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The School Entry Gap: Socioeconomic, Family, and Health Factors Associated With Children's School Readiness to Learn

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Notwithstanding the constant debate in the scientific and policy literature on the precise meaning of school readiness, research consistently demonstrates a wide variation between groups of children resulting in a gap at school entry. Recently, the teacher-completed Early Development Instrument (EDI), a new measure of children's school readiness in 5 developmental areas, was developed, tested, and implemented in Canada. EDI results confirmed the existence of a school entry gap. In this article, we explore factors in 5 areas of risk: socioeconomic status, family structure, child health, parent health, and parent involvement in literacy development. In a series of logistic regressions, we demonstrate that variables in all 5 areas, as well as age and gender, contribute to the gap. Child's suboptimal health, male gender, and coming from a family with low income contribute most strongly to the vulnerability at school entry. As the purpose of a tool like the EDI is primarily to assist in population-level reporting on children's school readiness, the results of our study provide additional and much-needed evidence on the instrument's sensitivity at the individual level, thus paving the way for its use in interpreting children's school readiness in the context of their lives and the communities in which they live.

INTRODUCTION

The holistic definition of school readiness that emerged in the early 1990s (Kagan, 1992; Meisels, 1999) improved upon a former limited and narrow concept of a child's admission to school. This reconceptualization included a socioemotional

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context for development as well as the component of applied skill sets. This latter aspect involves the recognition that both possession and implementation of skills are essential. In other words, although children may enter school with specific skills, it is the way they are able to use these skills in the course of learning that is much more important to their overall success. In practical terms, this concept puts as much emphasis on noncognitive skills as on the strictly cognitive ones. The former skills include adaptability, flexibility, comfort to ask questions, cooperation with peers, respect for people and property, physical comfort, independence, and effective communication; the latter, knowledge of letters and numbers, counting, and reading.

From this vantage point, it is possible to extend our horizon to view children's school readiness in all these domains as an indicator of their developmental health. The "new" concept of school readiness owes a lot to the advances in neuropsychology. The brain is ready to learn while the fetus is still *in utero*, and this aptitude continues from the moment a child is born. The description of the process of neurosynaptic pruning over the first months and years greatly assisted in understanding that school readiness is not something that suddenly "happens" before school entry. Rather, it is an outcome of the child's life up to this point. Children who are not exposed to appropriate stimulation will not be able to form the building blocks for the abilities expected at 5 years of age.

This broader view of school readiness stands in sharp contrast to an approach that uses measurements of children's cognitive capacities as indicators of their school readiness. Such a narrow scope is limited in its usefulness. More holistic approaches, such as that which Love, Aber, and Brooks-Gunn (1994) described, offer a context-rich methodology. These authors suggest a community-level measurement strategy, including multiple modes of assessments; multiple respondents; sensitivity to local, cultural and ethnic issues; a balance between positive and negative indicators of readiness; and a willingness for action based on the results. By involving the community, incorporating the context, and facilitating interpretation of both positive and negative results with reference to the environment where a child has been reared and where she or he will be educated, this approach provides a comprehensive assessment of a child's readiness to learn. In addition, Meisels (1999) suggests that school readiness assessment should take place over time, rather than at one point.

Emerging research evidence on the trajectories of child development (and thus consequences for school readiness) suggests that no one skill can by itself contribute to children's school success. In a comprehensive meta-analysis, LaParo and Pianta (2000) demonstrated that most individual measurements of specific cognitive skills before school entry contribute relatively little to the variance in academic achievement several years later. This could potentially be explained by the results of yet another meta-analysis, which showed that academic readiness, language/reading tests, and teacher ratings carry higher predictive power over 1 or 2

years than tests of other types of constructs or direct assessments (Kim & Suen, 2003). Kim and Suen's analysis showed that predictive validity of early assessments could not be generalized across domains and types. However, some assessments have fair to good predictive value, especially over 1 or 2 years, as demonstrated by the results from the Early Childhood Longitudinal Study (ECLS), in which children were followed from kindergarten to Grade 1 and beyond (Lee & Burkam, 2002), and from a recent study by Forget-Dubois et al. (this issue) examining the predictive value of the Early Development Instrument (EDI), a measure of school readiness. On a longer term scale, a body of work by Alexander and Entwisle (1988; Entwisle & Alexander, 1999) indicates that the differences in academic abilities among groups of children that exist at the beginning of school will perpetuate themselves over their school careers. At best, differences are likely to remain at the level observed at school entry; at worst, they will diverge over time.

Similarly, health disparities follow a comparable pattern/outcome. The gradient nature of health inequalities in most societies is considered a key indication of human failure to distribute resources in an equitable way. Children's outcomes in the realm of health and behavior seem to reliably follow the income gradients established for adult populations (Case, Lubotsky, & Paxson, 2002). As a consequence, inequalities existing for young children are perpetuated into adulthood. Indeed, longitudinal studies have shown that children learn at school at comparable rates regardless of their background (Alexander & Entwisle, 1988), and therefore it is unrealistic to expect the school system to remedy the inequalities that exist at school entry.

Disparities in test results between groups of young children that are as large as or larger than half a standard deviation have been described as a *school entry gap* (e.g., Rouse, Brooks-Gunn, & McLanahan, 2005). Such gaps have been most commonly documented for children from different racial backgrounds (e.g., Fryer & Levitt, 2005; Jencks & Phillips, 1998), but also between poor and nonpoor children (Duncan & Magnuson, 2005) or in relation to child and maternal health (Currie, 2005). In this article, we follow this concept by defining the gap at school entry as a statistically significant difference in a measure of school readiness between groups of children that can be attributed to specific risk factors.

In the present study, we attempt to identify the factors contributing to children's vulnerability in readiness for school learning as measured with a new tool for assessing children's school readiness, the EDI (Janus & Offord, 2007). Variables in five general areas are examined for their contribution to children's school readiness: socioeconomic status (SES), family structure, parent health, child health, and parent involvement in child's literacy development. There is consistent evidence in the literature that variables in these areas have an impact on children's early school performance and behavioral adjustment (cf. Bradley & Corwyn, 2002). Our study endeavors first, to confirm these patterns for the outcomes measured with the EDI in a group of children from largely middle-income background; and second, to es-

tablish the relative relevance of factors contributing to the existence of differences in school readiness outcomes.

SES

Socioeconomic variables, most often family income, parent education, employment, or a combination thereof, are a reliable correlate of children's outcomes. The results from the ECLS demonstrated that in the first year of school, children's reading and mathematics skills differed according to maternal education (West, Denton, & Reaney, 2000). Children with fewer risk factors (which included low maternal education, single-parent family status, utilization of social assistance, and home language other than English) were more likely to arrive at kindergarten with better cognitive and reading skills. They were also more likely to have better social skills and more developed approaches to learning by the spring of the kindergarten year than children with more risks. Longitudinal studies indicate that economic disadvantage is strongly associated with psychosocial difficulties and lower cognitive outcomes from toddlerhood through to Grade 3 (NICHD Early Child Care Research Network, 2005). This has been ascribed to the fact that poor families usually experience a number of disadvantages that would impact the home environment and childrearing quality.

Socioeconomic resources have been demonstrated to account for much of the difference in the social and school readiness outcomes in the United States and Great Britain (Duncan & Magnuson, 2005; McMunn, Nazroo, Marmot, Boreham, & Goodman, 2001). Although there is still much speculation on the mechanisms through which income levels have an impact on children's outcomes (Bradley & Corwyn, 2002), some evidence suggests that, for young children at least, parent–child interaction and involvement could be the key components (Miller & David, 1997).

Family Structure

There are a number of factors through which a disrupted family structure, as evidenced by a marital separation or divorce, may impact child development. The most obvious one is the lower income that is often characteristic of a single-parent household: In Canada, over 50% of lone-parent families fall below the low-income cut-off, in contrast to about 12% of the two-parent families (Kerr, 2004). This can often be exacerbated by a minority status (NICHD Early Child Care Research Network, 2005) and by the number of transitions in the family structure (Martinez & Forgatch, 2002). The negative impact of both break-up and transitions appears to be mediated by effectiveness and supportive parenting (Shaw, Emery, & Tuer, 1993).

Kerr (2004) explored the relative importance of family structure and income poverty on parent-reported outcomes in both behavioral and academic areas (hyperactivity, anxiety, lack of achievement) for children 4 to 7 years old. He found that the impact of nonintact families, though low, was the strongest for hyperactivity and school difficulties. Income had a small impact on hyperactivity, but parental education was a stronger predictor than income. Research shows consistently that the disruption of family structure results in worse outcomes for boys than girls (Kerr, 2004; Shaw et al., 1993).

Child and Parent Health

The health of child and parent also have an impact on the early school years. Even though only a minority of children with chronic illnesses experience clinical symptomatology, they are at an increased risk of behavior problems (Barlow & Ellard, 2006). Some illnesses, like asthma, require children to stay at home from school and result in lower participation in activities. This, in addition to the effects of medication, could impact both academic and social competence (Naude & Pretorius, 2003).

Parental health, particularly the mother's, can influence the development of a young child. Mother's health is especially significant due to its influence in the prenatal period. For example, the relation between exposure to toxic substances and deficits in child developmental outcomes has been well documented (e.g., Napiorkowski et al., 1996; Wakschlag, Leventhal, Pine, Pickett, & Carter, 2006). Postnatal exposure appears to be just as important (Richter & Richter, 2001). Preschool and school-age children of parents who abuse alcohol are at a markedly increased risk for behavior problems and delayed development of cognitive abilities (Lieberman, 2000). Even when effects of other factors were controlled for, maternal smoking was associated with increased behavior problems in children (Weitzman, Gortmaker, & Sobol, 1992) as well as cognitive deficits (Johnson, Swank, Baldwin, & McCormick, 1999). Exposure to environmental tobacco smoking not only has an impact on children's emotional and cognitive development but also their general health status (Richter & Richter, 2001; Wakschlag et al., 2006), especially exacerbating risks for respiratory infections. Other parental health factors include affective disorders, like depression, which have been consistently implicated in disturbances of the healthy development of attachment system (Campbell et al., 2004) and behavioral and cognitive outcomes (Kim-Cohen, Caspi, Rutter, Tomas, & Moffitt, 2006; Kurstjens & Dieter, 2001). Infants of mothers with schizophrenia and other affective disorders experience delayed developmental milestones in the first 4 years of life (Henriksson & McNeil, 2004). Compromised parent well-being can also influence a child through the interaction with stress: More stressed parents are more likely to perceive child behavior as disruptive and perhaps exacerbate the degree of the problem (Barry, Dunlap, Cotten, Lochman, &

Wells, 2005). A comprehensive assessment of the social environment in which a young child is growing cannot be complete without an indicator of parental health.

Parent Involvement in Literacy Development

Parent involvement with the child often has its own contribution to early school outcomes. A number of investigations have shown an association between parenting in pre-kindergarten and school adjustment at kindergarten or Grade 1. Pettit, Bates, and Dodge (1997) found that maternal involvement, calm discussion (as a method of conflict resolution), and proactive teaching in the pre-kindergarten year were positively related to children's social skillfulness and academic performance in kindergarten, as rated by teachers. Pre-kindergarten harsh parenting was negatively related to both social and academic skills. Supportive parenting (Cowan, Cowan, Schulz, & Heming, 1994; Pettit et al., 1997) and maternal social support (Pianta & Ball, 1993) were also identified as reliable predictors of children's successful school adaptation.

The concept of parent involvement is most frequently found in the literature in the context of parent activities related to the child's schooling, such as providing homework help and supervision, or volunteering at the child's school (Hoover-Dempsey & Sandler, 1997). For school-age children, there is a consistent body of research suggesting that regardless of background characteristics, parent involvement makes a difference in developmental outcomes (Barnard, 2004; Dearing, Kreider, Simpkins, & Weiss, 2006; McWayne, Hampton, Fantuzzo, Cohen, & Sekino, 2004). However, when younger children are considered, the equivalent activities are those that promote the development of reading and literacy. Parent–child activities promoting reading and literacy have been shown to have an impact on early development of cognitive abilities (Sénéchal & Lefevre, 2002; Sénéchal, Lefevre, Hudson, & Lawson, 1996). In the United States, most parents read to their children at least once a week regardless of their ethnicity or poverty status (Bradley, Corwyn, McAdoo, & Coll, 2001), although this declines as children move from preschool to school age. In a comprehensive longitudinal study of maternal reading to children up to 3 years of age in low-income families in the United States, Raikes et al. (2006) established that reading was associated with children's language outcomes (vocabulary comprehension and production): The strongest and most direct relationship emerged at 2 years of age. At 3 years of the child's age, it was the frequency of reading at 2 years that emerged as a stronger predictor than the concurrent reading. Although this result did not undermine the importance of reading at 3, it emphasized the belief that the earlier a pattern of literacy-oriented activities is established, the better it is for the child's development. It is not known at present, though, whether there is similar robustness of association for nonpoor families.

Often, the number of books children have at home is taken as an indicator of children's literacy activities. However, some recent research suggests that such an indirect indicator does not predict children's reading and language abilities in elementary grades in middle-class samples (Evans, Shaw, & Bell, 2000; Sénéchal & Lefevre, 2002). Therefore, in the absence of the opportunity to directly observe the literacy-oriented activities, collecting information on the frequency of such activities is the recommended approach (Sénéchal & Lefevre, 2002).

The Present Study

A federally funded initiative to investigate the outcomes of early child development at school entry in six communities in Canada provided the opportunity to explore the factors contributing to the gap in school readiness at school entry. Participants in the project were neither targeted according to group membership in specific at-risk or disadvantaged populations (e.g., poor, inner city, new immigrant) nor excluded for the same reason. Moreover, the sample was drawn from large communities. Therefore, families with widely varying levels of income and education were included. Such a wide range makes it likely that the inequalities in school readiness were representative of the Canadian general population. The variation on both sides of the affluence level also allowed us to test the assumption that school readiness follows the expected gradient with respect to parent education and income.

School readiness in this study was measured by kindergarten teachers' reports collected with the EDI. The EDI was conceived and designed to provide a simple, reliable, and feasible proximal measure of the state of children's developmental health in communities. The instrument has an acceptable validity at the individual level (Janus & Offord, 2007), and the results are interpreted for groups of children within a community (Guhn & Forer, 2006; Kershaw, Irwin, Trafford, & Hertzman, 2005). The EDI reflects developmental outcomes and milestones children should be able to achieve under optimal circumstances in physical and socioemotional health as well as in their cognitive development. It gives a picture of a child's development in five domains (physical health and well-being, social competence, emotional maturity, language and cognitive development, communication skills and general knowledge), before a child enters Grade 1. Kindergarten teachers base their judgment on their observation of children for at least 5 months. Thus, measured outcomes reflect the definition of children's developmental health by assessing progress on all developmental milestones.

The questions guiding this investigation were as follows:

1. What are the most relevant risk factors in the following five general areas of influence: SES, family status, child health, parent health, parent involvement in literacy support?

2. How do the risk factors contribute to the gap in children's school readiness at school entry?

METHODS

Procedure

The data collected for the study came from the Community Component of the National Longitudinal Survey of Children and Youth (NLSCY; Statistics Canada, 1999). The NLSCY is a prospective study initiated by Human Resources Development Canada (now Human Resources Social Development Canada) and Statistics Canada to create a nationally representative database on the characteristics and life experiences of children and youth in Canada as they grow from infancy to adulthood (Statistics Canada, 1995). The study began in 1994 with data collection at 2-year intervals on a cohort of 22,831 children aged 0 to 11 years living in 13,439 households (86.3% response) across Canada; children are being followed to age 25. Children were identified using a stratified, multistage probability sample design based on area frames in which dwellings (residences) were the sampling units. Information is collected on a wide variety of outcomes—health, language, cognitive, social, emotional, and behavioral—and determinants. The determinants include characteristics of the child's family—SES, structure, parenting style, family functioning, social support.

The Community Component of the NLSCY is a subset of questions drawn from the full NLSCY designed to fit the purpose of the federally funded Understanding the Early Years project in order to focus on the kindergarten-age population and not to overlap with other measures. Thus, questions not relevant to the preschool and early school age range were eliminated, and teacher and principal questionnaires were not used.

The Understanding the Early Years project was designed to provide information on school readiness, community influences, and other determinants and outcomes at the community level for children in Senior Kindergarten (the grade level that children enter the year they turn 5). This initiative was carried out in six sites in Canada over a period of 2 years. The sites were chosen based on a request-for-proposal process, in which local coalitions had to demonstrate a capability to engage their community in the initiative. The six participating communities were located in British Columbia (Coquitlam), Saskatchewan (Prince Albert), Manitoba (Winnipeg), Newfoundland and Labrador (Southwest Region), Prince Edward Island, and Ontario (North York). In all participating schools, English was the language of instruction. All children attending the Senior Kindergarten year (or equivalent) in the area were included in the school readiness assessment component.

Unlike the main NLSCY, whose sampling unit is the household, the sampling unit for the NLSCY–Community is the child. These children are selected from school files provided to Statistics Canada by the community school boards. When selecting the sample for the six communities, Statistics Canada was provided with a frame of 11,662 potential children attending Senior Kindergarten to select from (a "community sample"), of whom 10,663 had valid school readiness data. Because a quality assessment of the frame could not be performed prior to sample selection, the level of frame imperfection was estimated during the field operations and estimated for the frame as a whole. A systematic sample of children was selected in each community from the lists, and information about the sampled individuals was obtained for interviewing. This was referred to as the *enriched sample*. In all, 2,414 children were included in the enriched sample. The final sample for the study was selected by choosing only those children who had valid data for all analyses. This comprised 2,196 children (50.4% girls, mean age 5.76 years). The sampling unit for the enriched sample was the child. Additional data were collected from the Person Most Knowledgeable (PMK), which in most cases was the mother of the selected child, through an interview.

Measures

EDI

In the spring of the Senior Kindergarten year, teachers completed the EDI (Janus & Offord, 2007; Janus et al., 2007) on all children in their classrooms. The EDI combines several areas that have been identified as relevant to children's school readiness (Doherty, 1997; Janus et al., 2007; Kagan, 1992): physical health and well-being, social competence, approaches to learning, emotional maturity, language development, cognitive development, communication skills, and general knowledge. In addition, information is collected on child demographic variables (gender, date of birth, language), as well as on selected variables related to the child's school-based designations (e.g., English as a second language, special needs, type of class).

The EDI consists of 104 questions, 103 of which are grouped into the following five domains (one question refers to the number of days the child was absent from school).

Physical health and well-being. This domain includes gross and fine motor skills, holding a pencil, running on the playground, motor coordination, adequate energy levels for classroom activities, independence in looking after own needs, and daily living skills.

Social knowledge and competence. This domain includes curiosity about the world, eagerness to try new experiences, knowledge of standards of acceptable behavior in a public place, ability to control own behavior, appropriate respect for adult authority, cooperation with others, following rules, and ability to play and work with other children.

Emotional health/maturity. This domain includes ability to reflect before acting, balance between too fearful and too impulsive, ability to deal with feelings at the age-appropriate level, and empathic response to other people's feelings.

Language and cognitive development. This domain includes reading awareness, age-appropriate reading and writing skills, age-appropriate numeracy skills, board games, ability to understand similarities and differences, and ability to recite back specific pieces of information from memory.

Communication skills and general knowledge. This domain includes skills to communicate needs and wants in socially appropriate ways, symbolic use of language, story telling, and age-appropriate knowledge about the life and world around them.

Interview

The parent household interview was carried out using the same procedure as in the routine 1998–1999 NLSCY data collection (Statistics Canada, 1999). A computer-assisted interviewing technique was employed with one adult in the household selected as the PMK for the child. The content of the interview covered sociodemographics, parents' education, labor force activity, income, health, children's health, literacy activities, development, and other issues.

Derived Variables

From the EDI

There are two types of derived measures from the EDI: (a) domain scores, which vary from 0 (*low ability*) to 10 (*high ability*) and are based on means of the items contributing to each domain; and (b) a vulnerability score, which is a binary variable (0 = not vulnerable, 1 = vulnerable) and is calculated based on comparing children's scores with the lowest 10th percentile boundary for each domain. If a child's score falls below the lowest 10th percentile in one or more domains, the score is 1; otherwise, it is a 0. The percentile distribution was based on the community sample of 10,663 children.

The rationale for using a dichotomous measure of vulnerability based on the 10th percentile cutoff was two-fold. First, it was a way to provide a single

EDI-based score without the necessity of averaging among the five domains of school readiness. Averaging or summing the scores to come up with a single total score could potentially lead to diminishing the variance and underestimation of problems, as a child scoring well in one domain but poorly in another would receive an average total score. Because one of the strengths of the EDI is inclusion of a wide range of developmental domains, the dichotomous vulnerability score ensured that even children who have many overall strengths, yet also have weaknesses, were not overlooked. Second, for most behavior and health issues, children with diagnosable conditions represent about 3% to 5% of the population (e.g., Achenbach, Howell, Quay, & Conners, 1991). The EDI's mandate is to identify areas of weakness in groups of children, not to diagnose a serious problem. Therefore, a margin of the 10th percentile was chosen as close enough to capture children who were struggling, but not only those who were doing so visibly as to have already been identified.

From the Interview

PMK education. The variable used as a measure of PMK education was the number of years of schooling. This was derived from the information from two variables—years of elementary and high school completed, and highest level of education attained beyond high school using the algorithm used in the NLSCY (Statistics Canada, 1999).

Income. Household income levels were adjusted for the place of residence and number of people in the household. Subsequently, an income ratio, based on the ratio of the income to a low income cutoff (LICO) level, was derived and assigned to each child record and used for analyses. The LICOs are established by Statistics Canada and are arrived at by considering expenditure-to-income patterns observed in the most recent Family Expenditure Survey. These thresholds or values are calculated for different urban-size and family-size categories and are updated annually using the Consumer Price Index. The 1996 cutoffs were used to calculate the income ratio in this sample. The ratio was simply calculated to be the household income multiplied by 1,000 and divided by the cutoff value. It should be noted that the cutoffs are based on economic family income. For the NLSCY it was household income (i.e., including everybody living at the same address) that was collected and not economic family income (members of one family only). However in 98.7% of households in the sample the two concepts were equivalent (i.e., there was only one economic family in the household).

Number of siblings. Siblings included full, half, step, adopted, and foster siblings, and only siblings residing in the household were included. In the case

of common-law relationships, if both members brought their own children into the relationship then these children were considered to be siblings.

Health status. The Health Utilities Index (HUI; Horseman, Furlong, Feeny, & Torrance, 2003) is a generic health status index that is able to synthesize both quantitative and qualitative aspects of health. Developed at McMaster University's Centre for Health Economics and Policy Analysis, the Comprehensive Health Status Measurement System, the HUI provides a description of an individual's overall functional health based on eight attributes: vision, hearing, speech, mobility (ability to get around), dexterity (use of hands and fingers), cognition (memory and thinking), emotion (feelings), and pain and discomfort. The HUI varies from 0 to 1, with 1 representing high overall function.

Lone-parent status. This was derived from the question on marital status of the PMK and was categorized into lone-parent or two-parent status.

Variables Representing Measures in Areas of Risk

For the purpose of these analyses, variables were recoded into binary categories, where necessary, with 0 indicating no or lower risk. Selection of the 17 risk factors for the preliminary analyses was based on the existing evidence of what were the most likely predictors.

SES

1. *Income.* The LICO (see "Income") was recoded to a binary variable: 0 = ratio greater than or equal to 1, indicating adequate or high income (i.e., no risk); 1 = ratio lower than 1, indicating risk.
2. *Education*. PMK education was recoded into 0 = more than 12 years, 1 = 12 years or less.
3. *English as a second language status.* 0 = no ESL status at school, 1 = child has an ESL status.
4. *Place of birth.* 0 = born in Canada, 1 = born outside Canada.

Family Status

1. *Intact family.* 0 = intact family, which refers to a census couple family (married or common-law couples) in which all children are the natural and/or adopted offspring of both members of the couple; 1 = nonintact family.
2. *Lone-parent family.* 0 = two-parent family, 1 = single parent.

3. *Number of siblings.* 0 = none, one, or two siblings; 1 = more than two siblings.

Child Health

1. *Child's health status.* 0 = PMK's rating of the child's health was "good," "very good," or "excellent"; 1 = the rating was "fair" or "poor."
2. *HUI index.* 0 = perfect health (the index value 1), 1 = less than perfect health.
3. *Low birth weight.* 0 = weight of the child at birth was greater than or equal to 2.5 kg, 1 = birth weight was less than 2.5 kg.
4. *Frequency of seeing a health professional.* 0 = response was "rarely," 1 = response was either "sometimes" or "often."

Parent Health

1. *PMK health.* 0 = PMK's rating of his or her own general health was "fair," "good," or "excellent"; 1 = rating was "fair" or "poor."
2. *PMK smokes cigarettes.* 0 = PMK not currently smoking, 1 = PMK currently smoking.

Parent Involvement

1. *Frequency of reading with child.* 0 = frequency of reading with child was daily, 1 = frequency was a few times a week or less.
2. *Frequency of the child looking at books and magazines.* 0 = frequency of the child looking at books was daily, 1 = frequency was a few times a week or less.

Other Demographics

1. *Gender of child.* 0 = female, 1 = male.
2. *Age of child.* Age of child at interview was recoded to older (0) or younger (1) than the mean age of enriched sample.

Statistical Analyses

To assess differences between the enriched sample and the nonenriched sample, comparisons were made by gender and age at completion using cross-tabulations (Pearson chi-squares) and analyses of variance (ANOVAs), respectively. Multivariate analysis of variance (MANOVA) was used to assess the similarity of the

samples with respect to the EDI domains. This method has more power to detect differences than the ANOVA. The analyses were controlled for the effects of gender and age as covariates.

MANOVAs were also used to assess the relationship between the socioeconomic indicators (income, PMK education, number of siblings, HUI, and lone-parent status) and the EDI domains. These were also done controlling for the gender and age of the child. Nonparametric correlations were used to assess the directions of the relationships of these covariates.

To assess the risk factors in the five areas that influence school readiness to learn, we analyzed the risk factors using bivariate cross-tabulations and the relationship between these and vulnerability using odds ratios.

Finally, we used univariate logistic regression to predict outcome (vulnerable or not on the basis of selected covariates) and to understand the impact of these covariates. The decision to use logistic regression was dictated by the fact that many of the variables of interest were either originally or practically dichotomous (e.g., gender, smoking, place of birth) or had considerably skewed distributions.

Logistic regression applies maximum likelihood estimation after transforming the outcome into a logit variable (the natural log of the odds of the outcome occurring or not). In this way, logistic regression estimates the probability of a certain event occurring. Note that logistic regression calculates changes in the log odds of the outcome.

It is important to note that although data were clustered in six sites, this number was too low for hierarchical analysis, which generally requires at least 30 participants per site in at least 30 sites (Hox, 2002). The intraclass correlation coefficients varied from 0.006 to 0.031 and therefore were sufficiently close to 0 to allow for the nonhierarchical design of the analysis.

All analyses were carried out using SPSS version 13.0.1 (SPSS, 2004).

RESULTS

Comparison of the Enriched Study Sample With the Community Sample

These comparisons were carried out between the 2,196 children in the enriched study sample and the remaining 8,467 children in the community (EDI-only) sample. Children in the enriched sample included significantly more girls (50.6% vs. 47.9%) and were significantly younger (5.76 years vs. 5.79 years) than in the community sample. In addition, a MANOVA controlling for gender and age demonstrated that children in the enriched sample had significantly higher scores on four out of five EDI domains (Table 1).

TABLE 1
Comparison Between the Enriched Study Sample and the Community Sample

Variable	*NLSCY/EDI (Enriched) (n = 2,196)*	*EDI Only (Community) (n = 8,467)*	*Total (N = 10,663)*	*Effect Size*	*Statistical Test*	*p*
Gender (% male)	49.4	52.1	51.5		Fisher's exact test	.026
Mean age (*SD*)	5.76 (0.36)	5.79 (0.33)	5.78 (0.33)	0.08	$F(1, 10402) = 8.027$	.005
EDI domain						
Physical health and well-being	8.65 (1.18)	8.43 (1.25)	8.48 (1.24)	0.19	$F(1, 10216) = 49.137$	<.001
Social competence	8.33 (1.77)	8.21 (1.81)	8.24 (1.80)	0.07	$F(1, 10216) = 4.162$	.041
Emotional maturity	7.92 (1.50)	7.84 (1.54)	7.85 (1.54)	0.05	$F(1, 10216) = 1.629$	.202
Language and cognitive development	8.05 (1.95)	7.88 (2.08)	7.92 (2.05)	0.09	$F(1, 10216) = 8.616$	.003
Communication skills and general knowledge	7.69 (2.05)	7.23 (2.25)	7.33 (2.22)	0.22	$F(1, 10216) = 68.901$	<.001

Note. NLSCY = National Longitudinal Survey of Children and Youth; EDI = Early Development Instrument

Associations Between Risk Factors and School Readiness

Variation in School Readiness in Relation to the Socioeconomic, Health, and Family Factors

Zero-order pairwise correlations between the socioeconomic predictors and the school readiness domains are listed in Table 2. In all, 24 of the 25 correlations were significantly different from 0. However, even the strongest pairwise correlation accounted for only 5.4% of the variance.

Using multivariate analysis of covariance and controlling for age and gender, all factors were singly significantly associated with the EDI domains scores, with one exception (number of siblings and Physical Health and Well-Being; see Table 3). When all five factors were included together in the model, all of the associations showed statistical significance at the level of .05, with the exception of number of siblings and Physical Well-Being. That is, the five SES, family, and health factors are significantly associated with school readiness: Scores are higher in all domains when the family income is higher, the PMK is better educated, parents' health is better, and there are two parents in the family. The more siblings in the family, the lower the child's scores in the Language and Communication domains, although they are higher in Emotional Maturity.

Almost 20% of the children (19.9%, 438) scored in the lowest 10th percentile in at least one domain of the EDI, thus being classified as vulnerable. Overall, 10.1% (222) scored in the lowest 10th percentile in only one domain, 4.3% (94) in two, 3.0% (65) in three, 1.6% (36) in four, and 1% (21) of children scored in the lowest 10th percentile in all five domains.

TABLE 2
Zero-Order Pairwise Correlations Between the Socioeconomic Predictors and EDI Domains

Domain	*Income (LICO)*	*Years of Education of PMK*	*Number of Siblings*	*Health Utilities Index*	*Lone-Parent Status*
Physical health and well-being	.166**	.113**	–.054*	.177**	–.132**
Social competence	.145**	.129**	.031	.232**	–.140**
Emotional maturity	.116**	.093**	.062**	.200**	–.130**
Language and cognitive development	.207**	.201**	–.104**	.197**	–.124**
Communication skills and general knowledge	.219**	.158**	–.093**	.216**	–.053*

Note. EDI = Early Development Instrument; LICO = low income cutoff; PMK = person most knowledgeable.

*.01 = $p < .05$. **$p < .01$.

TABLE 3
F Statistics for the Results of Multivariate Analysis of Covariance With All Covariates in the Model, and Adjusting for Age and Gender

Domain	*Income (LICO)*	*Years of Education of PMK*	*Number of Siblings*	*Health Utilities Index*	*Lone-Parent Status*
Physical health and well-being	17.654***	8.847**	2.422	77.203***	8.823**
Social competence	8.044**	13.462***	7.009**	156.457***	8.183**
Emotional maturity	4.754*	5.994*	9.600**	106.980***	11.611***
Language and cognitive development	26.498***	48.186***	9.625**	101.074***	5.594*
Communication skills and general knowledge	50.044***	22.814***	4.093*	148.004***	4.643*

Note. Degrees of freedom are 1 and 1832 for all values. LICO = low income cutoff; PMK = person most knowledgeable.

*.01= $p < .05$. **$p < .01$. ***$p < .001$.

Contribution of Risk Factors to School Readiness Outcomes

The 15 predictors in five categories (Table 4) were examined using bivariate chi-square analyses, and the odds ratio for each of them was computed. The predictors with the highest odds ratio per category were chosen and entered into a logistic regression. These were as follows: SES (above/below LICO), family (intact/not intact family), child health (perfect/less than perfect health), parent health (PMK not smoking/smoking), and literacy support (child looking at books daily/less often than daily). Age (above/below the mean age) as well as gender (girl/boy) were also retained in the final model.

Although the reduction of variables minimized the exclusion of children from the analyses due to missing values, there were still 359 children who had to be omitted from the final model due to missing data on one or more variables. All children had valid age and gender data. The excluded group was slightly older (5.93 years vs. 5.73), $F(1, 10402) = 92.868, p < .001$, but did not differ in gender distribution or proportion of vulnerable children from the group retained in the analyses.

Mean differences in EDI scores on all five domains and their effect sizes were calculated for the five variables in the areas of risk (i.e., above/below LICO, perfect/less than perfect health etc.). The largest effect sizes, accounting for about half of the standard deviation, emerged for the health status and family status categories (Table 5).

Table 6 shows the odds ratios and significance levels for the five predictors retained, age, and gender in the final model. With the exception of parent smoking ($p = .06$), all the variables in the equation are significantly associated with the in-

TABLE 4
Results of the Logistic Regression With 15 Variables in the Five Areas of Risk and 2 Demographic Variables in the Model

Area of Risk	*Variable*	β	*SE*	*OR*	*p*	*Confidence Interval for OR*	
						Lower	*Upper*
Socioeconomic status	Income	0.803	0.163	2.232	<.000	1.620	3.076
	Education	–0.017	0.146	0.983	.906	0.739	1.307
	English as a second language	0.166	0.218	1.181	.447	0.770	1.812
	Country of birth	–0.048	0.191	0.954	.803	0.656	1.387
Family structure	Intact	0.572	0.229	1.772	.012	1.131	2.774
	Lone parent	–0.030	0.243	0.971	.903	0.603	1.564
	Number of siblings	–0.251	0.244	0.778	.305	0.482	1.256
Child health	Health Utilities Index	0.864	0.135	2.373	<.000	1.820	3.095
	Child health status	–0.825	0.494	0.438	.095	0.166	1.154
	Low birth weight	0.547	0.254	1.729	.031	1.052	2.841
	Frequency of seeing a health professional	0.128	0.159	1.136	.423	0.831	1.552
Parent health	Parent smoking	0.226	0.154	1.253	.143	0.927	1.695
	Parent health status	0.167	0.147	1.182	.256	0.886	1.578
Parent involvement	Reading/looking at books/magazines	0.251	0.152	1.285	.099	0.954	1.731
	Reading with parent	–0.005	0.147	0.995	.973	0.747	1.326
Demographics	Gender	0.849	0.137	2.338	<.000	1.786	3.060
	Age	–0.372	0.136	0.690	.006	0.528	0.901

Note. The first variable listed in each of the five areas was retained for the next analysis. OR = odds ratio.

creased odds for a child to be vulnerable in his or her school readiness. Less than perfect health, being a boy, and family income below LICO made it more than twice as likely for a child to be vulnerable, with odds ratios of 2.35, 2.32, and 2.02, respectively, than good health, being a girl, and a higher family income.

The number of risk factors was entered as a predictor in a separate analysis, which showed that for each additional risk, a child's chances to be vulnerable in school readiness increased by 1.33 (confidence interval = 1.265–1.404).

DISCUSSION

Our study contributed to the existing body of knowledge in two ways. First, it showed that teacher-reported children's abilities in all major developmental domains demonstrated expected associations with measures derived from parent in-

TABLE 5
Means, Standard Deviations, and Effect Sizes Between Groups Within Each Area of Risk for the Five EDI Domains

Area of Risk	*Group 1*		*Group 2*		*Effect Size*
	M	*SD*	*M*	*SD*	
	Not low income		Low income		
SES	(*N* = 1,426)		(*N* = 613)		
Physical health and well-being	8.803	1.061	8.341	1.346	0.344
Social competence	8.486	1.698	7.986	1.856	0.270
Emotional maturity	8.033	1.471	7.715	1.544	0.206
Language and cognitive development	8.296	1.736	7.429	2.282	0.380
Communication skills and general knowledge	7.946	1.894	7.069	2.267	0.387
	Intact family		Not intact		
Family status	(*N* = 1,481)		family (*N* = 715)		
Physical health and well-being	8.353	1.304	8.797	1.085	0.409
Social competence	7.835	1.910	8.571	1.640	0.449
Emotional maturity	7.505	1.591	8.116	1.413	0.432
Language and cognitive development	7.506	2.256	8.310	1.729	0.465
Communication skills and general knowledge	7.378	2.201	7.847	1.956	0.240
	Perfect health		Not perfect		
Child health	(*N* = 1,444)		health (*N* = 605)		
Physical health and well-being	8.800	1.079	8.311	1.344	0.452
Social competence	8.565	1.585	7.685	2.026	0.555
Emotional maturity	8.094	1.387	7.419	1.664	0.487
Language and cognitive development	8.274	1.733	7.367	2.316	0.523
Communication skills and general knowledge	7.992	1.827	6.980	2.350	0.554
	Not smoking		Smoking		
Parent health	(*N* = 1,504)		(*N* = 662)		
Physical health and well-being	8.765	1.107	8.390	1.308	0.287
Social competence	8.482	1.708	7.984	1.854	0.269
Emotional maturity	8.043	1.472	7.644	1.539	0.259
Language and cognitive development	8.272	1.794	7.590	2.169	0.314
Communication skills and general knowledge	7.807	1.998	7.488	2.109	0.151
	Reading frequently		Reading infrequently		
Parent involvement	(*N* = 1,644)		(*N* = 545)		
Physical health and well-being	8.715	1.152	8.463	1.240	0.204
Social competence	8.420	1.726	8.063	1.860	0.192
Emotional maturity	7.949	1.503	7.828	1.488	0.082
Language and cognitive development	8.169	1.881	7.677	2.122	0.232
Communication skills and general knowledge	7.875	1.969	7.155	2.193	0.328

TABLE 6
Results of the Logistic Regression With One Variable Per Area of Risk

Area of Risk	*Variable*	β	*SE*	*OR*	*p*	*Confidence Interval for OR*	
						Lower	*Upper*
Socioeconomic status	Income	.701	0.141	2.016	<.001	1.530	2.656
Family	Intact	.606	0.143	1.834	<.001	1.385	2.427
Child health	Health Utilities Index	.853	0.127	2.346	<.001	1.831	3.007
Parent health	Parent smoking	.256	0.137	1.292	.062	0.987	1.690
Parent involvement	Reading/looking at books/magazines	.296	0.137	1.345	.030	1.029	1.758
Demographic	Gender	.843	0.129	2.324	<.001	1.804	2.993
	Age	.308	0.127	1.360	.015	0.573	0.943

terview. Second, it addressed the gap at school entry among the general population, representative of six diverse communities in Canada, rather than exclusively in a disadvantaged population. As expected, the findings of this study demonstrate that children's school readiness as measured by the EDI is sensitive to socioeconomic, demographic, and family factors. These associations proved to exist both in the analyses of actual scores, and when likelihood of vulnerability was considered. Children with identified risk factors were more likely to have lower EDI scores and were more likely to be at a disadvantage (to be vulnerable) at school entry, thus contributing to the existence of the gap.

The Gap in School Readiness and Risk Factors

A child's odds of being vulnerable in school readiness were the strongest for having suboptimal versus good health, and for being a boy versus being a girl. For a child coming from a low-income family versus not, the odds of being vulnerable were more than two-fold. Broken family, younger age, not looking at books with parents, and parent smoking also increased the likelihood of vulnerability, albeit not as strongly as the previous three factors.

Among child health variables, less than perfect health had a higher odds ratio for school readiness vulnerability than low birth weight or the concurrent rating of a child's health. Possibly, this was due to the fact that the HUI comprises all the functional areas of a child's well-being rather than being narrowly focused on one, and therefore it is broader than a specific issue. This finding demonstrates clearly that a child's deficiency in functional health carries with it a disadvantage that may not be large enough to warrant early intervention or indeed identify a need for one,

yet that is serious enough to contribute to the gap at school entry. Although the literature is clear that a health problem that warrants a special needs status at school entry is a serious impediment in the successful transition to school (Janus, Cameron, Lefort, & Kopechanski, in press), there is very little research on the impact of a child's suboptimal health status on school readiness, except in how it contributes to differences between ethnic groups (Currie, 2005). Our study indicates that the difference in functional health status alone is responsible for a comparable proportion (to racial differences) of the gap between children at school entry in all areas of development in academic testing (about half of a standard deviation), and therefore health status among children without special needs is a more serious issue than currently acknowledged.

Among the demographic characteristics, being a boy carries with it a 2.3 times higher likelihood of vulnerability than being a girl. Thus, disproportionately more boys are at the wrong end of the gap at school entry, which has been shown in many other studies on gender differences in achievement outcomes among young children (Gurian & Stevens, 2004), behavior (Hammerberg & Hagekull, 2006), and language (Huttenlocher, Haight, Byrk, Seltzer, & Lyons, 1991). As gender is a demographic, not environmental, factor, prevention needs to focus on the mechanisms that lead to the gap between boys and girls. There is evidence that whereas some differences may be due to biological factors, they may be magnified or perpetuated by adult behavior. Research shows that brain development differs between boys and girls: The lateralization of language to the left hemisphere happens earlier among girls (Bornstein, Hahn, & Haynes, 2004). Added to this is the evidence that mothers tend to engage in more conversations with their infant daughters than sons (Clearfield & Nelson, 2006), an imbalance that persists into later ages (Huttenlocher et al., 1991), leading to differences in children's abilities at school entry and later. Similar patterns can be observed for socioemotional outcomes. Considering that socialization of emotions appears to favor girls in that adults are more likely to intervene when girls show unacceptable emotional behavior than when boys do so (Chaplin, Cole, & Zahn-Waxler, 2005), it is clear that observed gender differences are at least partly amenable to change. Interestingly, educational institutions have only recently recognized this problem as one requiring attention. There is evidence that schools are tailored to meet educational learning styles more common among girls, who respond better to structured learning activities than boys (Zill & West, 2001). Recent calls among educationalists are to recognize and promote boys' needs in ways that would not be costly and yet would capture their attention (Spence, 2005). For example, adjusting the length of verbal instruction in the early stages of learning and offering nonfiction reading choices in later grades are just two among many possible strategies. In summary, it is perhaps ironic that, at least up until now, society simply accepted the gender differences in children's learning and developmental outcomes without much effort at remedy.

The other demographic variable that contributed to school readiness gap is relative age at school entry. A comprehensive analysis of a large sample of children entering kindergarten in the United States in 1998 found that children who enter school close to being 6 years old have better skills and abilities in all measured areas: language, math, social competence, and reasoning skills (Zill & West, 2001). In some areas the differences can be compounded by parents holding off the child's enrollment for another year, especially those at the younger end of the spectrum (Meisels, 1992), although being "old" for a grade level has also been reported to have negative effects (Byrd, Weitzman, & Auinger, 1997). The expectations and short-term evidence appear to suggest that deficiencies due to age, if any, are erased within a few years (Stipek & Byler, 2001). However, recent analyses suggest that, contrary to common expectations, the age differences created by a single school-entry cutoff date are observable in high school test results and college enrollment (Bedard & Dhuey, 2006). Bedard and Dhuey report that as many as 5% children in the United States are held back a year from entering the kindergarten. Relatively younger children, and those within the high SES bracket, contribute disproportionately to this group. No such figures are available for Canadian children; however, this practice does not appear to be as common. Nevertheless, the impact of the relative age at school entry on children's school readiness and later school success is persistent and real, and it contributes to the gap.

In our study, income was a far more powerful contributor to children's vulnerability at school entry than parent education. There are arguments in the literature that at an early age, maternal education should account for more variation in children's outcomes than income (Shonkoff & Phillips, 2000). This claim is based on several assumptions. First, the major mechanism through which SES impacts child development is through the parent interaction and resources (including quality of nonparental care and nutrition). Second, many educated women do not earn an income commensurate with their education within the first few years of their child's life, perhaps due to part-time work, staying at home, or even inability to find well-paid employment after maternity leave. Third, well-educated mothers are more likely to employ adequate parenting strategies and nutritional and activity choices regardless of their income level than are less-educated ones. As our study is the first to investigate this relationship in a large sample of Canadian families, it is possible that the inequalities between education and income levels in Canada may not be large enough to result in unique contributions. It is also possible that the second assumption may not be true in Canada. In this respect at least, our results differ from those in the ECLS kindergarten year, in which maternal education had a strong impact on children's knowledge and skills (West et al., 2000). However, two key disparities between our study and the ECLS may have contributed to this difference: (a) West et al. investigated income assistance as a part of a four-fold risk score (of which mother's education was one factor), rather than as a separate contributing factor; (b) only cognitive (math and reading) outcomes were in-

cluded, rather than a spectrum of skills. Nevertheless, both this and further longitudinal investigations of children within the ECLS (e.g., Lee & Burkam, 2002) clearly show that regardless of parental education, low income contributes strongly and consistently to children's school outcomes, which was confirmed in our study at school entry. Interestingly, the pattern of results shown in our study with individual-level analyses was also evident in the neighborhood-level EDI analyses by Kershaw and colleagues (Kershaw, Forer, Irwin, Hertzman & Lapointe, this issue).

The analysis of effect sizes of differences on all five EDI domains indicated that differences due to family structure (intact or not) were somewhat larger than those due to low income, except for Communication Skills domain. Although lone-parent status is often used as an indicator, it is a plethora of factors associated with family break-up and lone parenthood—like transitions, lower income, parent health, and so on—that are crucial in determining outcomes for children (Carlson & Corcoran, 2001; McMunn et al., 2001). Lone-parent status was significantly associated with scores on all five EDI domains, although the strength of the correlations was very modest. Interestingly, of the two family structure variables that were considered, the intact family one emerged as a stronger contributor to children's lack of vulnerability than the lone-parent one. This likely reflects the argument put forward previously, that intactness (i.e., being a child of an intact biological family from birth to the time of the study—approximately 5.8 years of age) is a strong protective factor against vulnerability at school entry.

Infrequent reading/looking at books and magazines by the child was more strongly associated with vulnerability than the lack of frequent reading with a parent in the first model. When entered in the final model, with one predictor per domain, lack of frequent reading by the child made him or her 1.3 times more likely to be vulnerable at school entry. This measure of reading was concurrent to the measurement of children's outcomes, which may have diminished its sensitivity. The Raikes et al. (2006) longitudinal study of reading with young children suggested that early reading (at 2 years) is a stronger predictor of later outcomes than the concurrent reading. It is possible that by the time children in our study reached kindergarten, their ability—and willingness—to reach for the printed word by themselves became a much clearer indicator of their school readiness than reading with a parent. The increased independence observed in many populations at about 5 years of age may dictate children's choice to reach for a book rather than do something else, which contributed to the school entry gap. If that is the case, it is even more crucial to ensure that reading materials are available and accessible to children from the youngest ages.

Finally, parent smoking emerged as the strongest parent health indicator and increased children's likelihood to be vulnerable almost 1.3 times. Although smoking is sometimes thought to be associated with lower education and income, this alone cannot be the explanation, as income was a separate entry in the analyses. There-

fore, parental smoking confers upon a child a risk for suboptimal development that is identifiable at school entry, in that it contributes to the child's vulnerability. It is possible that the mechanism of this association is based on environmental risk, the effects of which have been well documented (Richter & Richter, 2001). Moreover, although the question about smoking referred to the concurrent behavior, it is possible that the parent smoked during the child's prenatal development, which has been shown to impact neurobehavioral outcomes (Napiorkowski et al., 1996).

Association Between the EDI and Family Variables

In the study population, there were significant, albeit small, linear bivariate correlations between children's scores in all five domains with family income, parent education, health, and family status. This result is indicative of the fact that children's outcomes at school entry follow a gradient with respect to parental SES, comparable to those observed for health or achievement outcomes among adult populations. Similar relationships in behavior and language areas were shown for Canadian children by Offord and Lipman (1996) and for children in the United States (Aber, 1994; Brooks-Gunn & Duncan, 1997). Although not much data are available as yet on the relationship of the EDI with other measures, there is plenty of evidence that children's behavioral and cognitive outcomes are strongly predicted by family's socioeconomic characteristics. For a new measure like the EDI, these results provide evidence supportive of its external validity.

Limitations

Several limitations of the study need to be mentioned, some of which have been indicated previously. First of all, the methodology used was cross-sectional and therefore did not allow for a temporal investigation of cause and effect. The study allows identification of the concurrent factors contributing to the school readiness gap, but the longitudinal aspects can only be speculated upon.

Second, the analyses depended on the dichotomous variables of risk and outcome. This type of analysis limits variability and thus may obscure some more subtle relationships. The necessity to use such a method, however, was dictated by the distribution. In future investigations, it will be crucial to extend the findings of this study with a more precise methodology, if possible.

Third, the sample on which our investigation was based had higher SES than the large population from which it was drawn. This raises some questions about the representativeness and generalizability of the results. There are, however, several factors that may have mitigated the limiting impact of this difference. First, the sample has been drawn randomly using an established methodology, so we are confident that there was no intended systematic bias. Second, despite the difference between the selected and nonselected groups on SES, the amount of variation

among the participating families in the level of income was sufficiently large to test the hypotheses. Third, because relationships with SES variables were identified in this study, despite the sample's possible underrepresentation of low SES families, we can assume that if the spectrum of SES variation was increased, the associations would have been even stronger. Finally, the majority of similar investigations relied on data from socioeconomically disadvantaged populations (Aber, 1994). Our study shows that the gradient in children's health and school readiness is also present in a predominantly middle-class population.

Conclusions

Using a large population of largely middle-class Canadian kindergarten children, we were able to demonstrate that school readiness, as measured by the EDI, varied in relation to socioeconomic, health, and family structure variables. We showed that there was indeed a gap in school readiness among kindergarten children. We found the most powerful factors that contribute to the existence of that gap among variables in several areas shown to influence children's outcomes. Finally, we established that for this population, a combination of health, demographic, and socioeconomic factors (i.e., suboptimal functional health, being a boy, and living in a family with low income) increased a child's likelihood to be at the bottom side of the gap more strongly than other factors.

Within the current framework of considering children's school readiness in a context of their lives and communities, and in a dynamic relationship among spheres of influence on early child development, the analyses in this article present the EDI as an instrument sensitive to individual-level variables. The results can, therefore, be taken further, to the population level, and related to population trends. Although we can address many of the factors that contribute to the school readiness gap one by one with every child, another strategy, a universal prevention, albeit targeted at the identified population characteristics, likely has larger chances of success than the individual intervention (Offord et al., 1999). Studies like ours and measures like the EDI are intended to assist in designing preventive strategies most effective at decreasing the school readiness gap.

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