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The Effect of Childcare and Early Education Arrangements on Developmental Outcomes of Young Children

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Résumé:
Cette étude explore la relation entre les modalités des services de garde et des indicateurs mesurés du développement des jeunes enfants à l'aide des données du cycle 1 de l'Enquête longitudinale nationale sur les enfants et les jeunes canadiens. La modélisation économétrique analyse les déterminants des scores de développement social et moteur (DSM) des enfants de 0 à 47 mois ainsi que les scores à un test de vocabulaire (EVIP-R) administré aux enfants de 4-5 ans en prenant en considération différentes caractéristiques des services de garde et d'éducation des enfants. Les résultats suggèrent que pour les nouveaux-nés et les enfants en bas âge les modalités de garde non parentale ont des effets non statistiquement significatifs ou négligeables sur le DSM. Pour les enfants d'âge préscolaire, les modes de garde ou d'éducation préscolaire n'ont pas en moyenne d'effets sur le développement cognitif (EVIP). L'estimation d'un modèle à effets fixes pour un sous-échantillon d'enfants composé de frères et de sœurs confirme la conclusion précédente. L'analyse est répétée pour identifier les déterminants de la probabilité qu'un enfant soit observé avec un score le classant dans la partie inférieure de la distribution des scores (DSM et EVIP), et les conclusions sont similaires.

Abstract:
This study investigates the relationship between child care arrangements and developmental outcomes of young children using data from Cycle 1 of the Canadian National Longitudinal Survey of Children and Youth. Models of the determinants of Motor and Social Development (MSD) scores for children aged 0-47 months, and of the Peabody Picture Vocabulary Test assessment scores (PPVT-R) for children aged 4-5 years are estimated controlling for a variety of non-parental childcare and early education characteristics. The results suggest that infant-toddler non-parental care arrangements have insignificant or negligible impacts on developmental outcomes (MSD). For preschoolers, modes of care and early education do not, on average, influence cognitive development (PPVT). The results of fixed effect estimates for a sample of siblings aged 0-47 months confirm the preceding conclusion. The analysis is repeated to identify the determinants of the probability the child's MSD (PPVT) score is in the bottom part of the distribution of MSD (PPVT) scores and the conclusions are similar.

Keywords:
Childcare, early education, developmental outcomes, public policy.

JEL classification: J1, J2.

1. Introduction

According to data from Cycle 1 (1994-1995) of the National Longitudinal Survey on Children and Youth (NLSCY) on child care use, about thirty percent (over 450,000 children) of infants and toddlers (aged 0-3 years), whose mothers (and spouse in two-parent families) are in the labour force or students, are cared for by adults other than their parents while their parents are at work or attend school (see Tables 1 and A1.1). These data also reveal two neglected aspects of mothers' employment and child care arrangements: (1) a large proportion of children less than 4 years old, in which the parents are both currently employed, part-time or full-time, or living with an employed single mother, are in families that do not use any form of child care (about 18 percent of all children and approximately 275 000 children); (2) a non-negligible proportion of children under 4 with a mother (or/and spouse) not currently employed, and mostly attending school, are in families that use non-parental child care (about 7 percent of all children or around 113 000 children). It is more tedious to draw the same profile for the preschoolers (aged 4-5 years) (see Tables 2 and A1.2). A very large majority of 5 year-olds (89 percent) are in kindergarten[2] (some are in junior kindergarten and some attend school in grade 1). Moreover, for about a third of these children, families use non-parental childcare. About twenty-two percent not in kindergartens are in non-parental care. The proportions are different for children who are 4 year-old: about thirty-nine percent are in junior kindergarten and approximately forty percent receive non-parental childcare. The same data reveal that in two-parent families, fifty-eight percent of children aged 0-3 years have a mother currently working on a full- or part-time basis.[3] The same percentage for children living with a single mother is thirty percent. Two-thirds of the working single-mothers are employed on a full-time basis.

Adults other than their parents care for large numbers of young children in Canada on a regular basis. For a sample of children in families reporting positive hours of child care (see Table A1.3), the mean number of hours children spent in all care arrangements is a little more than 30 hours per week (the average is nearer 40 hours per week when parents work full-time). When a child spends almost half of his or her waking hours in custodial-type care, it is reasonable to expect that the caregiver exert some influence on his or her development.

The reality that many young children are in extensive non-parental childcare has stimulated the interest of policy makers and scholars. Three main issues have been addressed in the research literature. One is how the cost of childcare affects the labour market decisions of mothers of young children and demand for the principal mode of childcare use (Cleveland *et al.* 1996; Powell 1997; Cleveland and Hyatt 1993).[4] Another issue is the

[2] In 1994-95, public kindergarten in Canada was mainly half-day.

[3] In six percent of the cases, the mother's spouse is not currently working.

[4] There are numerous studies in the American context.

quality of the non-parental care, that is, the demand, supply and production of quality in childcare since it is thought to affect the cognitive, social, and emotional development of children as well as their health.[5] Developmental psychologists characterize the ("process") quality of childcare by the appropriateness of the interactions between providers and the child, appropriateness of the curriculum, materials, and activities to which the child is exposed, and the environment in which the care is provided. "Structural" quality (child/staff ratio, group size, specialized training in early childhood) has often, but not consistently, been found to have positive effects on child development. The important questions that can be raised about quality have not been addressed empirically in Canada, because there has been no on-site survey or study designed to collect information on process or structural quality in childcare centres (and family-based care). In the United States, the findings are that the quality of childcare is low on average and that it displays considerable variation (Hayes *et al.* 1990).

One last issue that we address in this paper is how childcare affects developmental outcomes for young children. Is daily separation from the mother damaging for young children, especially if non-maternal childcare occurs during infancy? What characteristics of mothers' employment status and of non-parental child care modes is supportive of children's development?

This paper analyses the relationship between childcare modes and child development outcomes. Models of the determinants of Motor and Social Development (MSD) scores for children aged 0-47 months, and of the Peabody Picture Vocabulary Test assessment scores (PPVT) for children aged 4-5 years using data from Cycle 1 of the NLSCY, which provides information on childcare arrangements for young children and on parents' labour force status, are estimated. Section 2 reviews the studies that examine the links between childcare modes and child development outcomes. The issues involved in modelling and estimating the effect of childcare modes are discussed in section 3. Section 4 describes the data and the variables used for the regression analysis. The empirical results are presented in section 5. They suggest that infant-toddler non-parental care arrangements have insignificant or negligible impacts on developmental outcomes (MSD). For preschoolers, modes of care and early education do not, on average, influence cognitive development (PPVT). The results of fixed effect estimates for a sample of siblings aged 0-47 months confirm the preceding conclusion. The analysis is repeated to identify the determinants of the probability the child's MSD (PPVT) score is in the bottom part of the distribution of MSD (PPVT) scores and the conclusions are similar. The last section discusses the results, their limits, and their implications for public policy.

[5] In many studies, the quality of childcare purchased by a family has been treated as exogenous, as equivalent to the family's expenditures on childcare, as an unobserved variable proxied by the mode of care, or as an unobserved choice variable. The studies of Blau and Hagy 1998, Blau 1997, and Blau and Mocan 1999 tackle the issue directly.

2. Literature Survey

Research in psychology and cognition demonstrates the vital importance, for a variety of skills, of the early preschool years when human abilities and behaviours are fostered by families and non-institutional environments (Lindsay Chase-Lansdale 1998). Early learning of social, emotional, and cognitive skills begets later learning. At each stage, skills acquired breed later learning making it easier to learn. Early success or failure feeds into success or failure at later stages, particularly in elementary and secondary school. Moreover, recent research indicates that formal or institutional education is not necessarily the most important aspect of the developmental and learning processes. These remarks parallel the changing focus of empirical research on childcare over the years.

Reviews of studies concerning the effects of family labour market decisions including childcare choices have described the research in terms of "waves" (Love et al. 1996; Lamb 1998; Belsky 1990).[6] One wave examined the potential effects of maternal care in the first years after the birth of a child on outcomes at ages 3 to 6. Four studies can be singled out because they adopt an econometric approach with control variables for family background, parental income and mother's time allocation while they also address the selectivity issue of the mother's labour market participation.[7] Blau and Grossberg (1992) found that the net effect over the first three to four years is close to zero. Hill and O'Neil (1994), after controlling for non-parental childcare found a significant and negative association between a mother's hours at work and her child's cognitive skills. In a replication study, James-Burdumy (1999), using a variety of estimation methods in a panel setting (random effects, fixed effects, IV-fixed effects) to reduce endogeneity problems associated with labour supply choices, and considering types of care, concludes that neither hours, weeks worked by the mother nor type of childcare use affect test scores of children aged 3 and 4. Ruhm (2000) investigates the children born to a more recent cohort (women aged 29 to 38 at the end of 1995). His results, robust to the inclusion of controls for daycare arrangements, show that maternal labour supply during the first three years of a child's life have a small negative effect on the verbal ability of 3 and 4 year-olds but a substantial detrimental impact on the reading and math achievement of 5 and 6 year-olds. There is some indication that early employment may be particularly negative for children in "traditional" two-parent families.

Lefebvre and Merrigan (1998a, 1998b) used data from Cycle 1 of the Canadian NLSCY to study the

[6] We cite studies, which in their analyses of the effects of maternal employment/child care on cognitive skills and on social development of the children used the American National Longitudinal Survey of Youth-Child Supplement (NLSCY-CS) begun in 1986 and repeated every other year. Most of the studies did not address the issue of differences among type of care when the mother worked.

[7] All analysed children PPVT scores.

effects of maternal work and schedules and of family income on child outcomes (for children aged 4-11 years). Their results suggest that the most important predictors of cognitive scores, behavioural scores, and schooling achievements were the child's personal characteristics as well as maternal and family characteristics and not income or work decisions.

Another wave of childcare research asked how variations in type and quality of care differentially affect children. There is ample empirical evidence in the psychology literature that quality, defined as "classroom" dynamics (behaviour of the care providers towards the children, appropriateness of the activities), contributes positively to the cognitive, social, and emotional development of children. Lamb and Sternberg (1990) emphasize that children's care experiences occur in the context of other events and experiences in their lives. Failing to control for the others factors, child and family characteristics, and possible selection factors into type of arrangements, does not allow drawing firm conclusions about the effects of childcare quality nor of the variety of childcare settings.[8] Blau (1999) questions the robustness of the findings in the field:

> "Most of these studies suffer from small sample size, non-randomly selected convenience samples, few or no measures of family and child characteristics, no measure of child development prior to exposure to the child arrangements being studied, and no control for self-selection of children into child arrangements" (p. 789).

Using data on childcare inputs ("structural quality") and retrospective histories of the childcare arrangements, his results suggest that childcare characteristics (inputs, and modes compared to parental care) have no effect on a variety of child outcomes when controlling for family background and the home environment.[9]

The research and evaluations of preschool program interventions are also partly relevant despite their particularities. These programs operate several days of the week and particularly for a half-day, more likely focus on child development and school preparation for children from disadvantaged social and economic background, are more likely to have some component for helping parents to foster parenting practices conducive to child development, and only partially meet parents' child care needs. Overall, such targeted programs seem to reduce developmental delays for children (Currie and Thomas 1995; Campbell and Ramsey 1994). However, even if we presume of their higher quality, these small-scale programs are limited in scope and access.[10]

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[8] When quality of childcare has been measured, the assessment was essentially in one setting, centre-based care. Differential access to care for families with different resources and others arrangements like family-based care and care by relatives further complicates the quality picture.

[9] The outcomes assessed were an index of behavioural problems, achievement tests in mathematics and reading recognition, and the PPVT test. There is a lag between the age of the children at which the childcare characteristics were measured and the outcomes assessed. In some cases the assessments were repeated.

[10] Most provinces have put in place such small-scale programs oriented mainly towards welfare families in larger cities.

Some studies have extended the self-selected nature of childcare arrangements by examining the additive or interactive effects of family factors and childcare variables. Using the NLSY, Gamoran et al. (1999) study differential effects of various non-parental child care modes by interacting the mode of childcare with the mother's education or with family income in a regression analysis. Their results, from the models estimated with fixed family effects (and a non-parametric estimation technique), suggest that non-parental childcare tends to magnify the existing disparities in child development skills (measured by PPVT scores and scores on a mathematical test, the PIAT Math). The explanation offered is the synergy between the activities undertaken by childcare providers and more well-off and educated families who reinforce at home positive learning activities and adult-child interactions. Hence, a general view held is that families at large with more economic resources have greater options and that their children are more likely to benefit from childcare providers and settings that replicate parental care.[11,12] Thus, child care may have no effect on children development because non-parental childcare patterns simply mirror the diversity of family background.

We are aware of only one research paper using the NLSCY data that addresses directly the issue of non-parental childcare effects on children's development. Lipps and Yiptong-Avila (1999) analyse the impact of "early childhood education" - defined as any type of non-parental daycare arrangement including nursery schools and kindergarten - for children aged 4-5 years in 1994-1995 (from Cycle 1 of the Survey) on their achievements in school two years later (the same children from Cycle 2, in 1996-1997, of the Survey). Based on their results, the authors affirm that children in early childhood care and education "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" (p. 5). Unfortunately the study does not provide explicit interpretable results, nor presents estimated effects of the control variables used or of the estimation methods. The report of the study is a model of vagueness and imprecision.

3. Theoretical Issues and Methodology

Health Canada also funds community groups to establish and deliver services that address the developmental needs of at risk children aged 0-6 years (see the Community Action Program for Children on their Web site). We are not aware of published evaluations related to these programs.

[11] Some analyses (Kohen and Hertzman 1998; Mayer and Rose 1998) suggest that low-income families are able to consider centre-based childcare and paid family-home care when subsidies are available, otherwise they tend to rely on relatives and free care. There is no conclusive evidence about whether centre-based care is more beneficial than home-based care by a relative or not.

[12] The evidence for the willingness of parents to pay for quality in childcare is not compelling. Results from Blau and Hagy (1998), and Hagy (1998) suggest that parents value more convenience of the hours, location and reliability of the arrangement rather than elements of structural or dynamic quality.

The questions about the effects of childcare use on outcomes raised in the introduction are difficult to answer because of several factors. First, there is the question of the long-term effect of the types of childcare experienced by children. Second, child development is a complex process, where childcare is only one influence on how children learn, grow and develop. Inherent abilities, given at birth, vary from one child to another. Differences in children's social and economic environments constitute a major source of inequality in development. The nature of family life and the educational environments to which children are exposed vary among them. Moreover, family childcare arrangements and mothers' employment decisions are selective decisions and controlling for the unobservable selection factors and for unobserved aspects of the home environment is often quite difficult. Finally, the joint choices facing a family with a young child are whether the mother will work, whether a paid childcare arrangement will be used, and which mode of childcare will be used.[13]

In view of the problems mentioned above and the limited information available in the public-release data set, the methodology will consist in obtaining evidence on the existence of causal effects, in the sense of Angrist and Krueger (1999), relating the type of childcare arrangement and a young child's development. A simple causal regression model that would answer this question, if the choice of a childcare arrangement is a random event, is:

$$Y_i = \alpha + \beta * FC_i + \gamma * DC_i + \varepsilon_i , \qquad (1)$$

where FC is a dummy variable taking the value of 1 if the child's main care arrangement is non-parental family-based care, zero otherwise, DC is a centre-based daycare dummy variable, Y is a developmental measure and i is a subscript representing child i. If there is no correlation, between the two regressors and ε_i, Ordinary Least Squares (OLS) regression will produce consistent estimates (when regressions are done with large samples of children) of β and γ. However, if the error term contains elements that are correlated with FC and DC, the estimated coefficients will be biased. If we assume ε_i can be written as:

$$\varepsilon_i = \theta' X_i + \eta_i , \qquad (2)$$

where θ is a column vector of parameters, X is a column vector of variables correlated with FC and DC, and η_i is an error term that is uncorrelated with X, FC and DC, then OLS will produce unbiased results if the variables in X are included in the regression analysis. Therefore, if our data set can encompass all the variables that determine the child's care arrangement, and if these variables are exogenous, we can identify the causal

[13] Blau and Hagy (1998) estimate such a structural model.

effects pertaining to childcare arrangements. This is Barnow, Cain and Goldberger's (1996) case of "selection on observables". If some of the variables that determine care arrangements are not included in the X vector because they are correlated with child care arrangements, and that the correlation is assumed to be known a priori, OLS estimates can be interpreted as upper (lower) bounds of the effects if the correlation between η_i, FC, and DC are positive (negative).

The inclusion in our sample of children with siblings that experience a different childcare arrangement permits the estimation of a model with family fixed effects. Rewriting (1) as:

$$Y_{if} = \alpha + \beta * FC_{if} + \gamma * DC_{if} + \mu_f + \varepsilon_{if}, \qquad (1')$$

where the subscript f represents a particular family, we can use these children to estimate the parameters with a fixed effect (FE) estimation method (rewriting the variables as deviations from family means). If all the correlation between unobserved factors and care arrangements is due to unobserved family effects, the fixed effect method will produce consistent estimates of β and γ.

4. Data and Variables[14]

Data collected in 1994-95 for Cycle 1 of the NLSCY and available on the public-release Micro data file were used for the regression analysis (Statistics Canada 1998).[15] This data set contains information on childcare arrangements, the mother's employment status, family background and a set of developmental instruments. However the data set available has some drawbacks for our purposes. While there is useful information for the type of childcare used and hours per week, there is no information on child care quality (providers' behaviour, environment) and inputs (group size, staff-child ratio, staff qualifications).[16] Also, the public-release data file includes many variables that have been top-coded or suppressed which imposes the use of cruder variables and limits the availability of instrumental variables.[17] Although the NLSCY is a

[14] Appendix 2 presents for the samples the mean value of the specific variables used in the regression analysis.

[15] The larger data set is not available to researchers outside Statistics Canada or Human Resources Development Canada.

[16] The production of dimensions of quality is subject to controversy. Blau (1997), and Blau and Mocan (1999) suggest on one hand that there is no relation between structural quality (such as group size, staff/child ratio and level of staff training) and measures of quality that matter for child development and, consequently, from a public policy perspective it is difficult to implement childcare quality.

[17] For example, the first age group of mothers (spouses) is 15-24 years; the total income of all families is coded with the last group being $40,000 or more (there are more income groups for two-parent families only); the years of education are recoded, the last one being college, trade or university degree; the number of children in families are top coded (3 or

longitudinal survey and data from Cycle 2 (1996-1997) are available, the public-release data set is constructed as a cross-section and so "prevents" any longitudinal regression methods that permit, for example, the control of fixed individual effects or the identification of the effects of time-varying regressors in the presence of fixed individual effects.[18] We used data from Cycle 1 because the sample of young children is substantially larger than the sample from Cycle 2 permitting the estimation of a model with fixed family effects, albeit a crude one.[19]

4.1 Dependent outcomes variables

For children aged 0-47 months (referred to as 0-3 year-olds in this study), the dependent variable is the child's standardized score for the index of Motor and Social Development (MSD). The MSD is based on 15 questions that measure dimensions of motor, social, and cognitive development. Each item asks the person most knowledgeable of the child (PMK), usually the mother, whether or not a child is able to perform a specific task with questions varying with the child's age.[20] The scores ranged from 15 to 162 with a mean of 100 and a standard deviation of 15 for all age groups. For children aged 4 and 5, (referred to as 4-5 year-olds in this study), the dependent variable is the child's standardized score on the Peabody Picture Vocabulary Test-Revisited (PPVT-R). This test, administered to the child by the interviewer, assesses verbal competence. The score is widely used and cited as one of the best measures of verbal intelligence, of scholastic aptitude among children, and as a very good predictor of later academic achievement. The scores ranged from 50 to 160 with a mean of 100 and a standard deviation of 15 for all age groups.

4.2 Independent variables

The set of independent variables used in the estimations reflects different aspects of childcare arrangements and preschool education, mother's labour force status, child's characteristics, and family background.

Childcare arrangements, early childhood and preschool education Indicators of childcare and

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more); age of the mother at the child's birth is suppressed.

[18] The suppressed variables differ from the first two cycles which also "prevents" matching.

[19] A maximum of up to two children per family where surveyed in Cycle 2, whereas up to four children aged 0-11 years per family could be observed in Cycle 1.

[20] Children for whom the PMK is neither the biological, adopting or stepmother or the father, and children from single-father families are excluded.

education are derived from questions to the PMK. Specifically, on childcare, the PMKs were asked for each child whether child care, such as by a relative or non-relative in the child's own or other home or in a daycare centre and before or after school program, was currently used while the PMK (and spouse) are at work or studying.[21] In addition, PMKs were asked the number of hours per week each child spent in each type of care and the total number of care arrangements[22], and for family-type care if it is regulated or not. Because of the small number of cases in some arrangements, the categories were combined in three care situations: non-parental home-based care, centre-based care and parental care (no daycare used). Regarding schooling, the PMKs were asked, for children aged 4 years or more, whether his or her child attends school, if yes, the school grade (junior kindergarten, kindergarten, grade 1) and whether the school was privately or publicly funded.[23] Finally, in a section of the Survey on activities done by children, PMKs are asked for each child whether he or she attended an *early education program* (such as a nursery daycare centre, a junior kindergarten or a kindergarten) or participated in any *education activities* (such as playgroup, halt-daycare, toys library, infant stimulation program, mom and tot program) and the number of hours per week spent in these activities. Although PMKs are asked to ignore time spent in daycare or in school when providing these informations, there is overlapping in answers for childcare arrangements and activities. Most of the children in an early education program are 4 or 5 year-old. Furthermore, a large majority of these children are involved in a non-parental childcare arrangement. While children participating in educational activities are more likely to be aged less than three but otherwise stay at home with their parents.[24] Two educational care dummy variables were constructed from these answers. The first one is *education care* if the child attends an educational program. The second one is *other activities* if a child participates in educational activities.

Mother's labour force status The extent of the mother's employment and variation in hours of work should affect more child outcomes than paternal employment. The number of weeks worked full-time or part-time by the mother during the reference year was used as regressors in some of the specifications while in others a participation dummy variable indicating current labour force participation is used. However, the main

[21] In some cases more than one care arrangements is used. The primary care arrangement defined in this study is the one used for the greatest number of hours.

[22] Kohen et al. (1998), interpret number of childcare arrangements as an environmental change that may impact on a child's development. In their empirical results, changes in care arrangements were not significantly associated with a poor score for MSD (less than a standard deviation, <85) but with children likely to be rated as having a "difficult" temperament (behavioural problems). For children aged 4-5, these changes were associated with lower PPVT-R scores.

[23] A small number of children aged 5 are in grade 1. In one province, Prince Edward Island, no children are stated as attending kindergarten, private or public. Only PMKs from two provinces (Quebec and Ontario), declared that their children attend a junior kindergarten.

[24] Eighty percent of children spent less than 15 hours per week in an early education program, while eighty percent of children spent less than 10 hours per week in education activities.

results are not sensitive to which labour market control variable is present in the regression.

Table 1 and 2 present the patterns of child care arrangements and the current working status for children aged 0-3 years, while Table A1.1 of Appendix 1 presents the same information by ages of the children. As children age, more two-parent families have both spouses working full-time and they are more likely to prefer non-parental home-based care. What is surprising is that so few families used a centre-based daycare. Table 2 shows the patterns of child care arrangements according to schooling status with parental current working status for children aged 4-5 years, while Table A1.2 of Appendix 1 presents this information by ages of the children. Most of the 5 year-olds are in kindergarten and otherwise no childcare is used. A majority of the 4 year-olds are in some form of childcare arrangements (junior kindergarten or non-parental child care).

Control variables The literature suggests that the child's gender is a factor that is likely to affect their cognitive, social and motor development. Therefore, a dummy variable for being a female child is included as a control variable.[25] There is a great deal of evidence linking a low birth weight (considered as an health shock) to poor health, cognitive deficits, and behavioural problems (Bartley et al. 1994). Birth weight is available for children aged 0-3 years and used in the MSD estimations. The literature also shows that family size and birth order directly affects children's achievement (Hanushek 1992). The effect of the number of siblings is present in the analysis, considering that a greater number of siblings in the family dilute the amount of time and the emotional and financial resources parents can spend on each child. The child's age assures comparability across ages. In the case of the PPVT scores, there are control variables for the presence of a physical or health problem at the time the child took the test, and for the quality of the room environment and for the level of distractions during the test (a score that ranged from 0 to 16 and used as such).

Mothers, regardless of maternal employment status, provide more direct care to young children than fathers. It is hypothesised that the mother's age at the child's birth captured by her age group and the mother's years of formal education will have a positive influence on the child's cognitive skills and motor and social development. In general, it is also expected that better educated mothers will be better prepared at anticipating, preventing, and solving problems that arise in the lives of children.

Several studies suggest that maternal ethnicity or ethnic background will influence maternal values and mother-child interactions. To take into account this factor, the immigration status of the mother and the time of immigration are used in the analysis

The presence of two parents in the home provides greater opportunity for parent-child interactions and a greater base of parental resources from which the child may draw. Thus, it is expected that other family structures may affect negatively children's outcomes. However, in the cited literature, when the mother's

[25] The variable was omitted for the PPVT-R estimations because it always appeared non significant.

characteristics and family resources are taken into account, the effects of family structure are generally not statistically significant. Thus, we include a dummy variable for a single-mother status and for children living with both parents; the stepparent nature of the family is also captured by a dummy variable indicating whether the parents are not both biological parents.

In addition to these independent variables, a series of control variables to account for possible effects associated with the province of residence of the children are added in the models. These might capture differences in preferences towards investment in children or differences in family policies that matter in terms of disposable income available to parents, and childcare subsidies.

5. Results

5.1 Effect of income on childcare arrangements

Before presenting the results, we provide a brief discussion on why income will not be included in the regression analysis. Variation in total household income measures the level of material resources that the family can use to provide market goods and services enhancing the quality of the child's environment, and to pay for childcare if both spouses decide to work. Since family income is correlated with a host of regressors and surely correlated with unobservable factors in the developmental scores equations, this variable is omitted from the analysis and it is simply assumed that childcare effects are upper bound of these effects because the correlation with income should be positive. Empirical evidence on this correlation is found in Tables 3 and 4, where odd ratios for multinomial logit regressions of non-parental childcare arrangements compared to parental care on income class are presented. The income effects are captured by a series of dichotomous variable indicating a class of income.[26] The first level (reference category) is, for two-parent families, a family income of less than $30,000 and the five others are levels increasing by increments of $10,000 (the last one being $80,000 or more). For single-mother families, the first level (reference category) is a family income of less than $15,000 and there are four other levels (the last one being $40,000 or more).

Clearly, there is a positive effect of income on the probability of receiving non-parental care relative to receiving only parental care as in almost all cases the odds ratios increase with the category of income and this even in the case where both parents with infants/toddlers are working full-time. In general, the higher the income, the higher is the probability of choosing a daycare centre relative to parental care while the same is true for non-parental care in a home. Therefore, not adding income in our regressions should bias the coefficients upward.

[26] The earned income of working mothers is a variable suppressed on the public-release data set.

5.2 Effect of non-parental care, childhood and early education on developmental outcomes

This section presents and comments both OLS and FE estimates within the framework exposited in section 3. The strategy will be to present results from a series of specifications, starting from one with childcare arrangement dummies and explanatory variables that are, almost surely, exogenous and linked to choice of child care arrangement, and then adding variables which would be pre-determined but clearly influential in the choice of care arrangement.

0-3 year-olds: Motor and Social Development (SMD)

In the first column of Table 5, the pattern is clear. As more variables are added to the original specification, in a sample including all children less than 4 years, the care arrangement coefficients decrease in value and become statistically insignificant.

When the child's sex, his age, and his province of residence are added as controls (see Panel A), the two care arrangement coefficients are statistically significant but the values are relatively small (for non-parental care in home 1.3, less than one tenth of one standard deviation of the dependent variable and 2.4 for centre-based care, less than one fifth of a standard deviation). With the mother's characteristics (her age and education), the number of children and family characteristics (Panel B), the coefficients remain significant but lose 30 percent of their value. When labour market controls and other characteristics of childcare are added, then the coefficients are no longer significant. In none of the regressions was income included as a control. Also, other variables correlated with higher income such as quality of the home inputs, positive neighbourhood effects, intellectual stimuli are also not included and this also would tend to reduce the care effects, if added to the regression.

A second set of regressions was performed on the basis of the child's age. The large sample permits regression of the model in column 1 of Table 5 by the age of the child. The sample is split into 4 sub-samples (children below 1, of age 1, 2 and 3). The results are found in columns 2-5 of Table 5, with the age of children in the sample at the top of each column. For children under one, the coefficient on care in centre is systematically negative but with high standard errors as few children of that age are in daycare centres. The negative value of the effect is mirrored in the work of Blau and Grossberg (1992) who find that maternal work in the first year of life of the child has a negative effect on his later development (measured by the PPVT score). For the samples of older children we find the care variables to be invariably insignificant except for children aged 2 and 3 years (Panels A and B). Again, when the effects are significant, they remain relatively

small.

4-5 year-olds: Cognitive Development (PPVT-R)

Table 6 presents the estimates of models with the PPVT-R as dependent variable and with a categorization of care modes that depends on the age of the child. For children aged 4, with whom the analysis is started, the categories are: non-parental care given in a home, care given in a daycare centre and parental care. The first results are in panel A, column 1, of Table 6. In the simplest specification where the controls are reduced to provincial dummies and the context in which the assessment was made, very small effects are observed for the type of care the child receives with the care at home being statistically significant. With other child care activities added to the regression, the results are unchanged, and however, these activities produce a small positive and statistically significant effect on PPVT scores. When the mother's characteristics are added to the regression, only educational care remains statistically significant (with a positive sign). The addition of other regressors barely changes the results of Panel D. The conclusion is that type of care barely matters for children of aged 4 years.

For the case of the 5 year-old children in Panel A, schooling activities as well as for provincial effects, and assessment context are controlled. The results for the effects of care are very similar to Panel A column 1, where non-parental care in home has a small but statistically significant effect while care in a daycare centre has no significant effect on the PPVT score. In Panel B, the controls for schooling are omitted and replaced with dummies representing participation in educational type care and other educational activities. The conclusion from Panel A on the «care» coefficients remains unchanged. Since the analysis could not be continued while including both controls for schooling and "educational" care because of collinearity problems, we chose to continue controlling for schooling while adding other regressors in the model. Adding the mother's characteristics to the specification in Panel A, as for children of 4, reduces the effects of the childcare categories and renders them statistically not significant. Adding other regressors does not change this result and strengthens our preceding conclusion about the effects of the type of care used by parents on children's PPVT scores.

The large sample of children who are 5 year-olds permits a specification with the following differentiation of care: (1) cared in a home and attends kindergarten, (2) cared in a home and does not attend kindergarten, (3) attends a daycare centre and kindergarten, (4) attends a daycare centre and does not attend kindergarten, (5) receives parental care and attends kindergarten, (6) receives only parental care and does not attend preschool (the baseline category).[27] Once again the pattern is similar, and end up with the conclusion

[27] A dummy variable is included to control for children who are in grade 1.

that modes of care do not, on average, influence PPVT scores.

The determinants of developmental scores

For social-motor development scores, sex, birth weight (positive effects), immigration status and being from Quebec (negative effects) stand out as statistically significant. For 3 year-old children, the mother's education has a strong and statistically significant effect but only when women with at least a high school diploma are compared with those who have not completed high school. Within the class of children with mothers with at least a high school diploma there are no differences explained by varying levels of education. The strongest effects are associated to being an immigrant child, particularly being a recent immigrant child and the sex of the child.

For PPVT scores, several variables have relatively strong and statistically significant effects. First, 4 year-olds (1) with no siblings score 5.2 points better than children with more than two siblings, (2) with mothers who are less than 30 years score 5 to 6 points less than children with mothers who are older than 39 year-old, (3) with mothers who have completed a college or university degree score 8.3 points higher than those with no high school degree, (4) who are from a step family score 6.6 points less than children in families with two biological parents, (5) who are from Prince Edward Island or New Brunswick score respectively 5.5 and 3.7 points less than children from Ontario, and (6) whose mother is an immigrant will score about 6 points lower than a child with a non-immigrant mother (there are very few observations for the case of children with recent immigrant mothers).

Children who are 5 year-old (1) with no siblings score 3.4 points better than children with more than two siblings, (2) with mothers who are less than 24 years score 4 points less than children with mothers who are older than 39 years, (3) with a college or university degree scores 6.6 points higher than those with mothers with no high school degree, (4) whose mother is an immigrant will score from 4 to 12 points lower than a child with a non-immigrant mother (there are very few observations for the case of children with recent immigrant mothers), (5) with a single mother score 4.3 points less than those with two parent families, and (6) who attend kindergarten score 3.5 points more than children not attending kindergarten.

Therefore, these numbers clearly identify children who are at risk of having serious deficiencies when they start school. For example, a child with an immigrant single mother with a low level of education, or a child with a poorly educated young mother.

5.3 Effect with fixed family effects[28]

[28] The sample of children aged 4-5 years was to small to perform the fixed effect estimation for the PPVT scores.

Table 7 presents fixed effect estimates of parameters associated to variables that differ across siblings of the same family computed with a sample of siblings. The letter D is used in the analysis rather than its level precedes the name of the explanatory variables to remind the reader that the deviation of the variable with respect to the family mean. The results confirm the results in the preceding section, childcare arrangements have no effects on the MSD scores except for being cared for by a relative, while the sex of the child, its birth weight and the age of the child have relatively strong and significant effects on the same score.

5.4 Effect on the odds of having a low developmental score

Since evidence-using scores measuring child development could not be finding, the effect of childcare modes on the probability of having a low developmental score is evaluated. Children "at-risk" of delayed developmental outcomes can be analysed with the MSD and PPVT-R scores. Children whose scores were more than one standard deviation below the mean - scores less than 85 - were considered as obtaining a low score. In the weighted samples, 14 percent of infants and toddlers obtained a low score, while 16 percent of preschoolers were in such a position.[29]. Table 8 presents the results, in terms of odd ratios, of a logit estimating the probability for a child of each age to have a low score.[30]

For children less than 4 years, the models without the mother's education show strong and negative effects on the probability of scoring low. In fact, the odds are 2 to one of not being in this category for children in day care centres. However, when the mother's characteristics as controls the child are added, care effects are reduced and become not significant. The same pattern is observed for the probability of scoring low on PPVT.

6. Discussion and Conclusions

The importance of early child development and its effects on the later stages of life, especially school readiness and achievement is now widely recognized. Contemporary realities suggest that the workforce participation of mothers with young children will remain high and, consequently, will cause a strong demand for non-parental childcare which is largely "unregulated" and non centre-based. Thus, research is necessary to

[29] This rule is somehow arbitrary. For MSD and PPVT-R, the limit score for the lower 10 percentiles is 80.

[30] All the control variables are used in the estimations but their coefficients are not presented for space considerations.

investigate if certain modes of non-parental childcare are potentially harmful or beneficial to children.

Compensatory centre-based child care programs are considered by many as necessary to reduce inequality pertaining to young children's skills from socially disadvantaged families. Provincial governments initiatives on the welfare front will place more children of low-income and poorly educated mothers in some type of daycare.

These contexts surely justify the call for more attention to the issues of childcare. In Canada, there is a widespread conviction that the "market" for childcare is largely inefficient. That is, without state financial support and regulation, the offer of childcare services would be insufficient, inaccessible and unaffordable for middle-income families, and of poor quality. The far-reaching coalition promoting increasing support and implication for governments in childcare services brings together different vested interests. Parents who consider childcare services too costly and limited, producers who demand higher wages considering their qualifications, child development specialists who judge too low the quality of centre-based care and would like that higher quality services be made accessible for all children, especially those from disadvantaged families.

Before using government policy - regulatory powers and public resources - to improve the experiences of numerous children who spend time in childcare, policy makers need more findings about the effects of childcare. The findings of the study, although too tentative for conclusions giving their limitations discussed below, cannot substantiate these claims. Taken at their face value, they suggest that non-parental childcare arrangements and their characteristics compared to parental care do not matter for the specific outcomes assessed. When care is combined to some educational activities (educational care and kindergarten), there is some positive impact on outcomes for certain ages, albeit a modest one (a fifth of a standard deviation). These findings are similar to the ones in American analyses based on large representative samples of the population of children.

There are limitations to the study. The first limitation is the timing of the effects of childcare, early and preschool education. The data and models of the study do not capture the "value added" that non-parental childcare or early education might have besides family influences because of the inherent dynamic character of children's development processes. An outcome in one period is influenced by outcomes in earlier periods and inputs - from the home and the others environments of the child - which operate with a lag. To implement such an analysis necessitates longitudinal data. The second limitation is the issue of childcare and education arrangements. When more children (siblings) in the family will be assessed - and researchers will have access to the longitudinal data - it will be possible to control for unobserved characteristics specific to the parents, the family, and the children.

If the findings are correct, the main implications from a public perspective are that childcare should not be considered as a public service on the basis that it improves children's cognitive and social and motor

development outcomes. Given the current childcare arrangements observed in the NLSCY, parents seem to reconcile their occupational and parental roles in ways that are not detrimental to children. This does not imply that childcare subsidies have no benefits. Recognizing that childcare costs may deter mother's labour force participation, subsidizing childcare for low-income families and for the average unemployed mother may in terms of the life chances of their children generate positive social benefits.[31]

The real question is how to use the available funds wisely recognizing the need to prioritize.[32] The best evidence on compensatory preschool intervention for disadvantaged children suggests that they have lasting effects, and high social returns (Currie 2000; Heckman 1999). In this regard, government programs could be more aggressive. The child development initiatives taken by Health Canada, such as the Community program for children and the Canada Prenatal Nutrition Program (and their provincial counterparts), which focuses on lifestyle issues, parenting practises and parenting education, are likely to make a difference for, at risk, young children.[33]

[31] See Cleveland and Krashinsky (1998), and Cleveland and Hyatt (1998) for a discussion and illustrative evidences.

[32] The Quebec government commitment to offer $5 per day (per child) childcare services irrespective of family income is exerting considerable pressure on public resources, as the promised number of spaces should reach 200,000 by 2005. By September first, there were approximatively 115,000 subsidized and available spaces for children aged 0-4 years (the total population of children aged 0-4 years is slightly more than 500,000) at the tune of about $7,000 per space. In fact, this commitment to "universal" daycare as become such a large financial obligation that it precludes any other effort in early childhood development programs. For instance, in Quebec, every additional dollar coming from the federal government under the National Child Benefit initiative has been invested in the daycare program in order to sustain it. With highly subsidised childcare services as the cornerstone of family assistance programs, the Quebec "model" of child care channels public resources primarily to families in which both parents work at regular 9-to-5 jobs and whose children are cared for in accredited centres. Casual observation suggests these policy decisions unduly taint the choices parents have to make with regards to work and in particular childcare arrangements to benefit from these subsidized spaces. Calculations done by income fiscality professor Claude Laferrière at UQAM show that families with an income of less than $40,000 were financially better off before this formula, when their payments of $20 per day (the mean rate in Quebec in 1998) for daycare services were eligible for the very generous provincial refundable tax credit for childcare and for the federal tax deduction for childcare. These families now pay more taxes on income at the federal level and because their "net" family income is higher, their federal child tax benefit is consequently reduced. Thus, the $5 per day formula implies distributive effects where high-income families gain to the expense of low-income families.

[33] See also the American Early Head Start initiative, which is the object of a longitudinal study and random assignment evaluation by Mathematica Policy Research (http://www.mathematica-mpr.com).

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Table 1
Current Working Status and Primary Care Arrangement for children used to allow mother (and spouse) to work or study, ages 0-47 months (0-3 years) 1994-1995[1]

Working Status of Mothers and Spouses (if present)	Child Care Mode	Two-parent families[2]			
		Count sample	Count population	Percentage of total	Percentage of mode
1. Both spouses work full time	No care used (parent)	677	134,521	10.3	17.2
2. Both spouses work full time	Nonparental Home care	1,357	247,244	18.9	59.4
3. Both spouses work full time	Centre Daycare	186	43,764	3.4	53.1
4. Both spouses work full/part time	No care used (parent)	658	122,143	9.3	15.7
5. Both spouses work full/part time	Nonparental Home care	620	104,863	8.0	25.2
6. Both spouses work full/part time	Centre Daycare	67	20,213	1.6	24.5
7. One/both spouse(s) do not work	No care used (parent)	3,422	552,475	42.3	67.1
8. One/both spouse(s) do not work	Nonparental Home care	377	64,177	4.9	15.4
9. One/both spouse(s) do not work	Centre Daycare	71	18,365	1.4	22.3
Total		7,435	1,307,765	100.1	
10 Both spouses do not work[3]	No care used (parent)	483	72,452	(68.9)	
	Nonparental Care	235	33,032	(31.1)	
	Total	718	105,484	8.1	

Source: NLSCY, Public Micro data File, Cycle 1.
1. Excluding not stated working status and primary care arrangement used.
2. Two-parent families: children living with a least one biological parent or adoptive parent; female headed families: children living with biological mother.
3. Category included in lines 7-9.

Table 2: Current Working Status, Schooling Status and Primary Care Arrangement for children used to allow mother (and spouse) to work or study, 4-5 years, 1994-1995[1]

Working Status of parent(s) and Childcare Mode	No Kindergarten			Kindergarten[1]			Total (%)
	4 years (%)	5 years (%)	Total (%)	4 years (%)	5 years (%)	Total (%)	
1.Working and Childcare	108,362	15,799	124,161	60,394	137,031	197,425	321,586
	(42)	(37)	(41)	(39)	(40)	(40)	(40)
2. Working and No Childcare	115,007	20,781	135,788	77,640	153,680	231,320	367,108
	(44)	(48)	(45)	(50)	(45)	(47)	(46)
3. Not Working and No Childcare	32,679	6,128	38,807	14,450	36,135	50,585	89,392
	(13)	(14)	(13)	(9)	(11)	(10)	(11)
4. Not Stated Childcare mode	4,017	487	3,683	1,894	13,339	15 233	19,736
	(1)	(1)	(1)	(1)	(4)	(3)	(3)
Total	260,065	43,195	303,259	154,378	340,185	494,563	797,822
	(100)	(100)	(100)	(100)	(100)	(100)	(100)
(Row percentage)	(32)	(5)	(38)	(19)	(43)	(62)	(100)

Source: NLSCY, Public Micro-data File, Cycle 1.

1. Including junior kindergarten and a few cases (51 children in un-weighted sample) where 5 year-olds are at school in grade 1.

Table 3: Multilogit Odd Ratios Estimates of the Effects of Family Income on Infants-Toddlers (0-3 years) Childcare Arrangements

Child care arrangements	Family income group		Single-mother Families	Two-parent families				Two-parent families excluding non-working parents by age of child			
	All families	Two-parent families		All	Excluding non-working parents	Both parents working	Both parents working full-time	0-11 months	1 year	2 years	3 years
(No Care)			-	-	-	-	-	-	-	-	-
Centre Day-Care	<14,000 15-19,000 20-29,000 30-39,000 40,000+	<30,000 30-39,000 40-49,000 50-59,000 60-79,000 80,000+	- 1.1 1.1 3.2* 1.3	- 1.6*** 1.7** 3.9* 4.4* 5.6*	- 1.2 1.4 3.0* 3.3* 4.1*	- 1.7 2.2** 4.0* 3.6* 4.5*	- - 2.0*** 3.6* 3.3* 4.1*	- 0.7 0.7 2.0 0.8 1.6	- 1.3 0.6 3.5** 2.4*** 5.0*	- 1.7 2.2** 4.0* 3.6* 4.5*	- 1.7 2.2** 4.0* 3.6* 4.5*
Non-Parental Home Care	<14,000 15-19,000 20-29,000 30-39,000 40,000+	<30,000 30-39,000 40-49,000 50-59,000 60-79,000 80,000+	- 0.8 2.1* 3.4* 2.8*	- 1.6* 2.8* 4.5* 5.7* 7.5*	- 1.3** 2.1* 3.4* 4.3* 5.6*	- 0.9 1.6* 2.0* 2.1* 2.5*	- - 1.6* 2.0* 2.2* 2.6*	- 0.9 1.3 1.7* 2.3* 2.1*	- 1.6** 2.5* 5.0* 5.6* 8.7*	- 0.9 1.6* 2.0* 2.1* 2.5*	- 0.9 1.6* 2.0* 2.1* 2.5*
Number of observations			919	6,362	5,942	3,184	1,990	1,695	1,386	1,433	1,428

*(**)[***] Statistically significant at the 1 (5)[10] percent level.

Table 4: Multilogit Odd Ratios Estimates of the Effects of Family Income on Preschoolers (4-5 years) Childcare Arrangements

Family income group	Childcare Arrangements	Single-mother families		Two-parent families		Childcare Arrangements	Two-parent families	
		4 years	5 years	4 years	5 years		4 years	5 years
	(No Care)	-	-	-	-	(No Care)	-	-
<14,000	Centre Day-Care	-	-	-	-	No Care & Kindergarten	-	-
15-19,000		1.5	1.9	-	-		-	-
20-29,000		4.8*	5.3*	-	-		-	-
30-39,000		6.4*	2.9	1.3	1.3		-	-
40-49,000		3.6***	2.5	1.2	1.1		1.6***	1.0
50-59,000				3.2*	3.1*		2.5*	1.2
60-79,000				2.9*	2.8*		1.9*	1.2
80,000+				6.2*	6.4*		2.8*	2.0
<14,000	Non-Parental Home Care	-	-	-	-	Centre Day Care & No Kindergarten	-	-
15-19,000		0.8	1.5	-	-		-	-
20-29,000		2.2	4.5*	-	-		-	-
30-39,000		3.5**	3.8**	2.0*	2.1*		-	-
40-49,000		1.8	13.0*	2.6*	2.6*		3.1	1.3
50-59,000				4.2*	4.2*		6.5**	3.6**
60-79,000				6.0*	5.8*		7.3*	7.1*
80,000+				8.0*	7.9*		17.5*	20.1*
<14,000						Centre Day Care & Kindergarten	-	-
15-19,000							-	-
20-29,000							-	-
30-39,000							-	-
40-49,000							0.9	1.3
50-59,000							3.1*	1.9
60-79,000							2.4*	4.8**
80,000+							6.5*	5.4***
<14,000						Non-Parental Home Care & No Kindergarten	-	-
15-19,000							-	-
20-29,000							-	-
30-39,000							-	-
40-49,000							1.8*	1.7
50-59,000							3.2*	5.1*
60-79,000							4.5*	4.5*
80,000+							6.0*	2.7
<14,000						Non-Parental Home Care & Kindergarten	-	-
15-19,000							-	-
20-29,000							-	-
30-39,000							-	-
40-49,000							2.5*	2.4*
50-59,000							5.5*	4.2*
60-79,000							5.5*	7.3*
80,000+							12.5*	14.8*
Observations		232	249	1,438	1,315		1,483	1,315

*(**)[***] Statistically significant at the 1 (5)[10] percent level.

Table 5: OLS Estimates of the Effects of Infants-Toddlers (0-3 years) Non-parental Childcare Arrangements on Social-Motor-Development (SMD) Scores in Alternative Specifications[1]

	0-3 years	0-11 months	1 year	2 years	3 years
	A- Regressions including child's characteristics, and provinces				
Care in Home	1.3 (0.38)*	-0.5 (0.77)	-0.5 (0.76)	1.2 (0.74)	2.1 (0.78)*
Care Centre	2.4 (0.80)*	-3.4 (1.32)	1.0 (1.90)	2.3 (1.33)**	3.5 (1.32)*
Adjusted R^2	0.04	0.06	0.07	0.06	0.05
	B- Regressions including child's characteristics, provinces, mother's characteristics, number of children, and family's characteristics				
Care in Home	0.9 (0.39)*	1.1 (0.77)	-0.0 (0.80)	0.9 (0.76)	0.9 (0.80)
Care in Centre	1.7 (0.80)*	-3.5 (2.59)	1.2 (1.93)	1.9 (1.35)	2.6 (1.32)***
Adjusted R^2	0.05	0.08	0.07	0.07	0.07
	C- Regressions including child's characteristics, provinces, mother's characteristics, number of children, family's characteristics, and mother's number of weeks worked full and part time				
Care in Home	0.3 (0.43)	1.1 (0.80)	-0.2 (0.91)	-0.4 (0.88)	-0.7 (0.90)
Care in Centre	1.2 (0.82)	-3.6 (2.61)	1.0 (1.94)	0.9 (1.38)	1.2 (1.38)
Adjusted R^2	0.06	0.07	0.07	0.07	0.08
	D- Regressions including child's characteristics, provinces, mother's characteristics, number of children, family's characteristics, mother's number of weeks worked full and part time, and other characteristics of childcare				
Care in Home	0.6 (0.88)	-1.1 (2.05)	-0.9 (1.76)	1.0 (1.70)	0.3 (1.66)
Care in Centre	1.1 (1.53)	-5.2 (4.11)	0.6 (3.08)	1.4 (2.90)	0.6 (1.40)
Adjusted R^2	0.06	0.07	0.07	0.07	0.08
	E- Regressions including child's characteristics, provinces, mother's characteristics, number of children, family's characteristics, mother's number of weeks worked full and part time, other characteristics of childcare, and other childcare activities				
Care in Home	0.7 (0.88)	-1.1 (2.05)	-0.9 (1.76)	1.2 (1.70)	0.1 (1.66)
Care in Centre	0.2 (0.46)	-7.0 (4.24)	0.7 (3.11)	1.1 (2.92)	-0.3 (2.78)
Educational Care	3.4 (0.74)*	8.3 (5.00)	-0.5 (2.52)	1.4 (1.53)	4.1 (0.91)*
Other Activities	1.4 (0.59)**	0.1 (1.74)	-0.2 (1.33)	2.2 (1.05)**	0.8 (0.97)
Adjusted R^2	0.06	0.07	0.07	0.07	0.09
N. observations	7,281	2,039	1,701	1,795	1,746

*(**)[***] Statistically significant at the 1 (5)[10] percent level.

1. Reference care mode is parental care.

Table 6: OLS Estimates of the Effects of Preschoolers (4-5 years) Non-parental Child Care Arrangements on Cognitive Development Scores (PPVT-R) in Alternative Specifications[1]

Specifications	4 years	5 years	Specifications	5 years
A: Regressions including assessment context, and provinces				
Care in Home	2.2 (0.81)*	2.4 (0.8)*	Care in Home and Kindergarten	2.8 (1.5)***
Care Centre	0.8 (1.3)	2.5 (1.5)	Care in Home and No Kindergarten	1.4 (2.3)
Junior kindergarten		-2.6 (2.5)	Care Centre and Kindergarten	2.9 (2.1)
Kindergarten		4.6 (2.0)**	Care Centre and No Kindergarten	1.4 (3.3)
Grade 1		1.3 (3.2)	No Care and Kindergarten	0.1 (1.4)
Private school		3.2 (1.7)***	Grade 1	-2.1 (2.9)
Adjusted R^2	0.02	0.04	Adjusted R^2	0.03
B: Regressions including assessment context, provinces, and other childcare activities				
Care in Home	2.2 (0.8)*	2.3 (0.8)*	Care in Home and Kindergarten	3.2 (1.5)***
Care in Centre	0.2 (1.3)	1.3 (1.6)	Care in Home and No Kindergarten	1.6 (2.3)
Educational Care	3.4 (0.8)**	3.4 (1.3)*	Care Centre and Kindergarten	3.1 (2.1)
Others Activities	2.1 (1.0)**	4.1 (1.4)*	Care Centre and No Kindergarten	1.7 (3.3)
			No Care and Kindergarten	0.7 (1.4)
			Grade 1	-2.1 (2.9)
			Other Activities	4.3 (1.4)*
Adjusted R^2	0.03	0.04	Adjusted R^2	0.03
C: Regressions including assessment context, provinces, other childcare activities, and mother's characteristics				
Care in Home	0.4 (0.8)	1.0 (0.8)	Care in Home and Kindergarten	1.4 (1.5)
Care in Centre	-1.2 (1.3)	0.9 (1.5)	Care in Home and No Kindergarten	-0.5 (2.3)
Educational Care	2.3 (0.8)*		Care Centre and Kindergarten	1.0 (2.1)
Others Activities	1.2 (1.0)		Care Centre and No Kindergarten	0.4 (3.2)
Junior kindergarten		-2.8 (2.5)	No Care and Kindergarten	0.2 (1.4)
Kindergarten		3.7 (1.9)***	Grade 1	-1.5 (2.8)
Grade 1		1.3 (3.1)	Other Activities	3.2 (1.4)**
Private school		2.7 (1.7)		
Adjusted R^2	0.09	0.09	Adjusted R^2	0.09
D: Regressions including assessment context, provinces, other childcare activities, mother's characteristics, and family's characteristics and number of children				
Care in Home	-0.0 (0.8)	0.6 (0.8)	Care in Home and Kindergarten	0.9 (1.5)
Care in Centre	-1.3 (1.3)	0.9 (1.5)	Care in Home and No Kindergarten	-1.0 (2.2)
Educational Care	1.7 (0.8)**		Care Centre and Kindergarten	0.9 (2.1)
Others Activities	0.9 (1.0)		Care Centre and No Kindergarten	0.3 (3.2)
Junior kindergarten		-3.6 (2.4)	No Care and Kindergarten	0.0 (1.4)
Kindergarten		3.5 (1.9)***	Grade 1	-1.8 (2.8)
Grade 1		0.8 (3.1)	Other Activities	2.8 (1.4)**
Private school		2.4 (1.6)		
Adjusted R^2	0.12	0.11	Adjusted R^2	0.10
E: Regressions including assessment context, provinces, other childcare activities, mother's characteristics, family's characteristics and number of children, and mother's working status				
Care in Home	-0.8 (0.9)	0.2 (1.0)	Care in Home and Kindergarten	0.6 (1.5)
Care in Centre	-2.1 (1.3)	0.6 (1.6)	Care in Home and No Kindergarten	-1.3 (2.3)
Educational Care	1.7 (0.8)**		Care Centre and Kindergarten	0.6 (2.1)
Other Activities	0.9 (1.0)		Care Centre and No Kindergarten	0.1 (3.2)
Junior kindergarten		-3.6 (2.4)	No Care and Kindergarten	0.0 (1.4)
Kindergarten		3.5 (1.9)***	Grade 1	-1.7 (2.8)
Grade 1		0.8 (3.1)	Other Activities	2.8 (1.4)**
Private school		2.4 (1.6)		
Adjusted R^2	0.11	0.11	Adjusted R^2	0.10
Observations	1,654	1,511		1,511

*(**)[***] Statistically significant at the 1 (5)[10] percent level. 1. Reference care mode is parental care.

Table 7 : Effects of Infants-Toddlers (0-3 years) Non Parental Childcare Arrangements on Social-Motor-Development (SMD) Scores in Alternative Specifications with Mother Fixed Effects

Variables	Specifications			
DCare Home	0.6 (1.3)	-0.4 (2.2)	-2.2 (2.3)	-2.1 (2.3)
DCare Centre	2.3 (2.3)	1.3 (3.0)	1.0 (3.0)	1.3 (3.1)
DEducational Care				-0.6 (1.2)
DOthers activities				-1.0 (1.1)
DAge of children	1.8 (0.2)*	1.8 (0.2)*	1.8 (0.2)*	1.8 (0.2)*
DChild sex	4.5 (0.5)*	4.5 (0.5)*	4.5 (0.5)*	4.5 (0.5)*
DBirth weight/1000	4.5 (0.6)*	4.0 (0.6)*	4.1 (0.6)*	4.1 (0.6)*
DNumber of arrangements		0.1 (1.4)	0.3 (1.4)	0.4 (1.4)
DTotal hours of care per week		0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
DCare by relatives			5.8 (2.5)**	5.7 (2.5)*
DCare is regulated			0.0 (0.3)	0.0 (0.3)
Adjusted R^2	0.069	0.068	0.069	0.068
Number of observations	2,682	2,649	2,639	2,639

* (**) [***] Statistically significant at the 1 (5) [10] percent level.

Table 8 : Logit Odd Ratios Estimates of the Effects of Non-parental Childcare Arrangements on the Probability of a Low Score in Alternative Specifications[1]

	Age 0-3	Age 0-3	Age 0-3	Age 4-5	Age 4-5	Age 5
Care Home	0.8	0.7	0.9	0.7	1.2	
Care Centre	0.6***	0.8	0.9	2.4	3.1**	
Number of arrangements	0.13^2	0.17^2	0.13^2	-0.05^2	-0.08^2	-0.05^2**
Total hours of care per week	-0.0^2	0.0^2	0.0^2	0.0^2	0.0^2	0.0^2
Care by relatives	0.8	0.8	0.8	1.1	0.6***	
Care is regulated	0.8	0.8	0.9	0.4**	0.3*	
Educational Care		0.5*	0.5*	0.6**	0.5**	
Others activities		0.6*	0.6*	0.5**	0.8	
Junior kindergarten				0.7	2.0*	
Kindergarten				0.5**	1.0	
Grade 1				0.9	1.7	1.9
Private school				0.6	1.2	0.8
Care Home & Kindergarten						1.3
Care Home & no Kindergarten						2.2
Care Centre & Kindergarten						0.8
Care Centre & no Kindergarten						2.8
No Care & Kindergarten						1.3
Girl	0.5*	0.6*	0.5*			
Birth weight/1000	-0.6^2*	-0.6^2*	-0.6^2*			
PPVT-health problem				2.0*	2.6*	2.9*
PPVT-distraction score				-0.10^2*	-0.06^2*	-0.07^2*
Child age 1	1.1	1.2***	1.1			
Child age 2	1.2	1.2***	1.1			
Child age 3/4	0.8***	1.0	0.9	0.9	0.9	
One child in family			0.8*		0.6*	0.7
Two children family			0.9		0.8***	0.7**
Mother's characteristics						
Age group 15-24			0.5*		0.9	0.6
25-29			0.8		1.1	0.7
30-34			0.8***		1.2	1.0
35-39			0.9		1.0	0.9
High school diploma			0.7**		0.6*	0.6**
Beyond high school			0.7*		0.4*	0.4*
College or university degree			0.9		0.3*	0.4*
Immigrant 0-4 years			1.2		2.2*	6.6*
5-9 years			1.9*		6.0*	4.7*
10 or more years			1.5*		2.9*	2.1*
Work full-time			0.7*			
Work part-time			0.8**			
Currently working					0.5*	0.6**
Single-mother family			1.0		1.6*	1.5***
Step family			1.6		1.0	0.5
Pseudo R^2	0.037	0.044	0.062	0.048	0.043	0.142
Number of observations	1,381,862	1,381,862	1,381,862	703,436	703,436	342,056
Percentage with low score	13,94	13,94	13,94	15,95	15,95	15,50

*(**)[***] Statistically significant at the 1 (5)[10] percent level.

1. The estimations use the individuals weights of the sample. 2. Coefficients estimates.

Appendix 1

Table A1.1: Current Working Status and Primary Care Arrangement for children used to allow mother (and spouse) to work or study by children ages, 1994-1995[1]

Working Status of Mothers and Spouses (if present) and Child Care Mode	Ages of Children - Count and (Percentage)				Total	Total	Two-parent	Single-mother
	0-11 months	1 year	2 years	3 years	Count sample	Count population	Count population	Count population
1. Both spouses work full time & No care used (parent)	291	152	140	137	721	143,997	134,451	8,836
Row percentage	(38)	(20)	(22)	(21)		(100)		
Column percentage	(15)	(8)	(8)	(8)		(9)	(10)	(4)
2. Both spouses work full time & Non-parental care home	259	512	362	332	1,466	273,489	247,244	26,245
Row percentage	(15)	(29)	(30)	(26)		(100)		
Column percentage	(11)	(21)	(20)	(18)		(18)	(19)	(12)
3. Both spouses work full time & Centre day care	18	52	69	85	224	53,352	43,764	9,656
Row percentage	(7)	(21)	(32)	(39)		(100)		
Column percentage	(1)	(3)	(4)	(6)		(3)	(3)	(4)
4. Both spouses work full/part time & No care used (parent)	180	160	172	182	694	131,527	122,527	8,905
Row percentage	(24)	(18)	(26)	(32)		(100)		
Column percentage	(9)	(6)	(8)	(11)		(9)	(9)	(4)
5. Both spouses work full/part time & Nonparental care home	133	237	162	156	688	114,281	104,863	9,363
Row percentage	(17)	(32)	(29)	(22)		(100)		
Column percentage	(3)	(10)	(8)	(7)		(7)	(8)	(4)
6. Both spouses work full/part time & Centre day care	3	20	28	35	86	24,663	20,213	4,450
Row percentage	(3)	(17)	(31)	(49)		(100)		
Column percentage	(0)	(1)	(2)	(3)		(2)	(2)	(2)
7. One/both spouse(s) do not work & No care used (parent)	1,227	1,141	872	868	4,108	678,008	552,475	125,092
Row percentage	(29)	(24)	(24)	(22)		(100)		
Column percentage	(54)	(44)	(40)	(40)		(44)	(42)	(56)
8. One/both spouse(s) do not work & Nonparental care home	90	158	109	106	463	80,819	64,177	16,310
Row percentage	(20)	(28)	(30)	(21)		(100)		
Column percentage	(8)	(6)	(6)	(4)		(5)	(5)	(7)
9. One/both spouse(s) do not work & Centre day care	15	31	45	36	127	32,366	18,365	14,001
Row percentage	(6)	(17)	(39)	(37)		(100)		
Column percentage	(1)	(1)	(3)	(3)		(2)	(1)	(6)
Total Sample	2,216	2,465	1,959	1,937	8,577			
Population	366,808	379,327	405,001	381,556		1,532,702	1,307,765	228,858
Row Percentage	24	25	26	25		100	100	100

Source: NLSCY, Public Micro-data File, Cycle 1. 1. Excluding not stated working status and primary care arrangement used. 2. Two-parent families: children living with a least one biological parent or adoptive parent; single-mother families: children living with biological mother.

Table A1.2: Current Working Status and Primary Care Arrangement used to allow mothers (and spouses) to work or study and School Status by children ages, 1994-95[1]

Working Status of Mothers and Spouses (if present) and Child Care Mode	Not in kindergarten			In kindergarten		
	4 years	5 years	Total	4 years	5 years	Total
1. Both spouses work full time & Parental care	82	26	108	49	100	149
Row percentage	(73)	(29)	17,472	(35)	(65)	38,569
Column percentage	(5)	(9)	(6)	(9)	(8)	(8)
2. Both spouses work full time & Nonparental home care	234	37	271	85	270	355
Row percentage	(86)	(14)	45,878	(32)	(68)	87,988
Column percentage	(16)	(12)	(15)	(19)	(13)	(19)
3. Both spouses work full time & Centre day care	73	14	87	21	56	77
Row percentage	(84)	(16)	21,835	(28)	(71)	20,269
Column percentage	(5)	(5)	(7)	(4)	(5)	(4)
4. Both spouses work full/part time & Parental care	123	31	154	38	149	187
Row percentage	(80)	(20)	26,213	(27)	(73)	48,800
Column percentage	(9)	(13)	(8)	(9)	(11)	(10)
5. Both spouses work full/part time & Nonparental home care	136	20	156	38	123	161
Row percentage	(87)	(13)	27,922	(23)	(77)	39,236
Column percentage	(9)	(7)	(9)	(6)	(9)	(8)
6. Both spouses work full/part time & Centre day care	30	5	35	8	17	25
Row percentage	(86)	(14)	5,192	(27)	(73)	6,615
Column percentage	(2)	(2)	(2)	(1)	(2)	(1)
7. One/both spouse(s) do not work & Parental care	636	146	782	206	660	866
Row percentage	(81)	(19)	143,853	(33)	(67)	201,328
Column percentage	(44)	(46)	(46)	(44)	(42)	(43)
8. One/both spouse(s) do not work & Nonparental home care	86	20	106	32	76	108
Row percentage	(81)	(19)	17,501	(40)	(60)	23,866
Column percentage	(6)	(7)	(6)	(6)	(4)	(5)
9. One/both spouse(s) do not work & Centre day care	35	8	43	8	19	25
Row percentage	(81)	(19)	7,975	(52)	(48)	5,810
Column percentage	(2)	(3)	(3)	(2)	(1)	(1)
TotalSample	1,435	307	1,742	485	1,468	1,953
Population	259,555	54,286	313,841	151,846	320,635	472,481
Row Percentage	83	17	100	32	68	100

Source: NLSCY, Public Micro-data File, Cycle 1.

1. Excluding not stated working status and primary care arrangement used.

Table A1.3: Mean (standard deviation) number of hours spent in all non parental care arrangements by current working status of parent(s), type of arrangements, and schooling status, children aged 0-5 year, 1994-1995

Children ages	Full time & Home care	Full time & Centre care	Full/part time & Home care	Full/part time & Centre care	Not working & Home care	Not working & Centre care	Total
0-11 months	38 (13)	47 (22)	19 (13)	28 (7)	25 (16)	28 (19)	31 (17)
1 year	40 (17)	39 (16)	22 (13)	26 (14)	26 (16)	34 (8)	33 (17)
2 years	37 (13)	42 (13)	20 (11)	27 (9)	32 (16)	35 (14)	33 (15)
3 years	36 (15)	42 (13)	18 (11)	24 (11)	32 (17)	34 (18)	32 (16)
Total (0-3)	37 (15)	42 (14)	20 (12)	25 (11)	29 (17)	34 (16)	33 (16)
	Not in junior kindergarten/kindergarten/grade 1						
4 years	34 (15)	43 (17)	19 (11)	20 (15)	24 (18)	29 (14)	30 (18)
5 years	35 (20)	40 (16)	20 (13)	24 (9)	25 (14)	38 (17)	30 (18)
Total (4-5)	34 (17)	42 (17)	19 (12)	21 (14)	24 (17)	30 (13)	30 (18)
	In junior kindergarten/kindergarten/grade 1						
4 years	32 (16)	40 (22)	21 (12)	25 (14)	21 (12)	30 (23)	29 (16)
5 years	28 (15)	30 (20)	16 (9)	17 (10)	26 (17)	34 (20)	25 (16)
Total (4-5)	29 (16)	33 (19)	17 (10)	19 (12)	24 (15)	32 (22)	26 (16)

Source: NLSCY, Public Micro-data File, Cycle 1, weighted samples.

Table A1.4: OLS Estimates of the effects of Infants-Toddlers (0-3 years) Non Parental Child Care Arrangements of All Variables on Social-Motor-Development (SMD) Scores

Variables	0-3 years	0-11 months	1 year	2 years	3 years
Care Home	0.7 (0.9)	-1.1 (2.0)	-0.9 (1.8)	1.2 (1.7)	0.1 (1.6)
Care Centre	0.2 (1.5)	-6.9 (4.2)	-0.7 (3.1)	1.1 (2.9)	-0.3 (2.8)
Number of arrangements	-0.4 (0.5)	0.5 (1.1)	-0.1 (0.9)	-0.3 (0.9)	-1.1 (0.9)
Total hours of care per week	-0.0 (0.2)	0.3 (0.4)	-0.0 (0.3)	-0.0 (0.3)	0.0 (0.3)
Care by relatives	0.9 (0.7)	1.6 (1.5)	2.5 (1.3)***	-0.5 (1.3)	0.7 (1.4)
Care is regulated	0.4 (1.0)	-0.4 (2.4)	0.6 (1.9)	0.9 (2.0)	1.1 (2.0)
Educational Care	3.4 (0.7)*	8.3 (5.0)***	-0.5 (2.5)	1.4 (1.5)	1.4 (1.5)
Others activities	1.4 (0.6)*	0.1 (1.7)	-0.2 (1.3)	2.2 (1.0)**	2.2 (1.0)**
Girl	4.4 (0.3)*	1.2 (0.6)***	4.6 (0.7)*	6.9 (0.7)*	5.6 (0.7)*
Birth weight/1000	3.5 (0.3)*	5.0 (0.6)*	4.7 (0.6)*	1.9 (0.6)*	1.7 (0.6)*
Child age 1	-0.5 (0.5)				
Child age 2	-0.5 (0.5)				
Child age 3	-0.2 (0.5)				
One child in family	2.8 (0.5)*	4.7 (0.9)*	4.8 (1.1)*	1.8 (1.0)***	-2.0 (1.1)
Two children family	1.1 (0.4)**	1.3 (0.9)*	2.4 (1.0)**	-0.3 (0.8)	0.9 (0.8)
Mother's characteristics					
Age group 15-24	2.9 (1.0)*	3.1 (2.0)	2.9 (2.3)	2.4 (1.8)	1.4 (1.9)
25-29	0.8 (0.9)	1.7 (1.9)	0.2 (2.2)	1.1 (1.6)	1.1 (1.6)
30-34	0.3 (0.9)	-0.1 (1.9)	0.6 (2.2)	0.4 (1.6)	1.0 (1.6)
35-39	-0.5 (0.9)	-0.7 (2.1)	-0.3 (2.3)	-1.2 (1.7)	0.1 (1.7)
High school diploma	1.0 (0.6)***	-1.5 (1.1)	-0.4 (1.3)	0.3 (1.2)	5.6 (1.2)*
Beyond high school	0.6 (0.6)	-1.2 (1.0)	-0.5 (1.2)	0.7 (1.1)	4.4 (1.1)*
College or university degree	0.7 (0.6)	-2.5 (1.0)**	-1.1 (1.2)	2.1 (1.1)***	4.8 (1.1)*
Immigrant 0-4 years	-1.7 (1.3)	-0.8 (1.9)	-5.8 (2.6)**	3.1 (2.8)	-4.0 (3.2)
5-9 years	-4.6 (1.2)*	-1.4 (2.4)	-3.4 (2.6)	-4.8 (2.5)***	-8.4 (2.2)*
10 or more years	-1.3 (0.8)***	-0.2 (1.5)	0.7 (1.6)	-3.7 (1.6)***	-2.7 (1.5)***
Nb weeks worked full-time	0.03 (0.0)*	-0.00 (0.2)	0.2 (0.2)*	0.1 (0.2)*	0.1 (0.2)*
Nb weeks worked part-time	0.02 (0.5)**	-0.00 (0.2)	-0.0 (0.2)	0.0 (0.2)	0.1 (0.2)*
Single-mother family	0.9 (0.6)	1.8 (1.1)	0.7 (1.2)	1.6 (1.1)	0.2 (1.1)
Step family	2.7 (1.8)	11.0 (6.4)***	5.0 (5.3)	2.4 (3.6)	2.5 (2.5)
Newfoundland	0.6 (0.8)	1.3 (1.5)	-0.2 (1.8)	-0.0 (1.7)	1.7 (1.7)
Prince Edward Island	-1.0 (1.0)	-0.6 (2.0)	-4.1 (2.2)***	-1.1 (1.9)	0.6 (2.0)
Nova Scotia	-0.2 (0.7)	0.4 (1.4)	-1.7 (1.4)	-0.6 (1.5)	0.6 (1.5)
New Brunswick	-1.0 (0.8)	-0.5 (1.6)	-1.9 (1.6)	-1.0 (1.6)	-0.4 (1.4)
Quebec	-2.5 (0.5)*	-2.2 (1.0)**	-3.5 (1.1)*	-2.1 (1.0)***	-2.2 (1.0)**
Manitoba	-1.5 (0.7)**	-0.4 (1.3)	-1.6 (1.5)	-1.9 (1.3)	-2.0 (1.4)
Saskatchewan	-1.0 (0.7)	-0.3 (1.3)	-1.2 (1.6)	-2.9 (1.4)**	-0.9 (1.4)
Alberta	0.3 (0.7)	-0.3 (1.1)	0.8 (1.4)	-1.7 (1.3)	1.1 (1.4)
British Columbia	-0.8 (0.7)	-0.6 (1.2)	-3.4 (1.6)**	0.6 (1.3)	-0.2 (1.4)
Intercept	84.0 (1.5)*	80.1 (2.9)*	80.5 (3.2)*	88.0 (2.8)*	88.0 (2.8)*
Adjusted R^2	0.06	0.07	0.07	0.07	0.09
Number of observations	7,281	2,039	1,701	1,795	1,745

* (**) [***] Statistically significant at the 1 (5) [10] percent level.

Table A1.5: OLS Estimates of the effects of Preschoolers (4-5 years) Non Parental Child Care Arrangements of Others Variables on Cognitive Development Scores (PPVT-R) in Alternative Specifications

Variables	4 years	4 years	5 years	5 years
Care Home	-0.8 (0.9)	-0.8 (0.9)	0.2 (1.0)	
Care Centre	-2.1 (1.3)	-2.1 (1.3)	0.5 (1.6)	
Educational Care	1.8 (0.8)**	1.8 (0.8)**		
Others activities	0.9 (1.0)	0.9 (1.0)	2.9 (1.3)**	2.8 (1.4)**
Junior kindergarten		-0.5 (1.5)	-3.5 (2.4)	
Kindergarten			3.7 (1.9)***	
Grade 1			1.0 (3.1)	-1.8 (2.8)
Private school		-0.6 (1.5)	2.4 (1.6)	
Care Home & Kindergarten				0.6 (1.5)
Care Home & no Kindergarten				-1.3 (2.3)
Care Centre & Kindergarten				0.6 (2.1)
Care Centre & no Kindergarten				0.1 (3.2)
No Care & Kindergarten				0.0 (1.4)
PPVT-health problem	-2.9 (1.8)	-2.9 (1.8)	-4.6 (2.0)**	-4.7 (2.0)**
PPVT-distraction score	-0.3 (0.1)*	-0.3 (0.1)*	-0.4 (0.1)*	-0.4 (0.1)*
One child in family	5.4 (1.2)*	5.4 (1.2)*	3.4 (1.3)**	3.3 (1.4)**
Two children family	2.7 (0.8)*	2.7 (0.8)*	2.5 (0.8)*	2.4 (0.8)*
Mother's characteristics				
Age group 15-24	-5.0 (1.9)**	-5.0 (1.9)**	-3.9 (2.1)***	-4.1 (2.2)***
25-29	-6.0 (1.5)*	-6.0 (1.5)*	-1.7 (1.4)	-1.6 (1.5)
30-34	-3.5 (1.4)**	-3.5 (1.4)**	-0.3 (1.3)	-0.1 (1.1)
35-39	-0.6 (1.5)	-0.6 (1.5)	0.3 (1.4)	0.4 (1.4)
High school diploma	4.2 (1.2)*	4.3 (1.2)*	4.1 (1.3)*	4.0 (1.3)*
Beyond high school	6.3 (1.2)*	6.3 (1.2)*	5.2 (1.1)*	5.2 (1.2)*
College or university degree	8.3 (1.2)*	8.3 (1.2)*	6.6 (1.1)*	6.8 (1.2)*
Immigrant 0-4 years	-0.6 (4.0)	-0.7 (4.0)	-10.3 (3.8)*	-9.8 (3.8)*
5-9 years	-6.5 (2.5)*	-6.5 (2.5)*	-12.8 (2.8)*	-12.7 (1.6)*
10 or more years	-5.5 (1.5)*	-5.5 (1.5)*	-4.3 (1.6)*	-4.6 (1.6)*
Currently working	1.5 (0.9)***	1.5 (0.9)***	0.7 (0.9)	0.6 (0.9)
Single-mother family	-2.2 (1.1)***	-2.3 (1.1)***	-4.4 (1.1)*	-4.3 (1.1)*
Step family	-6.6 (1.7)*	-6.6 (1.7)*	-0.2 (1.8)	-0.1 (1.8)
Newfoundland	-0.9 (1.7)	-0.9 (1.9)	-1.6 (1.8)	-0.8 (1.8)
Prince Edward Island	-5.5 (1.9)*	-5.4 (2.0)*	-1.8 (2.3)	-1.6 (2.3)
Nova Scotia	-2.2 (1.5)	-2.1 (1.7)	2.4 (1.6)	2.8 (1.6)
New Brunswick	-3.7 (1.6)**	-3.6 (1.7)**	-1.8 (1.5)	-1.2 (1.5)
Quebec	-1.1 (1.1)	-1.0 (1.2)	2.0 (1.2)***	1.8 (1.2)
Manitoba	1.8 (1.6)	1.8 (1.7)	0.5 (1.6)	1.1 (1.6)
Saskatchewan	-0.4 (1.5)	-0.4 (1.7)	1.1 (1.5)	1.6 (1.5)
Alberta	0.2 (1.3)	0.3 (1.5)	1.1 (1.5)	1.7 (1.5)
British Columbia	-3.7 (1.4)*	-3.6 (1.6)**	-0.0 (1.5)	0.7 (1.5)
Intercept	97.5 (1.8)*	98.0 (2.3)*	92.4 (2.5)*	95.3 (1.6)*
Adjusted R^2	0.114	0.113	0.108	0.099
Number of observations	1,654	1,654	1,511	1,511

*(**)[***] Statistically significant at the 1 (5)[10] percent level.

Appendix 2

Table A2.1 Descriptive Statistics (standard deviation) of the Variables (reference in parenthesis) in the Models for the 0-3 years

Variables	Age 0-3	Age 0	Age 1	Age 2	Age 3
MSD score	100.3 (14.9)	100.4 (14.9)	100.3 (15.3)	100.0 (14.7)	100.5 (14.8)
(Parental Care)	0.64	0.76	0.58	0.60	0.61
Non-parental Care Home	0.31	0.22	0.38	0.33	0.31
Non-parental Care Centre	0.05	0.02	0.04	0.07	0.08
Number of arrangements[1]	1.4 (0.6)	1.4 (0.6)	1.4 (0.6)	1.4 (0.6)	1.4 (0.7)
Total hours of care per week[1]	32 (18)	32 (18)	33 (18)	33 (17)	32 (19)
Care by relatives[1]	0.09	0.08	0.11	0.10	0.09
(Care by non relatives)[1]	0.26	0.15	0.32	0.31	0.30
Care is regulated[1]	0.08	0.03	0.08	0.11	0.11
(Care not regulated)[1]	0.28	0.20	0.34	0.30	0.28
Educational Care	0.07	0.00	0.03	0.07	0.20
Others activities	0.10	0.04	0.09	0.12	0.15
Girl (Boy)	0.49	0.50	0.50	0.49	0.47
Birth weight-Kg/1000	3,413 (0.57)	3,39 (0.57)	3,42 (0.58)	3,40 (0.56)	3,44 (0.56)
(Child age 0)	0.28	1	0	0	0
Child age 1	0.23	0	1	0	0
Child age 2	0.25	0	0	1	0
Child age 3	0.24	0	0	0	1
One child in family	0.31	0.40	0.39	0.26	0.17
Two children in family	0.45	0.41	0.38	0.47	0.52
(Three or more children in family)	0.25	0.20	0.23	0.27	0.31
Mother's characteristics					
Age group 15-24	0.15	0.21	0.17	0.12	0.09
25-29	0.31	0.34	0.31	0.31	0.26
30-34	0.36	0.32	0.36	0.36	0.41
35-39	0.15	0.10	0.13	0.16	0.19
(40+)	0.03	0.02	0.02	0.04	0.05
(Less than high school diploma)	0.17	0.17	0.17	0.15	0.17
High school diploma	0.18	0.17	0.18	0.18	0.20
Beyond high school	0.28	0.26	0.28	0.29	0.27
College or university degree	0.38	0.40	0.37	0.38	0.36
(Born in Canada)	0.91	0.91	0.91	0.92	0.91
Immigrant 0-4 years	0.02	0.03	0.02	0.02	0.01
5-9 years	0.02	0.02	0.02	0.02	0.02
10 or more years	0.05	0.05	0.05	0.05	0.06
Currently working	0.51	0.46	0.53	0.54	0.54
Working full-time	0.33	0.31	0.35	0.34	0.34
Working part-time	0.18	0.15	0.18	0.20	0.20
(Two-parent family)	0.87	0.89	0.87	0.86	0.87
Single-mother family	0.12	0.11	0.13	0.14	0.13
Step family	0.01	0.00	0.00	0.01	0.02
Newfoundland	0.05	0.05	0.05	0.05	0.05
Prince Edward Island	0.03	0.03	0.03	0.04	0.03
Nova Scotia	0.07	0.06	0.08	0.06	0.06
New Brunswick	0.06	0.05	0.06	0.06	0.08
Quebec	0.19	0.19	0.19	0.19	0.19
(Ontario)	0.28	0.29	0.28	0.27	0.27
Manitoba	0.08	0.08	0.08	0.08	0.08
Saskatchewan	0.07	0.08	0.06	0.07	0.07
Alberta	0.09	0.10	0.09	0.09	0.07
British Columbia	0.08	0.09	0.07	0.08	0.08
Number of observations	7,283	2,040	1,701	1,795	1,747

1. When non-parental care is used.

Table A2.2 Descriptive Statistics (standard deviation) of the Variables (reference in parenthesis) in the Models for the 4-5 years

	Age 4-5	Age 4	Age 5
PPVT Score	100.0 (15.0)	100.0 (15.0)	100.0 (15.0)
(Parental Care)	0.59	0.57	0.60
Non-parental Care Home	0.32	0.33	0.32
Non-parental Care Centre	0.08	0.10	0.07
Number of arrangements[1]	1.4 (0.7)	1.4 (0.6)	1.4 (0.7)
Total hours of care per week[1]	27 (18)	29 (19)	25 (17)
Care by relatives[1]	0.09	0.10	0.07
(Care by non relatives)[1]	0.33	0.33	0.32
Care is regulated[1]	0.12	0.13	0.10
(Care not regulated)[1]	0.29	0.30	0.29
Educational Care	0.23	0.32	0.13
Others activities	0.12	0.14	0.08
(Not in school)	0.45	0.74	0.15
Junior kindergarten	0.14	0.22	0.04
Kindergarten	0.40	0.04	0.79
Grade 1	0.01	0.00	0.02
Private school	0.50	0.78	0.20
(Parental Care & No Kindergarten)	0.26	0.42	0.09
Care Home & Kindergarten	0.18	0.08	0.28
Care Home & no Kindergarten	0.14	0.24	0.04
Care Centre & Kindergarten	0.03	0.02	0.05
Care Centre & no Kindergarten	0.04	0.08	0.02
No Care & Kindergarten	0.33	0.15	0.51
Girl (Boy)	0.51	0.51	0.50
(Child age 4)	0.52	1	0
Child age 5	0.48	0	1
PPVT-Health problem	0.04	0.04	0.03
PPVT-Distraction score	2.3 (3.3)	2.3 (3.3)	2.3 (3.3)
One child in family	0.12	0.13	0.11
Two children in family	0.51	0.52	0.50
(Three or more children in family)	0.37	0.35	0.39

Table A2.2 continued

	Age 4-5	Age 4	Age 5
Mother's characteristics			
Age group 15-24	0.05	0.06	0.04
25-29	0.22	0.25	0.19
30-34	0.40	0.39	0.40
35-39	0.24	0.22	0.26
(40+)	0.08	0.07	0.09
(Less than high school diploma)	0.16	0.14	0.18
High school diploma	0.20	0.21	0.18
Beyond high school	0.29	0.29	0.28
College or university degree	0.35	0.35	0.35
(Born in Canada)	0.91	0.91	0.91
Immigrant 0-4 years	0.01	0.01	0.01
5-9 years	0.02	0.02	0.02
10 or more years	0.06	0.06	0.06
Currently working	0.56	0.56	0.55
Working full-time	0.34	0.35	0.34
Working part-time	0.21	0.22	0.21
(Two-parent family)	0.86	0.87	0.85
Single-mother family	0.14	0.13	0.15
Step family	0.05	0.05	0.05
Newfoundland	0.05	0.05	0.05
Prince Edward Island	0.04	0.04	0.04
Nova Scotia	0.07	0.08	0.07

New Brunswick	0.07	0.06	0.08
Quebec	0.18	0.19	0.18
(Ontario)	0.26	0.25	0.27
Manitoba	0.07	0.06	0.07
Saskatchewan	0.08	0.08	0.08
Alberta	0.09	0.10	0.08
British Columbia	0.08	0.08	0.08
Number of observations	3,165	1,654	1,511

1. When non-parental care is used.