk of being less successful in reading. With the federal and provincial objective of providing opportunities for all children to acquire literacy skills, the effect of these variables on reading served as a useful proxy for equity in reading. Furthermore, this multilevel set up allowed for subsequent modeling to examine the family factors that affect both quality and equity in reading within schools of similar characteristics.

The multilevel modeling proceeded by including variables describing school characteristics in the second model. These school-level variables served mainly as control variables to remove school influences in order for us to isolate (or emphasize) family influences. In the third model, we included variables describing family characteristics to address the question 'to what extent do varying family characteristics affect the reading performance of students within schools with similar characteristics?' The main function of this model is to isolate the unique importance of family characteristics on the quality and equity in reading within schools. Based on social capital and sociocultural theories, we expected family processes to influence reading achievement but the extent of this influence on quality and equity in reading with control of school characteristics is unknown. We continued the multilevel modeling with a fourth model where we included endogenous individual level variables describing students' behaviour and motivation to learn. Our objective was to use this final model to explore the extent to which these individual characteristics mediate the effect of family characteristics on reading. That is, for students with similar family characteristics, the multilevel modeling process we adopted allowed us to isolate the unique importance of these individual characteristics on quality and equity within schools controlling for school characteristics. Further details of these models are discussed in the results and discussion section.

In general, with the multilevel procedures, we were able to carry out our within-school analysis (or analysis of students) controlling for differences in school processes as the multilevel structure allows for estimate of within-school parameters. The multilevel models also provided estimates of variance so that we were able to carry out variance component analysis to determine proportion of variance attributable to differences in family characteristics. We note that any statistical claims about how much students vary in reading achievement that are not based upon a multilevel framework will not be able to control for school effects (see Raudenbush & Bryk, 2002; Snijders & Bosker, 1999).

In entering the independent variables in our multilevel modeling, we used the method of block entry as outlined in Cohen and Cohen (1983). Cohen and Cohen (1983) described the method as theoretically conservative and statistically rigorous. Another important advantage of the block entry method is that it controls for potentially confounding independent variables. The method entails sets (blocks) of independent variables that are added to model equations by block entry. In our case, we used four sets of independent variables: school characteristics, individual characteristics (gender, SES, single parent, and immigrant status) to identify equity in reading, family characteristics, and other individual level characteristics. The effect of each set on students' achievement on reading was evaluated through the change in total variance as well as change in within-and between-school variance.

3.5 Descriptive and logistic regression analysis

The multilevel analysis was designed to compliment a descriptive analysis that simply separated students into high, average and low achieving groups and use descriptive statistics to profile the groups. The descriptive analysis entails a profile of reading achievement by individual, family and school characteristics. In PISA/YITS, students' reading achievement levels are indicated by five plausible values with an international mean of 500 and standard deviation of 100. The profile analysis is based on the average of the five plausible values. We classified this average into three categories with "high" being defined as achievement above the 75th percentile, "average" being defined as achievement between the 25th percentile and the 75th percentile, and "low" being defined as achievement below the 25th percentile. The profile analysis of reading achievement of students is presented in terms of individual, family, and school characteristics. Individual characteristics include the variables; gender, the immigrant status, single parent home, enjoyment of reading, diversity of reading, time spent on homework, sense of belonging to school, and student education expectation. The family characteristics variables are; home educational resources, home cultural possession, home cultural activities, family educational support, parental academic interest, parental social interest, and parental education expectation. Variables describing school characteristics include; school socioeconomic composition, disciplinary climate, student behavior, teacher behavior, teacher-student relationship, teacher shortage, teacher moral and commitment, school instructional resources, and school material resources. See appendix for details of these variables. The continuous variables such as 'enjoyment of reading' were rescaled into quartiles (1=first quartile, 2=second quartile, 3=third quartile, and 4=fourth quartile).

The profile also included a logistic regression analysis with low reading achievement as the dependent variable. The logistic regression analysis was carried out separately for each independent variable.

4. Statistical Analysis and Findings

4.1 Profile Analysis

We began our statistical analysis with a profile of reading achievement by individual, family, and school characteristics. As we have indicated in section 3, we classified reading achievement of Canadian students into three categories with "high" being defined as achievement above the 75th percentile, "average" being defined as achievement between the 25th and 75th percentiles, and "low" being defined as achievement below the 25th percentile. Table 1 presents the results of the profile analysis of reading achievement of students in terms of individual (gender, immigrant status, single-parent household, enjoyment of reading, diversity of reading, time spent on homework, sense of belonging to school, and student education expectation), family (home educational resources, home cultural possession, home cultural activities, family educational support, parental academic interest, parental social interest, and parental education expectation), and school (school socioeconomic composition, disciplinary climate, student behavior, teacher behavior, teacher-student relationship, teacher shortage, teacher moral and commitment, school instructional resources, and school material resources) characteristics. The Appendix presents a description of the school-level variables. For the purpose of this profile analysis, we rescaled continuous variables (e.g., enjoyment of reading) into quartiles (1 = first quartile, 2 = second quartile, 3 = third quartile, and 4 = fourth quartile).

We continued the profile analysis with a series of logistic regressions where we employed low reading achievement as the dependent variable. We carried out separately analysis for each independent variable. For independent variables scaled into quartiles, the reference is the fourth quartile. We reported only odds ratio for the first quartile with respect to the reference in order to compare the likelihood of students on the first quartile being classified as low achievers with the likelihood of students on the fourth quartile being classified as high achievers.

4.2 Profile Analysis of Reading Achievement by Individual Characteristics

As a dichotomous variable, estimates associated with female indicate the percent of females in each achievement category. We find that 61% of students in the high achievement category, 50% of students in the average achievement category, and 37% of students in the low achievement category are female. We find that the likelihood of classifying a female student into the high achievement category is twice (1 ÷ 0.51) as high as the likelihood of classifying her into the low achievement category. All these estimates are a good indication that females have much superior reading achievement than males.

Table 1
Profile of Reading Achievement of Canadian Students by Individual, Family, and School Characteristics

	High Achievement (> 75th percentile)	Average Achievement (25th – 75th percentile)	Low Achievement (< 25th percentile)	Odds Ratio
Individual Characteristics				
Female	60.6	49.5	36.9	0.5
Single Parent	13.8	15.9	17.3	1.2
Immigrant Student	8.5	9.7	15.9	1.9
Reading Engagement				
Enjoyment of Reading	3.2	2.4	1.9	8.9
Diversity of Reading	2.9	2.5	2.2	2.9
Attitude Toward School				
Time Spent on Homework	2.8	2.5	2.2	2.8
Sense of Belonging to School	2.6	2.6	2.4	1.6
Student Education Expectation				
University	89.0	67.6	42.7	
College	8.2	20.4	22.8	2.5
Below College	2.8	12.0	34.6	7.1
Family Characteristics				
Home Environment				
Socioeconomic Status (SES)	3.0	2.6	2.2	3.9
Home Educational Resources	2.5	2.4	2.2	2.2
Home Cultural Possession	3.0	2.6	2.3	3.2
Home Cultural Activities	3.00	2.5	2.2	3.1
Family Support System				
Family Educational Support	2.4	2.5	2.6	0.7
Parental Academic Interest	2.8	2.4	2.2	2.5
Parental Social Interest	2.6	2.4	2.3	1.8
Parental Education Expectation	7.4	12.7	23.5	0.4
School Characteristics				
School Socioeconomic Composition	3.0	2.6	2.2	
School Climate				
Disciplinary Climate	2.3	2.5	2.7	
Student Behavior	2.3	2.4	2.6	
Teacher-Student Interaction				
Teacher Behavior	2.3	2.4	2.4	
Teacher-Student Relationship	2.8	2.5	2.3	
School Resources				
Teacher Shortage	2.1	2.1	2.3	
Teacher Moral and Commitment	2.5	2.5	2.4	
School Instructional Resources	2.3	2.3	2.4	
School Material Resources	2.4	2.3	2.3	

Note: Odds ratio describes the likelihood of falling into the low achievement category in comparison to the likelihood of falling into the high achievement category. Estimates for dichotomous variables are percentages

Percents of students coming from single-parent households are 13%, 16%, and 17% across the high, average, and low achievement categories. With such close percents, the results indicate that students from single-parent households are not much impaired in reading achievement. Percents of immigrant students increase from 9% to 10% to 16% across the three achievement categories from high to average to low. The likelihood of classifying an immigrant student into the low achievement category is twice as high as the likelihood of classifying the immigrant student into the high achievement category. All these results indicate that immigrant students are impaired in reading achievement.

Students in the high achievement category enjoy reading to the most extent, and students in the low achievement category enjoy reading to the least extent. We find that if a student enjoys reading to the least extent in the body of students, then the student is nine times more likely to fall into the low achievement category than the high achievement category. In addition, students in the high achievement category read most diversely, and students in the low achievement category read least diversely. If a student reads least diversely in the body of students, then the student is three times more likely to fall into the low achievement category than the high achievement category.

Students in the high achievement category spend the most time on reading homework, and students in the low achievement category spend the least time on reading homework. We find that if a student spends the least time on reading homework in the body of students, then the student is three times more likely to fall into the low achievement category than the high achievement category. On the other hand, the measure of sense of belonging to school does not differ much across the three achievement categories.

We find that 89% of students in the high achievement category, 70% of students in the average achievement category, and 43% of students in the low achievement category intend to attend university. On the other hand, 8% of students in the high achievement category, 20% of students in the average achievement category, and 23% of students in the low achievement category set their goal of further education at the college level. We find that if a student sets their goal of further education at the college level, then the student is three times more likely to fall into the low achievement category than the high achievement category. Finally, 3% of students in the high achievement category, 12% of students in the average achievement category, and 35% of students in the low achievement category have no intention for higher education. We find that if a student has no intention for higher education, then the student is seven times more likely to fall into the low achievement category than the high achievement category.

4.3 Profile Analysis of Reading Achievement by Family Characteristics

As we expect, students in the high achievement category show the highest SES, and students in the low achievement category show the lowest SES. We find that if a student has the lowest SES in the body of students, then the student is four times more likely to fall into the low achievement category than the high achievement category. Students in the high achievement category report the most educational resources at home, and students in the low

achievement category report the least educational resources at home. If a student has the least educational resources at home, then the student is twice more likely to fall into the low achievement category than the high achievement category.

Students in the high achievement category have both the most cultural possessions and the most cultural activities at home, and students in the low achievement category have both the least cultural possessions and the least cultural activities at home. If a student has the least cultural possessions or the least cultural activities at home, then the student is three times more likely to fall into the low achievement category than the high achievement category.

We find that students in the low achievement category get the most educational support at home, and students in the high achievement category get the least educational support at home. These results make sense to us in that low achieving students are in need of the most educational assistance. Students in the high achievement category report the most parental academic interest, and students in the low achievement category report the least parental academic interest. If parents of a student have the least academic interest in the body of parents, then the student is three times more likely to fall into the low achievement category than the high achievement category.

Also, students in the high achievement category report the most parental social interest, and students in the low achievement category report the least parental social interest. If parents of a student have the least social interest, then the student is twice more likely to fall into the low achievement category than the high achievement category. Finally, parents of 7% of students in the high achievement category, parents of 13% of students in the average achievement category, and parents of 24% of students in the low achievement category do not have education expectations for their children. If parents of a student do not have education expectation, then the student is three ($1 \div 0.39$) times more likely to fall into the low achievement category than the high achievement category.

4.4 Profile Analysis of Reading Achievement by School Characteristics

In the present analysis, we use school characteristics mainly as control variables. Because our goal is to examine non-school factors as they affect reading achievement of students, the removal of school effects reduces the disturbance to (and thus refines) the effects of non-school factors. Nevertheless, most school characteristics are fairly similar across the three achievement categories. Such a situation is particularly evident in comparison with individual and family characteristics. We consider these differences a good indication that individual and family characteristics have a great influence on reading achievement than school characteristics.

4.4.1 Multilevel Models

Although the results in Table 1 are informative with regard to individual, family, and school characteristics that are associated with high and low reading achievement, the analyses are based on raw data (without adjustment for sampling and measurement errors). As such, Table 1 offers preliminary insights into the issues at hand. Our further analysis employs a multilevel framework to demonstrate the importance of individual and family characteristics to reading achievement with adjustment for sampling and measurement errors (as well as school characteristics). Multilevel procedures allow for estimations of regression coefficients at the different levels simultaneously and for estimations of total variance partitioned into between-school and within-school components. We used HLM5 in all our multilevel analyses (Raudenbush, Bryk, Cheong, & Congdon, 2000). This version can handle plausible values as the dependent variable with weights being applied at the student and school levels. Our multilevel analysis entails four models to compare the impacts of individual, family, and school characteristics.

Different from profile analysis (that is mainly descriptive), multilevel analysis entails significance tests. When significance tests are performed, there is the issue of statistical significance versus practical importance. Statistically significant results may not always have practically important implications. Statistical significance may occur to a very small effect in the presence of a large sample size. To address this issue, we defined any effect less than 10% of a standard deviation as small and any effect more than 10% of a standard deviation as large. Given the Programme for International Student Assessment (PISA) reading achievement scale (a mean of 500 and a standard deviation of 100), 10% of a standard deviation indicates a change in score of 10 points (e.g., from 500 to 510). Such a difference seems reasonable to us as a standard, and we argue that large effects as so defined in the present analysis bear important policy implications. We applied this standard to both individual effects and comparative reductions (when control variables are introduced).

Table 2 presents statistical results of the four multilevel models. The first multilevel model contains only what we consider exogenous variables (gender, single-parent household, immigrant status, and SES) that affect other variables but are not affected by other variables. This model provides us with an opportunity to examine the absolute effects of individual variables on (or absolute individual differences in) reading achievement. We emphasize that these variables represent critical equity issues in education and such a model serves as a reference for us to discuss not only the influence of non-school factors on the quality of reading achievement but also the influence of non-school factors on the equity of reading achievement.

Table 2
Results of Multilevel Models Accounting for Effects of Individual, Family, and School Characteristics on Reading Achievement

	Models			
	1	**2**	**3**	**4**
Individual Characteristics				
Female	36.1	36.0	30.2	13.0
Single Parent	-8.5	-8.5	-6.9	-6.9
Immigrant Student	-22.0	-22.8	-26.0	-30.5
Socioeconomic Status (SES)	16.8	16.5	12.5	9.8
Reading Engagement				
Enjoyment of Reading				23.9
Diversity of Reading				2.2
Attitude Toward School				
Time Spent on Homework				3.0
Sense of Belonging to School				1.5
Student Education Expectation				
College (versus University)				-22.6
Below College (versus University)				-40.0
Family Characteristics				
Home Environment				
Home Educational resources			5.4	3.9
Home Cultural Possession			7.7	2.6
Home Cultural Activities			7.4	2.4
Family Support System				
Family Educational Support			-14.2	-12.9
Parental Academic Interest			10.7	6.1
Parental Social Interest			4.4	1.6
Parental Education Expectation			-26.6	-13.7
School Characteristics				
School Socioeconomic Composition		6.3	3.6	3.1
School Size		5.0	4.7	4.5
School Climate				
Disciplinary Climate		-3.7	-3.8	-3.7
Student Behavior		-4.9	-4.1	-4.3
Teacher-Student Interaction				
Teacher Behavior		-2.3*	-2.0*	-1.2*
Teacher-Student Relationship		-0.3*	-0.2*	-0.9*
School Resources				
Teacher Shortage		1.2*	0.7*	0.6*
Teacher Moral and Commitment		-2.0*	-1.2*	-1.1*
School Instructional Resources		0.2*	-0.1*	0.0*
School Material Resources		2.0*	2.2*	1.3*

Note: Stars indicate statistically non-significant results. Other results are statistically significant at the alpha level of 0.05. Model 1 contains exogenous individual characteristics (female, single parent, immigrant student, and SES). Model 2 contains all in Model 1 plus school characteristics. Model 3 contains all in Model 2 plus family characteristics. Model 4 contains all in Model 3 plus endogenous individual characteristics (reading engagement, attitude toward school, and student education expectation).

Specifically, we find a gender gap of 36 points in reading achievement in favour of females, a gap of 9 points in favour of students from both-parent over single-parent households, a gap of 22 points in favour of non-immigrant over immigrant students, and a socioeconomic gap of 17 points in favour of high SES students. These equity gaps correspond to 36%, 9%, 22%, and 17% of a standard deviation. According to our standard of 10% of a standard deviation, three of them are practically important in addition to statistical significance.

The second multilevel model brings in school characteristics as control variables. The addition of school-level variables makes few changes in terms of the effects of exogenous individual variables. We conclude that individual differences (or equity issues) in reading achievement are not much dependent on school characteristics. We note that this phenomenon is not necessarily an indication of the lack of influence of schools on individual differences. School policies and practices tend to show effects when schools rather than students are the unit of data analysis. In our case, individual differences are based on all students "pooled" together without regard to within-school equity gaps. To some extent, this model is our base-line model against which the following two models are compared for the effects of family and endogenous individual variables that can affect other variables and can be affected by other variables (in contrast to individual exogenous variables as described earlier).

In the third multilevel model, we introduce family characteristics into the second model. We first look at the effects of family characteristics on reading achievement and then examine how family characteristics mediate the equity gaps in reading achievement. Even with traditionally critical predictors of reading achievement (i.e., the four exogenous individual characteristics), all family characteristics demonstrate statistically significant effects on reading achievement. Students with more home educational resources are 5 points (5% of a standard deviation) ahead of students with fewer home educational resources. Students with more home cultural possessions score 8 points (8% of a standard deviation) higher than students with fewer home cultural possessions. Students with more home cultural activities achieve 7 points (7% of a standard deviation) higher than students with fewer home cultural activities. We note that these family characteristics mainly describe home environment, and we argue that home environment overall has small effects on reading achievement.

Students with less family educational support are 14 points (14% of a standard deviation) ahead of students with more family educational support. We consider the equivalent interpretation more meaningful in this case. That is, higher achievers in reading report less family educational support than lower achievers in reading. Students whose parents have higher academic interest score 11 points (11% of a standard deviation) higher than students whose parents have lower academic interest, and students whose parents have higher social interest score 5 points (5% of a standard deviation) higher than students whose parents have lower social interest. Finally, students whose parents have higher education expectation achieve 27 points (27% of a standard deviation) higher than students whose parents have lower education expectation. We note that these family characteristics mainly describe parental involvement, and we argue that parental involvement overall has large effects on reading achievement. In particular, parental education expectation, family

educational support, and parental academic interest are critical family characteristics that make large contributions to reading achievement.

Once family characteristics are introduced, a comparison between the first and third multilevel models shows that the gender gap is narrowed down from 36 points to 30 points (a reduction of 6% of a standard deviation), the gap associated with number of parents is narrowed down from 9 points to 7 points (a reduction of 2% of a standard deviation), the gap associated with immigrant status is enlarged from 22 points to 26 points (an increase of 4% of a standard deviation), and the socioeconomic gap is narrowed down from 17 points to 13 points (a reduction of 4% of a standard deviation). Therefore, family characteristics influence not only the quality of reading achievement but also the equity of reading achievement. According to our standard, family characteristics make small contributions to the equity issues in reading achievement.

In the last multilevel model, endogenous individual characteristics (enjoyment of reading, diversity of reading, time spent on homework, sense of belonging to school, and student education expectation) are present together with family characteristics. These new variables represent students' behaviors or attitudes on which parents can exert a fair amount of influence. Three phenomena deserve special emphases. First, these new variables are important predictors of reading achievement by themselves. Students who enjoy reading more are 24 points (24% of a standard deviation) ahead of students who enjoy reading less, and students who read more diversely are 2 points (2% of a standard deviation) ahead of students who read less diversely. Students who spend more time on reading homework score 3 points (3% of a standard deviation) higher than students who spend less time on reading homework, and students who have a greater extent of sense of belonging to school score 2 points (2% of a standard deviation) higher than students who have a less extent of sense of belonging to school. Students who intend to attend university are 23 points (23% of a standard deviation) ahead of students who intend to attend college and 40 points (40% of a standard deviation) ahead of students who have no intention for higher education. According to our standard, we emphasize that enjoyment of reading and student education expectation have large effects on reading achievement.

The second phenomenon is that these endogenous individual variables reduce the effects of family characteristics on reading achievement. The effect of home educational resources is reduced from 5 points to 4 points (a reduction of 1% of a standard deviation), the effect of home cultural possessions is reduced from 8 points to 3 points (a reduction of 5% of a standard deviation), the effect of home cultural activities is reduced from 7 points to 2 points (a reduction of 5% of a standard deviation). Furthermore, the effect of family educational support is reduced from 14 points to 13 points (a reduction of 1% of a standard deviation), the effect of parental academic interest is reduced from 11 points to 6 points (a reduction of 5% of a standard deviation), and the effect of parental social interest is reduced from 5 points to 2 points (a reduction of 3% of a standard deviation). Finally, the effect of parental education expectation is reduced from 27 points to 14 points (a reduction of 13% of a standard deviation). We conclude that part of the influence of family characteristics works through reading engagement, attitude toward school, and student education expectation, although most reductions are categorized as small according to our standard.

The third phenomenon is that together family characteristics and endogenous individual characteristics associated with reading engagement, attitude toward school, and student education expectation influence the equity gaps in reading achievement. The gender gap in reading achievement in favour of females is narrowed down from 36 points to 13 points (a reduction of 23% of a standard deviation), the gap associated with number of parents is narrowed down from 9 points to 7 points (a reduction of 2% of a standard deviation), the gap associated with immigrant status is enlarged from 22 points to 31 points (an increase of 9% of a standard deviation), and the socioeconomic gap is narrowed down from 17 points to 10 points (a reduction of 7% of a standard deviation). Therefore, family characteristics together with endogenous individual characteristics descriptive of reading engagement, attitude toward school, and student education expectation influence (in some cases strongly) the equity gaps in reading achievement.

4.4.2 Effectiveness of Multilevel Analysis

Table 3 presents variance components and proportions of variance that have been accounted for by various multilevel models. The final multilevel model (the fourth one) explains 28% of the total variance in reading achievement among students and 54% of the total variance in reading achievement among schools. Therefore, the final model indicates two things. First, the model has accounted for a quite reasonable amount of variance at the student level (more than a quarter of the variance); and second, the model has a fairly good control of school characteristics with eventually more than half of the variance accounted for at the school level. Overall, we conclude that the final model is effective in addressing the research questions outlined in the present analysis.

Simple calculations based on information in Table 3 also reveal the relative importance of various sets of characteristics to reading achievement of students. The null model has a total variance of 8,707 (sum of between-school and within-school variances). Once exogenous individual characteristics (the equity variables) are introduced, the total variance of the first model is 7,785, indicating that exogenous individual characteristics account uniquely for 11% of the original variance. When school characteristics are introduced into the first model, the total variance of the second model is 7,649. Therefore, school characteristics account uniquely for 2% of the original variance over and above exogenous individual characteristics.

Table 3
Variance of Multilevel Models and Proportion of Variance Explained

	Model				
	0	**1**	**2**	**3**	**4**
Variance Components					
Between-School Variance	1813.7	1410.4	1278.0	990.0	976.4
Within-School Variance	6903.4	6374.2	6370.8	5775.1	4952.2
Total Variance	8707.1	7784.8	7648.8	6765.1	5928.6
Proportion of Variance Explained					
Between-School Variance		0.22	0.09	0.23	0.01
Within-School Variance		0.08	0.00	0.09	0.14
Total Variance		0.11	0.02	0.12	0.12

Note: Model 1 contains exogenous individual characteristics (female, single parent, immigrant student, and SES). Model 2 contains all in Model 1 plus school characteristics. Model 3 contains all in Model 2 plus family characteristics. Model 4 contains all in Model 3 plus endogenous individual characteristics (reading engagement, attitude toward school, and student education expectation). Proportion of variance explained compares variance reduction between a particular model and its previous model (e.g., Model 3 in comparison to Model 2). As such, proportions indicate unique contributions of the addition between neighbouring models (e.g., addition between Model 2 and Model 3, namely family characteristics)

Once family characteristics are introduced into the second model, the total variance of the third model is 6765, indicating that family characteristics account uniquely for 12% of the original variance over and above exogenous individual characteristics and school characteristics. Finally, when endogenous individual characteristics (associated with reading engagement, attitude toward school, and student education expectation) are introduced into the third model, the total variance of the last model is 5929. Therefore, endogenous individual characteristics account uniquely for 12% of the original variance over and above exogenous individual characteristics, family characteristics, and school characteristics. Overall, non-school factors (exogenous and endogenous individual characteristics as well as family characteristics) have reduced the total original variance in reading achievement by 35%, whereas school factors have reduced the total original variance in reading achievement by 2%.

5. Discussion of Major Findings

There are large equity gaps in reading achievement in favour of female, non-immigrant, and high SES students (exogenous individual characteristics), with control for characteristics of schools that students attend. Family characteristics are important predictors of reading achievement by themselves, highlighting the influences of parental education expectation, family educational support, and parental academic interest. Family characteristics affect not only the quality of reading achievement but also the equity of reading achievement, narrowing down both gender and socioeconomic gaps in reading achievement and enlarging the gap in reading achievement between immigrant and non-immigrant students.

Enjoyment of reading and student education expectation (endogenous individual characteristics) show large effects on reading achievement even in the presence of exogenous individual and family variables at the student level and school variables at the school level. Enjoyment of reading and student education expectation also reduce the effects of family characteristics, indicating that some of the influences of family characteristics function through enjoyment of reading and student education expectation. Finally, enjoyment of reading and student education expectation, together with family characteristics, substantially affect the equity gaps in reading achievement. In the presence of these variables, the socioeconomic gap and in particular the gender gap are substantially reduced, and the gap between immigrant and non-immigrant students is enlarged, indicating that enjoyment of reading and student education expectation and family characteristics contribute substantially to these equity gaps.

Exogenous individual characteristics, family characteristics, and endogenous individual characteristics are equally important in accounting for original variance in reading achievement. However, these characteristics together (referred to as non-school factors) explain more than a third of the total original variance in reading achievement, whereas school factors explain only a trivial amount of the total original variance in reading achievement. Clearly, this comparison indicates that non-school factors have substantially more influences on reading achievement than school factors.

5.1 Key Family Factors Associated With Reading Achievement

The importance of family characteristics can be appreciated from two perspectives—they influence both the quality of reading achievement and the equity of reading achievement. These double functions of family characteristics highlight the fact that family characteristics are very important targets of interventions aimed at improving overall reading achievement of students and making all students succeed in reading regardless of background characteristics. We find that parental education expectation, family educational support, and parental academic interest are the leading family characteristics that strongly influence reading achievement of students.

Specifically, we find that the higher education expectation that parents hold for children, the higher academic achievement of their children in reading. Parents may need to set a higher goal of education for children and constantly reinforce children's efforts in working toward the goal. These conclusions join a large number of research studies that have demonstrated the positive effects of parental expectation on a wide range of educational outcomes (e.g., Astone & McLanahan, 1991; Fehrmann et al., 1987; Lareau, 1987; Stevenson & Baker, 1987). The PISA data are not equipped to address the consequent actions of parents when they hold high education expectation for children. Parents who have high education expectation for children may well actively engage themselves in both spiritual (affective) and material efforts in helping children achieve the goal. The spiritual and material commitments of parents may well be critical to the well being of children in the learning of reading. The research literature does contain evidence that parents with high education expectation for children actively cooperate with teachers and schools, improving their children's opportunities to learn and achieve (see Fehrmann et al., 1987; Lareau, 1987; Stevenson & Baker, 1987).

The more academic interest that parents demonstrate, the higher academic achievement of children in reading. The broad academic interest of parents motivates, encourages, or influences children in the learning of reading. This conclusion is not alone in the research literature. In their categorization of parental involvement, Grolnick and Slowiaczek (1994) emphasized the intellectual involvement of parents. Parents with academic interest value academic achievement and promote intellectual activities, and such a home environment is critical for students (Fraser, Welch, & Walberg, 1986; Kurdek & Sinclair, 1988). We expect that parents with high academic interest emphasize the importance of academic achievement, monitor the progress of children in academic achievement, reward outstanding academic achievement of children, and interact with educators actively when academic problems occur in children. Although PISA does not have data to test whether this is the behavioural pattern of parents with high academic interest, these behaviors can be inferred from the existing research literature.

The negative effect of family educational support on reading achievement is a typical indication that lower achieving students in reading are getting more educational support at home. Reading problems in children have not gone by unnoticed by parents. It is certainly healthy news that students with problems in reading are getting the educational support that they need to overcome those problems. Such efforts in the part of parents to provide adequate family education support will improve children's reading achievement in due course. The research literature has accumulated evidence that endorses the importance of a positive family support structure (e.g., Bernard, 1995; Bradley et al., 1989; Franz et al., 1991). In particular, this analysis supports (and finds support from) the perspective of Reynolds et al. (1996) that "a positive supportive family atmosphere will provide a critical source of education and social support that promotes children's development over time" (p. 1121).

5.2 Relative Importance of Socioeconomic Background to Reading Achievement

The importance of SES to reading achievement is a rather complex picture. Two phenomena are observed in the present analysis. First, SES is an important predictor of reading achievement from the perspective of family characteristics. In the present analysis, SES is an exogenous individual characteristic (or an equity variable). If SES were classified into family characteristics, it would join parental education expectation, family educational support, and parental academic interest as the most influential family characteristics that strongly affect reading achievement. Although SES is secondary to parental education expectation and family educational support in terms of effects on reading achievement, it does have a larger effect on reading achievement than parental academic interest. It is reasonable to conclude that the "legacy" of SES as abundantly reported in the research literature continues—students coming from high SES families perform substantially better than students coming from low SES families. Like many researchers, we explain the socioeconomic gap using Coleman's (1990) conceptualization of social capital. Higher SES parents have larger social capital (entailing social relations and networks) that helps children develop an identity that allows them to better understand and value cognitive development.

On the other hand, although socioeconomic differences continue to be a serious social injustice from the perspective of reading achievement, the SES gap is the smallest among major equity indicators. In the present analysis, both gender differences and differences between immigrant and non-immigrant students are larger than socioeconomic differences. Consider the inequity in reading achievement between immigrant and non-immigrant students. It is more than three times as serious as the inequity associated with SES. Based on this discussion, efforts in bringing about socioeconomic equity have not eliminated the SES gap in reading achievement but this socioeconomic inequity may well have become secondary to other equity issues such as gender inequity (in favour of females) and inequity associated with immigrant status (in favour of non-immigrant students) that are much more prevalent in reading achievement.

5.3 Non-Financial Policy Sensitive Variables

Interestingly, apart from SES that is mainly a financial variable, other financially oriented variables among family characteristics are quite secondary in terms of effects on reading achievement. We find that home educational resources, home cultural possessions, and home cultural activities all have trivial effects on reading achievement in comparison to parental education expectation, family educational support, and parental academic interest that are typically non-financial variables. Overall, it is these non-financial family characteristics that are the "movers and shakers" of reading achievement. The implication is that parents do not have to incur financial expenses to help students perform well in reading achievement. Resources, possessions, and activities (material-based entities) are much less important than expectations, supports, and interests (spiritually-based entities). As a matter of fact, these

non-financial factors are critical not only to the quality of reading achievement but also to the equity of reading achievement as we have emphasized in multiple places above.

What about the other set of variables, endogenous individual characteristics that are just as important as family characteristics? Can parents help develop these characteristics so as to improve reading achievement? Do these characteristics imply serious financial commitment? The answers to these questions are also encouraging. Enjoyment of reading and student education expectation are the leading endogenous individual characteristics that strongly influence reading achievement. These two variables imply no serious financial commitment. Certainly, parents may want to provide reading materials as a basis for children to develop enjoyment of reading, which may require moderate financial commitment. However, school libraries and public libraries contain quite adequate reading materials for this purpose. Once there are sufficient reading materials for children from various sources, the rest of the effort on the part of parents to help children enjoy reading can take the form of parents becoming good examples of persistent serious readers. Their example will encourage children to read along and share the joy of reading. Parents can also reward children's enjoyment of reading and monitor children's reading. These actions require time commitment rather than financial commitment.

The higher education expectation that students hold for themselves, the better academic achievement that they produce in reading. This impact is huge. Students who intend to attend university are almost a quarter of a standard deviation ahead of students who intend to attend college and close to half of a standard deviation ahead of students who have no intention for higher education. The goal of parents is to help children establish and pursue high educational goals. Perhaps parents themselves need to first have high education expectation for children (which is also critically influential to reading achievement). There is research evidence that supports this conclusion. For example, Looker and Thiessen (2004) in their examination of the educational aspirations of 15-year-old Canadian youth found that, regardless of their socioeconomic backgrounds, students who feel that their parents want them to pursue higher education hold much higher education expectation. In addition, to increase education expectation, students need to be adequately informed of the benefits of education. This effort is especially important for students from low SES who are more likely to underestimate the benefits of education. Parents can also help convince children of the importance of higher education in the global economy that is rapidly taking shape. Again, this action requires time commitment rather than financial commitment.

In sum, either directly or indirectly, parents can influence greatly reading achievement of children. Effective and critical strategies for parents do not incur financial burdens. Parents may need to spend more time with children as a way to understand, encourage, guide, convince, and support them. It is also emphasized that parents need to model good examples for children. It is hard to imagine that children whose parents do not enjoy reading can find enjoyment in reading and that children whose parents do not have high education expectation for them can establish ambitious goals for higher education.

This emphasis on the importance of non-financial family characteristics fits well into Croll's (2004) major conclusion that "the central point … is the importance of families" (p. 412). According to Snow et al. (1991), it is the dinner conversations that matter to language skills of low SES children. According to Bus et al. (1995), it is the amount of time spent reading together as a family that matters to the development of children's language capacities. According to Hernandez (1997), it is the amount of social interaction with extended family that affects children's language abilities. According to Ho and Willms (1996), it is the "involvement at home, particularly in discussing school activities and helping children plan their programs, that [has] the strongest relationship to academic achievement" (p. 137). The list can go on, pointing to the same conclusion—time not money is parents' most effective investment to ensure their children's well-being in literacy (so is spiritual not material commitment of parents). As one can see, all those arguments above do not necessarily incur financial commitment. Instead, parents need to allocate time for these and other family activities.

6. Policy Implications

Statistical analysis always has to cope with what is often referred to as unobserved heterogeneity, a phenomenon in which selected variables are correlated with unobserved variables. In the absence of these unobserved variables, selected variables may act as proxies for these missing variables. For example, students' intellectual ability may be one of them. A student with higher ability at reading may be eager to read with parents, whereas a student with lower ability at reading may be reluctant to cooperate with parents. The observed positive effect of reading with parents may be reflective of the fact that students who cooperate with parents are those with high intellectual ability. Therefore, recommending a program that promotes parents to read with children may not improve reading achievement at all.

However, unobserved heterogeneity is not always a threat to the credibility of a research study especially when the study is theory-driven (in contrast to data-driven). Statistical models that are built on the basis of theories or previous studies are less likely to subject to unobserved heterogeneity. Because variables were selected and models were specified largely based on theoretical perspectives or previous studies on the effects of individual, family, and school factors on reading achievement, unobserved heterogeneity is less a threat in this analysis. The other way to develop credible policy implications is to search for supporting evidence for recommendations in the research literature. As shown above, research evidence that is in line with all of the major analytical conclusions was found. This strategy gives even more confidence in advocating policy implications derived from the present analysis.

Since education falls within provincial jurisdiction in Canada, it is appropriate for the federal government to focus on non-school factors that can effectively promote reading achievement of students as a way to help students (and thereafter schools) advance reading achievement. The present analysis indicates that such a strategy is justified and potentially fruitful given that non-school factors reduce the total variance in reading achievement by 35 percent whereas school factors reduce the total variance in reading achievement by 2 percent. Although programs such as the "Head Start" in the United States that distribute financial support to socially disadvantaged families are still important to tackle socioeconomic inequity in reading achievement as shown in the present analysis, all other critical non-school factors do not incur serious financial burden for parents (and thereafter the federal government). The role of the federal government is to create awareness among parents that their education expectation, educational support, and academic interest matter to children's learning in reading. Although educational resources, cultural possessions, and cultural activities at home can also help with reading achievement of children, they are more secondary to education expectation, educational support, and academic interest of parents.

Based on findings of the present analysis, it is suggested that non-financial policy sensitive strategies be so designed that they encourage parents to provide family educational support for children with reading problems to overcome their difficulties and that they assist parents to develop academic interest of their own. For example, exemplary reports that showcase how grandparents, relatives, parents, or older siblings can help children with reading difficulties inspire parents in general to provide family educational support for children at risk of academic failure in reading. Adult education programs can be easily modified to foster not only academic knowledge of parents but also academic interest of parents.

To utilize the "powerful" fact that both enjoyment of reading and student education expectation are critically important to reading achievement, parents should be encouraged first to enjoy reading and have high education expectation for children. Non-financial policy sensitive strategies should encourage (and help if necessary) parents to read and should promote parents to establish ambitious educational expectation for children. Adult reading programs are an effective strategy to develop parents' enjoyment of reading and to indicate the importance of reading to children. Information that describes and updates new labor market conditions and requirements under the current global economy helps create awareness among parents of consequent academic preparations for children's future careers.

This analysis demonstrates that, with effective, non-financial policy sensitive strategies, the federal government can reduce the equity gaps in reading achievement. These strategies can reduce a quarter of the gender inequity in reading achievement in favour of females and a fifth of the socioeconomic inequity in reading achievement in favour of high SES students (see results of the last model in Table 2). The double functions of these significant non-school factors that strongly influence both the quality of reading achievement and the equity of reading achievement makes them an attractive policy option.

Finally, although programs resulting from the above recommendations require minimum financial commitment to establish, operate, and manage, there are areas where financial commitment from the federal government can be critical to improve reading achievement of Canadian children in general and immigrant children in particular. The gap in reading achievement between immigrant and non-immigrant students is major in favour of non-immigrant students. Such a gap is strongly related to individual and family characteristics. Immigrant parents may need some forms of financial support to develop social and cultural capital when they start their new life in Canada. In the first few years after arrival in Canada the federal government may allow special tax credits for immigrant parents to help children with academic achievement. For example, costs for purchasing learning materials (books and magazines), computers, and educational software programs may be exempted for income tax. Costs for hiring tutors for academic remedies or advancements are other example items for tax exemption.

To conclude, based on the findings of the present analysis, working with parents is extremely important if the social goal is to advance reading achievement of students as a nation. Note that even with control for characteristics of schools that children attend, family characteristics still have critical effects on both the quality and equity of reading achievement. This position is supported by two theoretical perspectives. The first one is the "zone of proximal development" (Gallimore & Goldenberg, 1993; Rogoff, 1990; Tharp & Gallimore, 1988, Weisner, 1984). This theoretical perspective emphasizes the importance of parents as experts at home so that meaningful interactions between parents and children promote literacy skills. This is why the need to promote reading skills and academic interests of parents is highlighted. With these qualities, parents essentially become experts, and apprenticeship happens at home that helps children progress in reading.

The second theoretical perspective is the theory of parental involvement that identifies parents as a critical force even more powerful and direct than teachers in their children's education (e.g., Ascher, 1988; Chavkin, 1993; Christenson et al., 1992; Eccles & Harold, 1993; Eccles & Jacobs, 1986; Edwards & Young, 1992; Epstein, 1991, 1994). The Canadian Council on Social Development (1997) strongly encourages parental involvement in the education of their children for advancement in educational achievement. Parents should be, and indeed are as shown in this analysis, the focus of non-school factors that influence students' reading achievement. Overall, working closely with parents is a critical strategy to advance the quality of reading achievement and promote the equity of reading achievement among students.

Theoretically, the non-school factors that are identified in the present analysis as having a critical influence on the quality and equity of reading achievement add new meanings to the popular theory of parental involvement. The traditional elements of parental involvement including home supervision, home discussion, home-school communication, and volunteering work for school (see Ho & Willms, 1996) obviously cannot adequately cover critical family (or parent) characteristics that are identified in the present analysis. This situation gives parental involvement prominence in studies that attempt to identify factors for achieving quality and equity in reading. Is this prominence specific to reading achievement or general to all academic achievement? Similar studies employing mathematics and science outcomes may confirm these findings.

Appendix

Descriptions of Variables

The analysis in this report employed variables similar to those used in the International and Canadian Programme for International Student Assessment (PISA) reports. See below for the variables as described in **Bussière et al (2001)**

Single Parent (referred to in the international report as '**family structure'**)

Students were asked to report who usually lived at home with them. Their responses were then grouped into four categories: *i) single parent family* (students who reported living with one of the following: mother, father, female guardian or male guardian); *ii) nuclear family* (students who reported living with a mother and a father); *iii) mixed family* (students who reported living with a mother and a male guardian, a father and a female guardian, or two guardians); and *iv) other response combinations.* For this report, single parent family is coded as 1, and other responses are coded as 0.

Immigrant Status (Immigration status (immigrant = 1 vs. non-immigrant = 0)
Students' response to whether they or their parents were born outside Canada

Socio-economic status (index economic, social, and cultural status) was derived from student reports of their mothers' and fathers' occupations and job status (e.g., full-time paid, part-time paid, looking for a paid job). Student responses were coded in accordance with the International Standard Classification of Occupations. In this analysis we used highest International Socio-Economic Index (HISEI) of Occupational Status, which is based on either the father's or mother's occupations, whichever is the higher.

Reading enjoyment: This index was derived from students' level of agreement with the following statements: I read only if I have to; reading is one of my favourite hobbies; I like talking about books with other people; I find it hard to finish books; I feel happy if I receive a book as a present; for me reading is a waste of time; I enjoy going to a bookstore or a library; I read only to get information that I need; and, I cannot sit still and read for more than a few minutes. The International Organisation for Economic Co-operation and Development (OECD) report refers to this variable as *engagement in reading.*

Reading diversity: This index is derived from students' reporting how often they read various types of materials for enjoyment: magazines, comic books, fiction, nonfiction, e-mail and webpages, and newspapers.

Time spent on homework (in all subjects) was derived from student reports of the amount of time they devote to homework per week in reading, mathematics, and science.

Homework time: This index was derived from students' reports on the amount of time they devote to homework in the language of assessment, mathematics and science.

Sense of belonging to school: This index was derived from students' reports on their level of agreement with the following statements that school is a place where: I feel like an outsider, I make friends easily, I feel like I belong, I feel awkward and out of place, other students seem to like me, and I feel lonely.

Student education expectations: students' response to a questionnaire about the highest education level they intend to achieve.

Home educational resources: This index was derived from students' reports on the availability and number of the following items in their home: a dictionary, a quiet place to study, a desk for study, textbooks and calculators.

Home cultural possessions: This index was derived from students' reports on the availability of the following items in their home: classical literature (examples were given), books of poetry and works of art (examples were given). The International OECD report refers to this variable as the *index of possessions related to "classical culture" in the family home*.

Students' cultural activities: This index was derived from students' reports on how often they had participated in the following activities during the preceding year: visited a museum or art gallery; attended an opera, ballet or classical symphony concert; and watched live theatre. In the International OECD report, this variable is referred to as the *index of activities related to "classical culture"*.

Family educational support: This was derived from students' reports on how frequently the mother, the father, or brothers and sisters worked with the student on what is regarded nationally as school work.

Parental academic interest: The index of parental academic interest was derived from students' reports on the frequency with which their parents (or guardians) engaged with them in the following activities: discussing political or social issues; discussing books, films or television programmes; and listening to classical music. In the International OECD report, this variable is referred to as the *index of cultural communication.*

Parental social interest: This index was derived from students' reports on the frequency with which their parents (or guardians) engaged with them in the following activities: discussing how well they are doing at school; eating the evening meal with them around a table; and spending time simply talking with them. In the International OECD report, this variable is referred to as the *index of social communication*.

Parental education expectation: This variable was collected as part of the Youth in Transition Survey (YITS). It is available only for Canada. Students responded to questionnaire about the importance of education to their parents. The responses were recoded such that 1 indicates education importance while 0 indicates that parents do not see education as important.

School average socio-economic status: This index measures the average of the highest socio-economic status (ISEI) of the parents reported by all students in a school. The variable was then used as a characteristic for each student as a measure of the average socioeconomic status of his or her school.

Disciplinary climate: This index summarizes students' reports on the frequency with which, in their language class: the teacher has to wait a long time for students to quiet down; students cannot work well; students don't listen to what the teacher says; students don't start working for a long time after the lesson begins; there is noise and disorder; and, at the start of class, more than five minutes are spent doing nothing. In the International OECD report, this index was inverted so that low values indicate a poor disciplinary climate.

Student behavior: This index summarizes principals' perceptions of the school's disciplinary climate by reporting the extent to which learning by 15-year-olds in their school was hindered by: student absenteeism; disruption of classes by students; students skipping classes; students lacking respect for teachers; the use of alcohol or illegal drugs; and students intimidating or bullying other students. In the International OECD report, this variable was referred to as the *index of student related factors affecting school climate* and was inverted so that low values indicate a poor disciplinary climate.

Negative teacher behavior: This index was derived from principals' reports on the extent to which the learning by 15-year-olds was hindered by: the low expectations of teachers; poor student-teacher relations; teachers not meeting individual students' needs; teacher absenteeism; staff resisting change; teachers being too strict with students; and students not being encouraged to achieve their full potential. In the International OECD report, this variable was referred to as the *index of teacher-related factors affecting school climate* and was inverted so that low values indicate a poor disciplinary climate.

Teacher-student relations: This index was derived from students' reports on their level of agreement with the following statements: students get along well with most teachers; most teachers are interested in students' wellbeing; most of my teachers really listen to what I have to say; if I need extra help, I will receive it from my teachers; and most of my teachers treat me fairly.

Teacher shortage: This index was derived from principals' views on how much learning by 15-year-old students was hindered by the shortage or inadequacy of teachers in language classes, mathematics or science. In the International OECD report, this index was inverted so that low values indicate problems with teacher shortage.

Teacher morale and commitment: This index was derived from the extent to which school principals agreed with the following statements: the morale of the teachers in this school is high; teachers work with enthusiasm; teachers take pride in this school; and teachers value academic achievement.

Inadequacy of instructional resources: This index was derived based on the school principals' reports on the extent to which learning by 15-year-olds was hindered by: not enough computers for instruction; lack of instructional materials in the library; lack of multi-media resources for instruction; inadequate science laboratory equipment; and inadequate facilities for the fine arts. In the International OECD report, this variable was referred to as the *index of quality of a school's educational resources* and was inverted so that low values indicate a low quality of educational resources.

Inadequacy of material resources: This index was derived from principals' reports on the extent to which learning by 15-year-olds in their schools was hindered by: poor condition of buildings; poor heating and cooling and/or lighting systems; and lack of instructional space (e.g., classrooms). In the International OECD report, this variable was referred to as the *index of the quality of a school's physical infrastructure* and was inverted so that low values indicate a low quality of physical infrastructure.

References

Adams, D., Astone, B., Nunes-Wormack, E., & Smodlaka, I. (1994). "Predicting the Academic Achievement of Puerto Rican and Mexican-American Ninth-Grade Students." *Urban Review*, 26, 1-14.

Arzubiaga, R., Rueda, R., and Monzo, L (2002). *Family Matters Related to the Reading Engagement of Latina/o Children*. www.ciera.org

Ascher, C. (1988). "Improving the school-home connection for poor and minority urban students." *Urban Review, 20,* 109-123.

Astone, N. M., & McLanahan, S. S. (1991). "Family structure, parental practices and high school completion." *American Sociological Review, 56,* 309-320.

Ball. S. (2003). *Class Strategies and the Education Market.* London: RoutledgeFalmer.

Beers, G.K. (1996, February). "No time, no interest, no way! The 3 voices of aliteracy." *School Library Journal,* 42(2), 30-33.

Bernard, B. (1995). *Fostering resiliency in kids: Protective factors in the family, school, and community.* Unpublished Manuscript.

Bhattacharya, G. (2000). "The School Adjustment of South Asian Immigrant Children in the United States." *Adolescence, 35,* 77-85.

Booth, D. (2002). *Even hockey players read: Boys, literacy and learning.* Markham, ON: Pembroke.

Bourdieu, P. (1980). "Le capital social: notes provisoire." *Actes de la recherche en Sciences Sociales,* 31, 2-3.

Bourdieu, P. (1986). "The forms of capital." In A.H. Halsey *et. al*. (Eds) (1997). *Education: Culture, Economy and Society.* Oxford: Oxford University Press.

Bradley, R.H., Caldwell, B.M., Rock, S.L., Ramey, C.T., Barnard, K.E., Gray, C., Hammond, M.A., Mitchell, S., Bottfried, A.W., Siegel, L., & Johnson, D.L. (1989). "Home environment and cognitive development in the first 3 years of life: A collaborative study involving six sites and three ethnic groups in North America." *Developmental Psychology, 25,* 217-235.

Bus, A.G; van IJzendoorn, M.H, & Pellegrini, A.D. (1995). "Joint book reading makes for success in learning to read: A meta-analysis on intergenerational transmission of literacy." *Review of Educational Research, , 65,* 1-21.

Bussière, Patrick, Fernando Cartwright, Robert Crocker, Xin Ma, Jilian Oderkirk, Yanhong Zhang. 2001. *Measuring up: The Performance of Canada's Youth in Reading, Mathematics and Science – OECD PISA Study – First Results for Canadians aged 15*. Ottawa.

Canadian Council on Social Development (1997). *The Progress of Canada's Children – 1997. Ottawa:* Canadian Council on Social Development.

Chavkin, N. F. (Ed.) (1993). *Families and schools in a pluralistic society*. Albany: State University of New York Press.

Chao, R.K., & Willms, J.D.(2002). "The Effects of Parenting Practices on Children's Outcomes." In Willms, J.D.(Ed.), *Vulnerable Children: findings from Canada's National Longitudinal Survey of Children and Youth* (pp.149-165). Canada: University of Alberta Press.

Christenson, S. L., Rounds, T., & Gorney, D. (1992). "Family factors and student achievement: An avenue to increase students' success." *School Psychology Quarterly*, *7*, 1304-1312.

Cohen, J. and Cohen, P. (1983). *Applied multiple regression/correlation analysis for the behavioral sciences* (2nd edn). Hillsdale, NJ: Lawrence Erlbaum.

Cohen, P. (1995, August). "Designing performance assessment tasks." *Education Update*, 37(6), 1-5.

Cohn, D.A. (1990). "Child-mother attachment of six-year-olds and social competence at school." *Child Development, 56*, 1299-1313.

Coleman, J. (1990). *Foundations of Social Theory*. Cambridge, MA: Harvard University Press.

Corner, J. P., & Haynes, N. M. (1991). "Parental involvement in schools: An ecological approach." *Elementary School Journal, 91*, 271-278.

Croll, P. (2004). "Families, Social Capital and Educational Outcomes." *British Journal of Educational Studies*, 52(4), 390-416.

de Kanter, A., Ginsburg, A. L., & Milne, A. M. (1986). *Parental involvement strategies: A new emphasis on traditional parental roles.* Washington, DC: US Department of Education.

Dekovic, M., & Janssens, J. M. A. M. (1992). "Parents' child-rearing style and child's sociometric status." *Developmental Psychology , 28*, 925-932.

Dunst, C.J. (1993). "Implications of risk and opportunity factors for assessment and intervention practices." *Topics in Early Childhood Special Education, 13*, 143-153.

Easterbrooks, M.A., & Lamb, M.E. (1979). "The relationship between quality of infant- mother attachment and infant competence in initial encounters with peers." *Child Development, 50*, 380-387.

Eccles, J. S., & Harold, R. D. (1993). "Parent-school involvement during the early adolescent years." *Teachers College Record*, *94*, 568-587.

Eccles, J. S., & Jacobs, J. E. (1986). "Social forces shape math attitudes and performance." *Signs: Journal of Women in Culture and Society, 11,* 367-380.

Edwards, P. A., & Young, L. S. (1992). "Beyond parents: Family, community, and school involvement." *Phi Delta Kappan, 74,* 72-80.

Epstein, J. L. (1987). "Parent involvement: What research says to administrators." *Education and Urban Society, 19,* 119-136.

Epstein, J. L. (1988). "How do we improve programs for parent involvement?" *Educational Horizons, 66,* 75-77.

Epstein, J. L. (1991). "Effects on student achievement of teachers' practices of parent involvement." In S. B. Silvern (Ed.), *Advances in reading/language research: Literacy through family, community, and school interaction* (Vol. 5, pp. 261-276). Greenwich, CT: JAI.

Epstein, J. L. (1994, October-November). *Perspectives and previews on research and policy for school, family, and community partnerships*. Paper presented at the Family-School Links Conference, Pennsylvania State University.

Fehrmann, P. G., Keith, T. Z., & Reimers, T. M. (1987). "Home influence on school learning: Direct and indirect effects of parental involvement on high school grades." *Journal of Educational Research, 86,* 330-337.

Franz, C.E, McClelland, D.C, & Weinberger, J. (1991). "Childhood antecedents of conventional social accomplishment in midlife adults: A 36-year prospective study." *Journal of Personality & Social Psychology, 60,* 586-595.

Fraser, B. J., Welch, W. W., & Walberg, H. J. (1986). "Using secondary analysis of National Assessment data to identify predictors of junior high school students' outcomes." *Alberta Journal of Educational Research, 32,* 37-50.

Gallimore, R., & Goldenberg, C. (1993). "Activity settings of early literacy: Home and school features in children's emergent literacy." In E. A. Forman, N. Minick, & C. A. Stone, (Eds.), *Contexts for learning: Sociocultural dynamics in children's development* (pp. 315–335). New York: Oxford University Press.

Gallimore, R., Weisner, T. S., Kaufman, S. Z.,& Bernheimer, L. P.(1989). "The social construction of ecocultural niches: family accommodation of developmentally delayed children." *American Journal on Mental Retardation, 94,* 216–230.

Gonzalez, R. M., & Blanco, N. C. (1991). "Parents and children: Academic values and school achievement." *International Journal of Educational Research, 15,* 163-169.

Grolnick, W. S., & Slowiaczek, M. L. (1994). "Parents' involvement in children's schooling: A multidimensional conceptualization and motivational model." *Child Development, 65,* 237-252.

Hansen, J., & Kucera, M. (2003). *The Educational Attainment of Second Generation Immigrants in Canada: Evidence from SLID,* Statistics Canada Research Data Centre Conference, Hamilton: McMaster University.

Hernandez, D.J. (1997). "Child development and the social demography of childhood." *Child Development, 68,* 149-169.

Horvat, E., Weininger, E. & Lareau, A. (2003). "From social ties to social capital: class differences in the relations between schools and parent networks." *American Educational Research Journal,* 40(2), 319-351.

Ho Sui-Chu, E., & Willms, J. D. (1996). "The effects of parental involvement on eighth grade achievement." *Sociology of Education, 69*, 126-141.

Jencks, C. S. (1972). "The Coleman report and the conventional wisdom." In F. Mosteller & D. P. Moynihan (Eds.), *On equality of educational opportunity* (pp. 69-115). New York: Vintage.

Keith, T. Z. (1991). "Parent involvement and achievement in high school." In S. Silvern (Ed.), *Advances in reading/language research: Literacy through family, community, and school interaction.* (Vol. 5, pp. 125-141). Greenwich, CT: JAI.

Kurdek, L. A., & Sinclair, R. J. (1988). "Relation of eighth graders' family structure, gender, and family environment with academic performance and school behavior." *Journal of Educational Psychology*, *80*, 90-94.

Lareau, J. (1987). "Social class differences in family-school relationships: The Importance of Cultural Capital." *Sociology of Education, 60,* 73-85.

Lefebvre, P. & Merrigan, P. (1998). *Family background, family income, maternal work and child development.* Applied Research Branch Strategic Policy: Human Resources Development Canada. Working paper, W-98-12E.

Lindahl, K.M. (1998). "Family process variables and children's disruptive behavior problems." *Journal of Family Psychology*, *12*, 420-436.

Looker, D. & Thiessen, V. (2004). *Aspirations of Canadian youth for higher education*. Learning Policy Directorate, Strategic Policy and Planning: Human Resources and Skills Canada.

Ma, X. (2003). "Measuring Up: Academic Performance of Canadian Immigrant Children in Reading, Mathematics, and Science." *Journal of International Migration and Integration,* 4(4), 541-576.

McCubbin, H.I., McCubbin, M.A., & Thompson, A.I. (1993). "Resiliency in families." In T.H. Brubaker (Ed.), *Family relations: Challenges for the future* (pp. 153-177). Newbury Park, CA: Sage.

McTighe, J. (1996/1997). "What happens between assessments." *Educational Leadership,* 54(4), 6-12.

McMullen, K. (2004, October). "Children of immigrants: how well do they do in school?" *Educational matters: insights on education, learning and training in Canada,* Statistics Canada, http://www.statcan.ca/english/freepub/81-004-XIE/200410/immi.htm

Millard, E. (1997). *Differently literate: Boys and girls and the schooling of literacy.* London: Routledge and Farmer.

Muller, C. (1993, February). *Parent ties to the school and community and student academic performance*. Paper presented at the conference on Sociology of Education. Asilomar, CA.

OFSTED (Office of Standards in Education, UK). (2003). *Yes he can: Schools where boys write well.* Norwich, UK: Author. www.ofsted.gov.uk.

Pettit, G. S., Harrist, A. W., Bates, J. E., & Dodge, K. A. (1991). "Family interaction, social cognition and children's subsequent relations with peers in kindergarten." *Journal of Social and Personal Relationships, 8*, 383-402.

Pirie, B. (2002). *Teenage boys and high school English.* Portsmouth, NH: Boynton/Cook.

Raudenbush, S. W., & Bryk, A. S. (2002). *Hierarchical linear models* (2nd ed.).Thousand Oaks, CA: Sage.

Raudenbush, S. W., & Bryk, A. S., Cheong, Y., & Congdon, R. T. (2000). *HLM 5: Hierarchical linear and nonlinear modeling.* Chicago: Scientific Software International.

Redding, S. (1991). "Alliance for achievement: An action plan for educators and parents." *Journal of Educational Research, 15*, 147-162.

Reynolds, A.J., Mavrogenes, N.A., Bezruczko, N., & Hafemann, M. (1996). "Cognitive and family-support mediators of preschool effectiveness: A confirmatory analysis." *Child Development, 67,* 1119-1140.

Rogoff, B. (1990). *Apprenticeship in thinking: Cognitive development in social context.* Oxford: Oxford University Press

Rueda, R., MacGillivray, L., Monzo, L., & Arzubiaga, A. (2001). *Engaged Reading: A Multilevel Approach to Considering Sociocultural Factors With Diverse Learners*. www.ciera.org

Schneider, B., & Stevenson, D. (1999). *The Ambitious Generation.* New Haven: Yale University Press.

Snijders, T. A. B., & Bosker, R. J. (1999). *Multilevel analysis*. Thousand Oaks, CA: Sage.

Snow, C. E., Barnes, W. E., Chandler, J., Goodman, I. F., & Hemphill, L. (1991). *Unfulfilled expectations: Home and school influences on literacy*. Cambridge, MA: Harvard University Press.

Stevenson, D., & Baker, D. (1987). "The family-school relation and the child's school performance." *Child Development, 58,* 1348-1357.

Tharp, R. G., & Gallimore, R. (1988). *Rousing minds to life: Teaching, learning, and schooling in social context.* New York: Cambridge University Press.

Tungmala, M. (1999). "An exploration of familial and social influences on the superior educational achievement of Laotian high school students in Jordan school district" (Utah). *Dissertation Abstracts International, 59,* 3723.

Walberg, H. J. (1986). "Synthesis of research on teaching." In M. C. Wittrock (Ed.), *Handbook of research on teaching* (3rd ed) (pp. 214-229). New York: MacMillan.

Weisner, T. S. (1984). "Ecocultural niches of middle childhood: A cross cultural perspective." In W. A. Collins (Ed.), *Development during childhood: The years from six to twelve* (pp. 335–369). Washington, DC: National Academy of Science Press.

West, P. (2000, December). *Those damned boys again! How to get boys achieving*. www.icponline.org/feature_articles/f11_01.htm.

Wilson, G. (2003). *Using the National Healthy School Standard to raise boys' achievement.* Department of Education and Skills, UK. www.standards.dfes.gov.uk/genderandachievement/nhss_boys_achievement2.pdf?version=1

Worswick, C. (2004, February). "Adaptation and inequality: children of immigrants in Canadian Schools," *Canadian Journal of Economics* 37(1), 53 – 77.