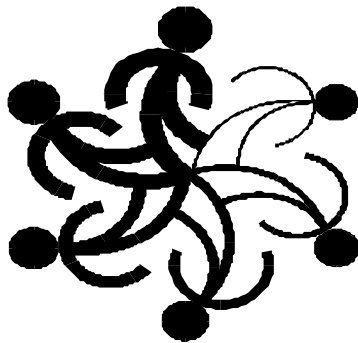




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**From Home to School - How Canadian Children Cope**

*Initial analyses using data from the second cycle of the School Component of the National Longitudinal Survey of Children and Youth*

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*This report outlines some initial results from the School Component of the first and second cycles of the National Longitudinal Survey of Children and Youth (NLSCY). It examines the longitudinal influence of early childhood care and education and literacy activities on young children's future academic and cognitive outcomes. This overview highlights the information newly available from this component of the survey; it is not comprehensive in its coverage or its analysis. Indeed, the information collected by the NLSCY is so rich and detailed that researchers and analysts will be using it to address a variety of important questions concerning the education of children and youth in Canada for many years to come. Here then, we are merely "scratching the surface" to stimulate awareness of this rich new data source, and to illustrate the kinds of analyses it makes possible.*

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*Data are also available through custom tabulations. For more information about tabulations and other products and services, contact Tamara Knighton at 613-951-7326; fax 613-951-7333 from the Special Surveys Division at Statistics Canada.*

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# National Longitudinal Survey of Children and Youth

## Note to readers

*The National Longitudinal Survey of Children and Youth, a joint project between Human Resources Development Canada and Statistics Canada, is a comprehensive survey examining a wide variety of important factors that influence children's development. The survey collects information every two years on children as they grow up, as well as on the environments in which they live, learn and play.*

*The second cycle of the survey took place in 1996–97 collecting information on just under 20,000 children from new-born to age 13. It gathers information on various aspects of children's lives such as demographics, socio-economic background, child health and development, behaviour, relationships, education, literacy, leisure activities, family functioning and parenting, child care arrangements and family custody history.*

*The NLSCY uses a variety of methods to collect information on children's development and functioning. The person most knowledgeable about the child (most often the child's mother) is interviewed within the child's household. Starting in the second grade, measures of mathematics and reading skills are administered to children in their schools. Pre-school children are administered a test of vocabulary skills in the household. All of these measures are administered with the informed consent of the person most knowledgeable about the child. Children 10 to 13 years of age complete questionnaires about themselves and their school experiences.*

*Questionnaires are also completed by the child's school teacher and principal. These school-based questionnaires provide unique information about the child's education, behaviour at school, and classroom and school environment. The second cycle provides information on the behaviour and educational functioning of a sample of 10,600 children of school age with teachers providing information on 8,600 of these children.*

*After following children and youth in the NLSCY over four years we are now able to examine the influence of some factors on children's development, such as the influence of early childhood education and parental involvement on children's academic achievement. This release reports on the transition from home to kindergarten and Grade 1.*

***To ease presentation of our findings, in this paper we use the term "mother" to refer to Person Most Knowledgeable (PMK) about the child. In the second cycle of the NLSCY, 90.3% of PMK's are the child's mother, 9.0% are the child's father, and 0.7% are some other person.***

***Estimates in this report marked with an asterisk (\*) have a coefficient of variance between 16% and 33% and are less reliable than unmarked numbers.***

## **From home to school- How Canadian children cope**

Nursery schools, kindergartens, mom and tot programs, play groups, structured and unstructured day-care programs are all popular options that parents have for their young children in Canada. It is thought that such programs may enhance children's intellectual and social skills, and that they may help children with the transition into formal schooling.

Recent research suggests that early education programs do produce some lasting improvements in young children's academic achievement and social adjustment, and that they can produce short-term increases in IQ scores.<sup>1</sup> This same research also suggests that such programs are effective in preventing children from failing grades in school and in being assigned to special education programs.<sup>2</sup> The positive effects of early childhood education programs have been found to extend across nations and types of programs.<sup>3</sup> Furthermore, literature suggests that early childhood education programs can narrow the gap in achievement between advantaged and disadvantaged children but will not eliminate this gap.<sup>4</sup> Other research with severely disadvantaged children suggests that early childhood programs have a positive impact over and above that of nutritional supplementation.<sup>5</sup>

Researchers have suggested that the high quality of intellectual stimulation provided in early childhood programs encourages both the growth and overall integration of the brain, and that the influence of early intellectual stimulation on brain development is lasting.<sup>6</sup> They also strongly suggest that it is best to provide such stimulation before the age of six, preferably before the age of three.<sup>7</sup> However, other research has found that environmental stimulation, while best provided during the early years of development, can still produce positive effects on brain development regardless of age.<sup>8</sup>

Despite the benefits of early education and the availability of programs suggested by researchers, a national survey of kindergarten teachers in the United States found that nearly half (48%) of children have moderate to severe problems making the transition to school.<sup>9</sup> In particular, these teachers reported children had problems following directions, working independently, communicating, and with general academic skills. Other research has suggested that children's early contact with the education system will establish a positive educational trajectory for the children.<sup>10</sup> Consequently, poor preparation for school and low achievement once in school can have substantial negative impacts on children's future academic success.

Much of the research on early education programs and starting school has been conducted outside of Canada. Consequently, the literature findings reported above may not extend to the Canadian context. However, research by Hertzman and Kohen<sup>11</sup> using the first cycle of NLSCY data appears to support the findings reported here.

In the first of three projects Kohen and Hertzman<sup>12</sup> found that 4 and 5 year olds who received some form of childcare had significantly higher scores on a standardised measure of receptive vocabulary (the Peabody Picture Vocabulary Test-Revised: PPVT-R) than children who stayed at home with a caregiver. Furthermore, childcare outside of the home had the greatest impact on vocabulary scores for children from lower income households. This

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suggests that the benefits of child care provided outside of the home may be especially large for children from lower income homes.

In a second project, Kohen and Hertzman<sup>13</sup> explored the influence of neighbourhoods on 4 and 5 year old's vocabulary skills. Results from this project suggested that children residing in affluent, socially cohesive, safe neighbourhoods with few female single parent households tended to have higher vocabulary scores. The effects of children's neighbourhoods on vocabulary scores appeared to be mediated by features of the child's household, such as household income and mother's level of education.

In a third study, Kohen and Hertzman<sup>14</sup> found evidence which suggests that changes in child care arrangements and frequent changes in residence negatively impact 4 and 5 year old children's receptive vocabulary. Children who frequently moved or experienced changes in their child care arrangements in the previous twelve months were found to have lower receptive vocabulary scores.

Kohen and Hertzman's studies were conducted using the first cycle of NLSCY data, the only data available at the time. These analyses could only point to associations between early education programs and children's cognitive and behavioural outcomes. The present analyses have used data from both the first and second cycles of the NLSCY and focus on the impact of early education programs on young children's academic and vocabulary skills shortly after entering the first year of school.

How many Canadian children attend early childhood education programs before entering school? Do these programs give children an academic advantage? How do the level of education of the mother and the household income influence the pathways through the education system? Are there educational activities shared by parents and children, which can improve their children's achievement in kindergarten and the first grade at school? What variables are associated with improved academic performance in kindergarten? Data from the second cycle of the National Longitudinal Survey of Children and Youth (NLSCY) were analysed to shed light on these issues.

### ***Educational programs and types of schools available in Canada***

For the purpose of this study, early childhood care and education programs include such activities as nursery schools, playgroups, day-care centres and mom and tot programs. Also included in the early childhood care and education programs is care provided by a paid worker such as a nanny, by a non-relative or by a relative other than the mother or the father.

Kindergarten programs are provincially funded and attendance is optional in the formal school system. Publicly-funded kindergarten programs are not available in all provinces and school boards across the country.

The age children enter school in Canada varies according to their province of residence. In some provinces, junior kindergarten is available to children 4 years of age. Other provinces provide kindergarten programs to 4 and 5 year olds, while in some provinces the first grade is the official starting point in the school system.

***Social factors influence the type of educational program attended by 4 & 5 year olds Canadian children***

Parents have several options for the care and education of their 4 and 5 year old children. In 1996-97, 513,000 children 4 and 5 years of age were attending kindergarten (64%), 198,000 children were attending some form of early childhood care and education program (25%), and 85,000 remained at home with their mother (11%).

The NLSCY data suggest that parental choices appear to be influenced by social factors. Children who attend early childhood care and education are more likely to be from households with high income and to have mothers who have completed a high school education or higher (Table 1). Children whose mothers hold a post-secondary diploma or degree are nearly twice as likely to attend an early childhood care and education program compared to those whose mothers did not graduate from high school, and one-third as likely to be at home. Similarly, children from households with incomes of \$40,000 or more are one third as likely to stay at home with their caregivers compared to children from families with household incomes of less than \$20,000.

**Table 1: Attendance in each education or care programs by mother's education and household income**

<b>Mother's Education</b>	<b>Early Childhood Education<sup>1</sup></b>	<b>At Home with Mother<sup>2</sup></b>
Less than High School	14% *	22% *
High School Graduate	24%	14% *
Some Post-Secondary	27%	10% *
Post-Secondary Diploma or Degree	27%	7% *
<b>Household Income</b>	<b>Early Childhood Education<sup>1</sup></b>	<b>At Home with Mother<sup>2</sup></b>
Less than \$20,000	17% *	20% *
\$20,000 to \$29,999	22% *	18% *
\$30,000 to \$39,999	25% *	13% *
\$40,000 or more	28%	6% *

Source: National Longitudinal Survey of Children and Youth, Cycle 1 1994-1995, Cycle 2 1997-1998

\* Coefficients of variation are between 16.4 and 33.3% suggesting that these estimates should be used with caution

<sup>1</sup> Early childhood care and education programs includes both early childhood education programs such as nursery schools, mom and tot programs, infant stimulation programs and any type of day-care arrangement.

<sup>2</sup> At home with the mother is defined the child not being enrolled in a kindergarten or any form of early childhood education program and not participating in any type of day-care, including those provided by relatives and paid workers in the child's home.

The following are results from analyses of the NLSCY data on the effect of early childhood education and care on young children as they start school.

Estimates marked with an asterisk (\*) have a coefficient of variance between 16% and 33% are less reliable than unmarked numbers

### ***Method of analysis of the first transition to school***

This analysis was performed using the ordered response logistic regression method. Like regular logistic regression it compares respondents who belong to one of a series of groups (e.g. children who attended early childhood education programs or children who attended kindergarten) to a specific reference group (e.g.; children who stayed at home). But unlike regular logistic regression where there are only two possible outcomes (e.g.; progressed to the next grade and retained in grade), there are a series of ordered ordinal outcomes (e.g.; the letter grades A, B, C, D, or F).

The technique examines the cumulative relative odds of a person belonging to a specific group falling into a specific ordered category. For example, the odds of a child who attended kindergarten versus one who stayed at home being ranked as near the top of his or her class in mathematics versus being ranked in any other ordered category. In all of the ordered response logistic regressions reported, either socio-economic status was included as a predictor variable, or the household income and the education of the child's mother were included as predictor variables.

### ***Early childhood care and education improves children's performance in kindergarten***

Analyses using data from the first two cycles of the NLSCY suggest that early childhood care and education may improve children's later academic performance in kindergarten. Approximately 192,000 (39%) Canadian children 2 to 3 years of age in 1994/95 attended some form of early childhood care and education.

The analysis compared the level of performance in kindergarten of two groups of children. The first group included those who attended an early childhood program, a day-care centre, or received care from a paid worker such as a nanny or a relative other than the mother or the father of the child. The second group of children were those who stayed at home with a parent, who in 90% of the cases was their mother. When followed up the children in the first group were faring better at school.

Two years later about 40% of children who were in an early childhood program at the age of 2 and 3 were judged by their teachers as being near the top of their kindergarten class in communication skills, as opposed to only 25% who did not participate in such programs. Also, 38% of these children were rated by their teachers as being near the top of their kindergarten class in learning skills, compared with 24% of kindergarten children who did not attend an early childhood program.

Furthermore, higher proportions of children who attended early childhood care and education were able to write a simple sentence, compare numbers and understand simple concepts of time, such as “today”, “summer” and “bedtime”.

These relationships hold true regardless of the education of the child's mother or the income of the household. In other words, the analysis showed that early childhood and care

programs had a positive effect on the performance of children in Kindergarten regardless of the economic situation of the household they belong to or the level of education attained by their mother.

***Early childhood care and education also improves children's performance in the first grade***

The study also found that four and five years old children who in 1994/95 were attending an early childhood care and education program did better in Grade 1 two years later. These children were 1.4 times more likely to be rated by their teachers as being near the top of their class in mathematics achievement in Grade 1 in 1996-97 than those who stayed at home with a parent (Table 2). As in the case of kindergarten achievement, these results hold true after statistically adjusting for the influence of the income of children's households and the education of the child's mother.

The NLSCY data also suggests that kindergarten programs did not to have the same impact on later performance as attending an early childhood education program. Youngsters who attended such early childhood education programs as nursery schools, playgroups, mom and tot programs, or a structured day-care centre in 1994-95, showed better performance in mathematics, reading, writing and overall academic achievement in grade 1 in 1996-97 compared to those who were enrolled in a kindergarten class in 1994-95.

**Table 2: Percentage of children who are at the top of their class by type of educational program attended prior to grade one.**

Number of Children attending each type of Educational Program in 1994-95		Percentage of Children Near the Top of their Grade 1 class in 1996-97			
		Reading	Written Work	Mathematics	Overall Achievement
Early Childhood Care and Education	202,300	27%	24%	34%	26%
Kindergarten	489,500	25%	18%	25%	21%
At Home	85,700	25%*	16%*	18%*	16%*

Source: National Longitudinal Survey of Children and Youth, Cycle 1 1994-1995, Cycle 2 1997-1998

\* Coefficients of variation are between 16.4 and 33.3% suggesting that these estimates should be used with caution

***Reading to children has substantial positive impact on their academic skills***

Children at the age of two to three who have been read to several times a day, did substantially better in kindergarten at the age of 4 and 5 years than youngsters whose parents read to them a few times a week or less often. The group of children who were read on a daily basis were 1.6 times as likely to be rated by their teachers as being near the top of their kindergarten class in learning skills, and 2.3 times as likely to be near the top of their class in communication skills. These relationships hold true regardless of the income of the child's household and the education of the child's mother.

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**Figure 1: Reading many times a day to a child and teachers' classroom rankings in learning and communication skills**



Furthermore, children who had early exposure to books and reading were also better at performing mathematical tasks. These children were twice as likely to be able to compare numbers, 2.6 times as likely to recognise geometric shapes, and twice as likely to know simple concept of time when they are 4 & 5 years old and attending kindergarten compared to those who were read to less often. Again, this relationship was observed regardless of the income of the child's household and the education of the child's mother.

***"Social factors", early education and reading combine to improve children's future vocabulary skills***

Features of children's home environment and participation in easily implemented educational activities, such as early education programs and daily reading, when combined can have substantial effects on children's future vocabulary skills.

Family characteristics such as household income and mothers' level of education influence children's receptive vocabulary skills two years later. Taken together these two factors were responsible for an 11 point difference in young children's receptive vocabulary scores. When compared to young children living in low income families (less than \$20,000) and with mothers who did not complete high school, 2 and 3 year olds in 1994-95 who lived in families with total household incomes of \$40,000 or more and who had mothers with a post-secondary education scored 11 points higher on the PPVT two years later.

Early educational activities such as reading to a child also have notable future impacts on children's receptive vocabulary. Children 2 and 3 years of age who were read to several times on a daily basis in 1994-95 scored higher on the PPVT two years later regardless of the household income and the mother's level of education. The score of those children who were read several times a day was about 5 points higher than those living in a household with an income of \$40,000 or more, or living with a mother who holds a post-secondary diploma or degree. For young children's future vocabulary skills, this represents an impact equal to having a mother who has a post-secondary education or living in a household with an income of \$40,000 or more.

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Attending some form of early childhood education and care also impacted children's vocabulary scores. Children 2 and 3 years of age who received early education programs in 1994-95 scored 2 points higher on the PPVT when they were assessed two years later in 1996-97. Again this increase in the scores of the children resulted regardless of the total household income and their mother's education.

Hence, a child who in 1994-95 was experiencing the more favourable home environment due to higher household income, had a mother with a high level of education, was read several times a day and received early childhood care scored 18 points higher on the PPVT than the other children.

It can be expected that such an increase in the PPVT score would promote a child from the below normal range to the average or above average range of vocabulary skills. Motivated children from higher socio-economic backgrounds and receiving both early childhood care and regular reading, could have fewer difficulties with school and educational activities than children in less fortunate circumstances.

### ***Conclusions***

This paper has presented results of the first longitudinal analysis using the Education data from the second Cycle of the NLSCY. The wealth of the NLSCY database for both Cycle 1 and Cycle 2 will allow for more studies. Readers of this paper will probably find that many of the questions regarding transitions in the education system have not been answered here. More analyses will be performed by Statistics Canada analysts and outside researchers in the coming months. Furthermore, future cycles of the NLSCY will continue to provide data that will help understand better the factors that influence Canadian children at school.

Future cycles of the NLSCY will also allow us to observe if the effects of early childhood education programs persist throughout children's educational careers. Analyses of data from future cycles may be able to show if children who stayed at home with their mother at the age of three and four, make the social adjustments to the structured school environment at a later stage or age compared to those children who attended early childhood care and education programs.

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<sup>1</sup> Barnett, 1995, NCEDL, 1999.

<sup>2</sup> Barnett, 1995.

<sup>3</sup> Boocock, 1995; McCain & Mustard, 1999.

<sup>4</sup> Boocock, 1995; Grantham-McGregor et al., 1991.

<sup>5</sup> Grantham-McGregor et al., 1991.

<sup>6</sup> McCain & Mustard, 1999, Carnegie Corporation, 1994.

<sup>7</sup> Cyander, 1994

<sup>8</sup> Kempermann & Gage, 1999.

<sup>9</sup> NCEDL, 1998.

<sup>10</sup> Entwisle & Alexander, 1993.

<sup>11</sup> Kohen & Hertzman, 1998; Kohen, Hertzman & Weins, 1998; Kohen, Hertzman & Brooks-Gunn, 1998.

<sup>12</sup> Kohen & Hertzman, 1998

<sup>13</sup> Kohen, Hertzman & Weins, 1998

<sup>14</sup> Kohen, Hertzman & Brooks-Gunn, 1998