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Family Structure and Child Cognitive Outcomes: Evidence from Canadian Longitudinal Data

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Family Structure and Child Cognitive Outcomes:

Evidence from Canadian Longitudinal Data of Children

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Abstract. This study investigates the role of family structure on cognitive outcomes of children. Using the rich panel data information from the National Longitudinal Survey of Children and Youth (NLSCY), collected on children and their families biennially since 1994, we investigate the association between a child's math & reading performance and family structure and changes in family structure. We find that children who stay-in or move-to non-intact families have lower reading scores than those who stay in intact families. Although initial findings indicate that family structure appears to have overall little effect on children's math performance, analysis by gender reveals that girls' performance appears to be more affected than boys' by their parents' divorce/remarriage or the presence of step-family members. Moreover, analysis by heritage reveals that family structure affects the math performance of children of French heritage differently from those of other Canadian heritage, while the impact on reading scores is similar between these two groups. A similar result follows our analysis of religious groups. The impact of family structure differs between children in Catholic families and those in Non-Catholic families for math performance, but is similar for reading performance.

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Keywords: Family structure, transition in family structure, family instability, academic performance of children

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1. Introduction

One of the most relevant changes in demographic trends of the late 20th century was the increase in divorce rates. Divorce rates more than doubled in most Western countries from 1960 to 1980. In Canada, between 1971 and 2015, the number of divorced individuals multiplied by ten, reaching 1.8 million divorcees. The divorce rate as a fraction of married individuals increased from 1.9% to 13.6% in this period. While flexible family arrangements may support the well-being of families, family disruptions are generally associated with a range of negative outcomes for the children involved, both cognitive and emotional. In this paper, we focus on reading and math scores of primary school Canadian children to explore the causal effect of family disruption on their cognitive outcomes. Additionally, we investigate how the family structure effect differs between boys and girls, as well as across children of various cultural backgrounds. Using rich panel data information from the National Longitudinal Survey of Children and Youth (NLSCY), collected on children and their families biennially since 1994, we investigate the association between a child's math and reading performance and his/her family structure and changes in the family structure. We find that children who stay-in or move-to non-intact families (single parent or step families) have lower reading scores than those who stay in intact families. Although initial findings indicate that family structure appears to have overall little effect on children's math performance, analysis by gender reveals that girls' performance is more affected than boys' by parents' divorce/remarriage or the presence of step-family members. We also find that family structure affects the math performance of children of French heritage differently from that of children whose parents claim Canadian heritage, while the impact on reading scores is similar between the two groups. A similar result follows our analysis of religious groups. The impact of family structure differs between children in Catholic families and those in Non-Catholic families for math performance, but it is similar for reading performance.

Family structure is changing considerably in North America. Generally, the number of marriages is decreasing, while the number of divorced and separated individuals is increasing. These changes are generally attributed to changes in divorce laws, the popularization of the birth control, and the increased education and participation of women in the labour force. As of 2017, around 52% of the US population aged 15 years and over are married (includes separated) - versus 61% in 1980 - and 10% are divorced - versus 5% in 1981.[1, 2] In Canada, the 2017 Census reported 57% of individuals living in a couple - married (46%) or living common law (11%) - and 9% either divorced or separated. Thirty seven years earlier, the 1980 Census reported 60% of individuals living in a couple and 5% either divorced or separated. Entirely comparable counts are

[1] U.S. Bureau of the Census, *Statistical Abstract of the United States*: *1981* (102d edition.) Washington, D.C., 1981.
[2] U.S. Census Bureau, Current Population Survey, Annual Social and Economic Supplements, 2000 to 2017.

not available from 1980 Census in Canada because individuals living common law were not identified. However, additional studies document an increase of proportion of living common law among people living in a couple from 6% in 1980 to 20% in 2011 (Milan (2013)).

Undoubtedly, these changes support more flexible (legal) living arrangements for adults. However, concern remains about the potentially adverse effect of marital dissolution on children. Currently, over 50% of US children live in non-intact families - either families headed by a single parent or families in which one (or both) of the parents is not the biological parent. In 2016, approximately 30% of children in Canada also live in non-intact families (Livingston (2014); Statistics Canada B (2017)).[3] These figures report on a general trend of the rising numbers of children living in non-intact families. In 1960 in the US, 27% of children under 18 lived in non-intact families. For Canada, the fraction of children under 14 living in single parent families in 1961 was only 8% (versus 19% in 2016).[4]

A large body of literature reports that kids who experienced parental divorce or reconstitution are at a disadvantage in several outcomes - such as mental health, educational attainment, earnings, and employment status, making the investigation of the association between changes in marital status and children's outcomes crucial to inform social policy.[5] If there are significant negative effects on child outcomes caused by family dissolution or reconstitution, adequate support policies could be put in place to attenuate these effects and give all children an equal start in life.

1.1. Context

The main psychological theories attempting to explain how family structure influences child outcomes stress that lack of resources such as income and/or parental involvement in specific family structures reduces children's attainment. In addition, parental conflict before a divorce or the involvement of new family members after remarriage may induce children to feel stress, which could affect their performances (Haveman and Wolfe (1995), Hill et al. (2001), Amato (2000)). In the United States, the literature investigating these connections finds that children raised by divorced or separated couples were more likely to have psychological and behavioral problems compared to children raised in intact families (Aughinbaugh et al., 2005, and Amato and Anthony, 2014, among others). The influence of living in a non-traditional family on children's cognitive outcomes, such as test scores, has also been analyzed extensively (Gennetian (2005) and Sanz-de Galdeano and Vuri (2007)). Many of these papers find a negative impact on children's cognitive

[3] Part of the striking difference comes from the age of children considered (17 and younger in the US, 14 and younger in Canada). Approximately, twice as many of these children in both countries are living with a single parent, while the rest live with blended families. A small fraction lives without either parent present in the care of relatives or in foster families.

[4] Statistics Canada. *Fifty Years of Families in Canada: 1961 to 2011*. Statistics Canada, 2012.

[5] See for instance, Biblarz and Gottainer (2000); Gruber (2004); Bjo¨rklund et al. (2007) and references wherein.

outcomes due to parental divorce that diminishes or disappears once family and individual background is accounted for.

It is unclear what the effect of remarrying (or starting a new relationship) would have on children. It is possible that individuals who experienced a failed relationship will weigh heavily positive parental skills, higher education or higher income in a second relationship. These positive parental skills of step-parents may improve children's performance. (Hofferth and Anderson (2003), Gennetian (2005)). On the other hand, children might resist the new relationship, leading to high stress for the child and resulting in worse school performance (Kiernan and Mensah (2009)).

In Canada, the literature has linked family disruption or reconstitution with negative consequences for children's non-cognitive outcomes. Pagani et al. (1998) found that teenage boys who experienced family reconstitution are more likely involved in delinquency than those who stayed in intact families. Similarly, Strohschein (2005, 2012) documented a positive association between parental divorce and anxiety/depression and mentions that these mental problems existed before the divorce event, while Kerr and Michalski (2007) - when studying hyperactivity problems - report an advantage for children living in intact families compared to those living in stepfamilies. Ram and Hou (2003) have also investigated the adverse impact of living in a non-intact family on children's cognitive outcomes. They used the first three cycles of the NLSCY to look into the outcomes of children in non-intact families. They find that one possible explanation for children's lower performance in cognitive (math or reading scores) outcomes is linked to the deterioration of economic resources typically accompanying family disruption. The decline in parental resources is also linked to the deterioration of emotional-behavioral outcomes (hyperactivity, offense, and aggression).

The challenge of identifying the causal effect of family structure on child's cognitive outcomes lies in disentangling it from other factors, also affecting the child's academic performance, such as parental education, household income, or parental involvement in child's education. Additionally, preexisting problems such as parental conflict before the divorce or breaks in the child's routine (during a separation preceding a divorce) might affect children' s outcomes as well. Researchers often point out that the negative association between parental dissolution and children's outcomes is not caused by the divorce per se, but due to those factors mentioned above (Strohschein, 2012; McLanahan et al., 2013). In this regard, the impossibility of fully capturing all related factors can overstate the detrimental impact of divorce. Researchers have employed various methodologies to deal with this omitted variable bias and identify the causal effect of parental divorce or remarriage. The traditional OLS model is broadly used to investigate the effect of parental dissolution/reconstitution on cognitive outcomes. However, it cannot fully control for

the omitted variable bias (McLanahan et al., 2013). Other, relatively advanced, statistical models have been used in later studies. The value-added model, for instance, includes a lagged value of the dependent variable to control for some unmeasured variables from the previous period that may influence current children's outcome (Ram and Hou, 2003; Sanz-de Galdeano and Vuri, 2007). This method, which requires a longitudinal profile, could reduce the omitted variable bias; however, it does not fully eliminate the problem. Alternatively, models with individual or sibling fixed-effects effect are able to control for unobserved variables as long as these variables are time-invariant (Aughinbaugh et al., 2005; Gennetian, 2005; Amato and Anthony, 2014; Arkes, 2015). Some studies use parental death or divorce law reforms as natural experiments, or an instrumental variable (IV) methodology, to investigate the influence of changes in parents' marital status on children (Corak, 2001; Gruber 2004). While the estimates of this approach can produce unbiased estimates for the treated population, they are sensitive to the randomness of the event or the validity of the instrumental variable used. Propensity score matching models (Amato, 2003; Hannan and Halpin, 2014) also rely heavily on how good the match between the treated and control group is. Each of these approaches has advantages and limitations, which emphasize the importance to investigate whether results are robust across multiple models (McLanahan et al., 2013). In this study, we use the broad set of variables available in the NLSCY to control for confounding effects in our initial estimation. Additionally, we exploit the panel nature of our data, estimating a value-added model and fixed effects model to further isolate the effect of family structure on children's outcomes.

An important dimension that might be lost in fixed effect models is the heterogeneity in children's responses. Specifically, children in different population groups might have different ability to adjust to changes in family structure they have experienced. In the U.S., some studies highlight the importance of investigating the heterogeneity of the family structure effect. They have analyzed how the family structure effect differs by gender, or race/ethnic (e.g., Fomby et al., 2010; Lee and McLanahan, 2015).[6] In Canada, research has provided only limited evidence in this area (Beaujot et al., 2013). Our main contribution is that, in addition to extending the analysis to a longer period and alternative methodologies, we disentangle part of the heterogeneity in children responses. Specifically, we explicitly examine a differential effect by gender, religion (Catholic/non-Catholic) and by Canadian/French heritage claimed by the parents.[7]

[6] Lee and McLanahan (2015) find that the effect of family instability on cognitive outcomes is stronger for girls than boys, for black children than white or Hispanic children in the U.S.. However, in terms of socioemotional performances, the effect of family instability is stronger for boys than girls, for white or Hispanic children than black children.

[7] We use the term Canadian/French heritage very loosely, being limited by the nature of questions in the survey and the reported cell size of the categories. Please see our discussion of these variables in section 3.3

Our estimates suggest that such heterogeneity is important. The analysis of math scores indicates that previous results pointing towards small, non-statistically significant effects on children's math performance mask a differential effect by gender. After controlling for a broad range of factors, we find that girls' performance in math is more sensitive than boys' to parental divorce/remarriage or to the presence of step-family members. Moreover, the effect of family structure on math performance differs between children in Catholic families and those in Non-Catholic families and between those of Canadian heritage and those of French heritage. Regarding the analysis of reading performance, we also find a differential effect by gender. Boys, but not girls, who stay in or move to non-intact families have lower reading scores than those in intact families. There is however no indication that family structure has a differential effect on the reading performance of children by religion or Canadian/French heritage. Our results are consistent across specifications especially in the religion and heritage analyses.

The remainder of the study is organized as follows: Section 2 explains the data, provides descriptive statistics, and presents methodology used in this article. Section 3 presents regression results analyzing the family structure effect on children's cognitive outcomes in a static and dynamic way. The final section concludes.

2. Data and Methodology

2.1 The National Longitudinal Survey of Children and Youth (NLSCY)

The data used in this article comes from the National Longitudinal Survey of Children and Youth (NLSCY). The NLSCY collected comprehensive information on Canadian children and "the person most knowledgeable about the child (PMK)" (excluding children who live on Indian reserves and institutionalized children) regarding their education, health, environment, development, behavior, friends and activities (Statistics Canada A (2008)).

The NLSCY provides information about family structure, PMKs' work status, children's math test scores and reading comprehensive scores – the focus of our analysis - and basic characteristics of children and their PMKs over time. Children's reading and math scores, the dependent variables, are provided for school children aged 4 or 5 years (children below grade 2) and school children aged 7 to 15 years (in grade 2 or above), respectively. This restricts our analysis of reading scores to data in Cycles 1-3 of the survey and the analysis of math scores to Cycles 4-6 of the survey, when we observe these (See Table A1 in the Appendix).

The children in our sample range from ages 1 to 5 during the initial cycle, turning 11 to 15 during the sixth cycle. There are 2,227 children with valid math test values across three cycles (Cycles 4 through 6) and 1,962 children with valid reading test values in either of two cycles (either

Cycles 1 and 2, or Cycles 2 and 3).[8] We excluded children living in adoptive or foster families from the dataset since we want to focus our attention on children who remain in the care of at least one biological parent.[9]

The math test score is derived from the Mathematics Computation Test given to school children during the interview, which measures the students' skills of addition, subtraction, multiplication, and division of numbers. The reading comprehensive test is derived from the Peabody Picture Vocabulary Test – Revised (PPVT-R), which was designed to measure children's receptive or hearing vocabulary skills (Statistics Canada A (2008)). The scores of these measurements are used in this study.

The family structure at the time of the test is our main variables of interest. Our definition of family structure is based on the child's living arrangement in each period. We consider (1) Intact families (the child lives with his/her two biological parents), (2) Lone-parent family (there is only one biological parent present), (3) Step families (the child lives with one biological parent present and his/her married or common law partner, who is not biologically related to the child).

The challenge of identifying the association effect of family structure on child's cognitive outcomes lies in disentangling it from other factors – such as household income or parental involvement in the child's education - which may also affect the children's academic performance. We include a broad set of current family characteristics that may potentially help to isolate the effect of family structure. Some of these variables are standard in the literature analyzing child outcomes, such as the child' s age and gender, whether the child has an education disability or the number of siblings. Also standard is the inclusion of parent's characteristics that might account for differential approaches to parenting, such as the PMK's age, gender and education, the PMK's age at birth of the child, PMK's place of birth (whether born in Canada or not), and whether the PMK's was a teen parent.

Further, for the analysis of math scores, collected in cycles 4 through 6, we account for preexisting problems - such as parental conflict before a divorce, new members moving into the family in previous periods, job loss or job incorporation of the PMK in previous periods - by including variables for previous changes in family structure and in the PMK's employment history. These could affect the child's outcomes either by directly affecting the long-term behavior of the child or by changing the amount of resources (in time and money) available to the child, which may in turn have longer term effects on cognitive performance. We classify previous transitions

[8] In the NLSCY, no child has valid reading scores across all the first three cycles, due to the age restriction of this test.
[9] Many studies indicate that the social attitude towards biological and adoptive parents is different (Brodzinsky, 1987; Kressierer and Bryant, 1996). Adoptive or foster children also show a higher risk of behavior and academic problems compared to those who live with their biological parents (Haugaard, 1998; Wierzbicki, 1993). Our dataset has only a few children (less than 3%) in an adoptive or foster family, which impedes us to focus on this issue.

in family structure, depending on whether there was a change in family structure that occurred during cycles 1 to 3 into three categories: (i) Children who stayed in an intact family during the first three cycles; (ii) Children who stayed in a non-intact family during the first three cycles; (iii) Children who experienced a change in family structure during the first three cycles.[10] We classify previous transitions in the PMKs' work status between two adjacent cycles during cycles 1 through 3 also into three categories; (i) PMKs stay persistently employed in the first three cycles; (ii) PMKs stay persistently non-employed in the first three cycles; (iii) PMKs presented unstable work status (had experienced changes in work status such as being lay-off or found a job) during cycles 1 and 3. Note that we cannot include these variables in the analysis of reading scores as reading scores are only available for children in cycles 1 through 3 and there is no retrospective information collected from the families.

Finally, we include a set of controls aimed to account for resources available to the child, such as the number of adults in the household, household income and the PMKs' depression and family functioning scores. [11] Household income is reported by categories in the first three cycles of the NLSCY, so we include it in the reading analysis as a series of seven indicators ranging from less than CAN$ 10,000 (the omitted category) to more than CAN$ 80,000. Household income is reported as a continuous variable in cycles 4 through 6. We also introduce the PMK's current work status in each cycle (either employed or non-employed) as a further approximation of time resources available to the child, once household income has already been included as a control variable.

A distinctive feature of our analysis is the use of the panel nature of the data to analyze changes in family structure across adjacent time-periods, since we are also interested in assessing the effect of changes in family structure, a measure of family instability, on cognitive outcomes. Unlike indicators for the family structure at one point, which constitutes a static measure of family structure, transitions of family structure measures specifically how the changes affect children's performance. The distinction is important as this could be the most disruptive of the child's living environment. The instability theory indicates that changes in parental marital status are related to several changes in children's living environment such as family routines, parenting behaviors,

[10] We excluded the unusual scenario of children who transferred to an intact family from a non-intact family as there are no cases of this occurrence.

[11] The PMK's depression and family functioning scores are derived from 12 survey questions ranging from 0 to 36. The PMKs depression scores are obtained from answers regarding poor appetite, having problems to get rid of the blues, having problems concentrating on work, etc.... Family functioning scores are calculated from answers to questions regarding having problems planning family activities, sharing emotions with other family members, etc... A high score of the PMK's depression or family functioning shows the presence of depression symptoms and family dysfunction respectively (Statistics Canada A (2008))

economical and familial resources, and even residential location. All of these changes could disrupt children's cognitive outcomes. Additionally, children who have experienced one change in family structure are more likely to be involved in repeated parental dissolution or remarriage (Wu and Martinson, 1993; Amato, 2000; Crosnoe et al., 2014). To better understand the dynamic nature of family structure, we derive a variable accounting for transitions in family structure according to whether the child has experienced a change in family structure between two adjacent cycles. These transitions are classified into 4 categories: (1) children who stay in an intact family in both adjacent cycles, (2) children who stay in a single-parent family in both adjacent cycles, (3) children who stay in a step-family in both adjacent cycles and (4) children who experienced a change in family structure between two adjacent cycles. The last category includes children who either moved from an intact family to a non-intact one, or moved from a single-parent family to a step family, or moved from a step family to a single-parent one. We combine these three cases due to the small sample sizes involved in these transitions. When we analyze reading scores, we further combine the second and third categories into one - children who stay in a non-intact family in both adjacent cycles, due to the relatively smaller sample size available for analysis.[12] We also have included a vector of transitions in PMK work status to account for the changes in parental resources that often accompany changes in family structure. These transitions are classified into four categories according to the PMK employment status between two adjacent cycles: (1) PMKs stay persistently employed in both cycles; (2) PMKs stay persistently non-employed in both cycles; (3) PMKs becomes employed during the inter-survey period; (4) PMKs becomes non-employed during the inter-survey period.

2.2 Descriptive Statistics

Table 1 shows the fraction of different family structures and the percentages of PMKs' work status in each cycle. We also report reading and math average scores by gender for Cycles 1 to 3 and Cycles 4 to 6, respectively. Table 2, panel A, indicates the distribution of children by transitions in family structure between Cycles 1 and 2 or Cycles 2 and 3 for the reading sample, and the distribution of children between Cycles 4 and 5 or Cycles 5 and 6 in the math sample. The distribution of children by previous transitions in family structure (that is changes during cycles 1 through 3 affecting math performance of children in cycles 4 through 6) is presented in Panel B.

Tables 1 and 2 show that most children lived or stayed in intact families and the percentage of children in intact families decreased slightly over time. Further, PMKs are mostly employed in each cycle (over 70%, Table 1), or remained employed between two adjacent cycles (over 63%,

[12] We exclude an unusual scenario, children who transferred to an intact family from a non-intact family, because there were only a handful of observations for this scenario.

Table 2, panel A). The percentage of PMKs employed and staying employed increased slightly over time and it is generally higher during cycles 4 through 6, coinciding with better economic conditions in the early 2000s. Along these lines, panel B reveals that the fraction of PMKs experiencing changes in working status during cycles 1 through 3 is relatively large (29.4%) as Canada's economic struggled through the slow recovery of the early 1990s bust.

Tables 3 and 4 show descriptive statistics for other variables used in the reading and math performance analysis, respectively. The first column reports the data for the whole sample, and Columns 2-4 show summaries by family type. Children in the reading sample are 66 months of age (around 5.5 years old) on average and 139 months of age (around 11.5 years) in the math sample, equally distributed by gender.[13] The average reading and math scores are 100.69 and 457.13, respectively. Children in the sample have slightly over one sibling, with the older children in the math sample having slightly more siblings and more learning disabilities. PMKs are most likely to be the mother of the child, with average age at birth of 30, and currently around 40 years of age in Cycles 4-6 and 34 years in Cycles 1-3. Most PMKs have a high school or less education are Canadian born (a higher fraction than in the total population). The average depression score for the PMK is about 4 (on a scale from 0 to 36) suggesting that the levels of depression are low on average. Most families have no additional adults in the household and reside in a CMA. About 23% of children in the reading sample live in a low-income household.[14] Household income averages $75,913 before taxes and deductions in the math sample.[15] The average family functioning score is about 8 (on a scale from 0 to 36) suggesting relatively low levels of family dysfunction.

Columns 2-4 in both tables reveal the degree of variation that exists among families in our sample. Children in stepfamilies show a slight advantage on math scores – but not on reading scores - than those in intact families, while children in single parent families do not show an obvious disadvantage. Children in intact families also have a slight advantage in reading scores. It is worth noting that average household income in single-parent families is much lower than in the other families ($39,772), even though it includes child and spousal support from former partners (Table 4). Also, single-parent families are more likely to be a low-income household (Table 3). PMKs in single-parent families are also more likely to be teenage parents and have a higher depression score than those in intact families. The family functioning score in single parent

[13] Following Chen et al. (2015), we used the actual age of children in months in the analysis in order to control for the difference of ability in children who are relatively young compared to their classmates.
[14] A family is considered as a low-income family when its income is below the pre-tax low-income cut-off (LICO) after the family size and the community have been taken into account (Statistics Canada A, 2008). For example, for a family of four in a community with population under 30,000, the pre-tax LICO is 24,234 in 1994 and 26,270 in 1999.
[15] Household income is provided in real 2002 Canadian dollars, using CPI with 2002 basket content.

families is also higher than in the other families. All these characteristics are likely to be correlated with lack of resources to help child to success in school.

2.3 Empirical Model

Identifying the association effect of family structure on children's performances requires disentangling it from other aspects of family background that can affect cognitive performance and taking into account the initial disadvantage of children in non-intact families. To this effect, we apply different identifications strategies in this work. First, we used a standard OLS model to ascertain the effect of family structure on child reading and math scores after controlling for observable characteristics. Second, we use a value-added (VA) model, which includes a lagged value of the dependent variable, to control for some unmeasured variables from the previous period that may influence current child's outcomes. Third, we use individual and time specific fixed-effects (FE) to control for time-invariant unobserved child/family characteristics that may further influence children's outcomes. The VA and FE models contain the full set of control variables used for the OLS model as well.

The NLSYC has extensive information about the characteristics of the children and their families. Common control variables used in the analysis of child outcomes are the child's age and gender, whether child has an education disability and the number of siblings. It is also common to include parental information and household characteristics. We include information about the PMK – age, gender, education, age at birth of the child, whether born in Canada, whether the PMK was a teen parent, whether the PMK works – which is likely to influence performance as it relates to the extent of parental skills and parental resources that can be devote to the child. Household characteristics included in this analysis are the CMA of residence, the number of additional adults in the household, household income and the PMKs' depression and family functioning scores. These variables further characterize available resources for parenting.

In addition, since children's outcomes may not only be influenced by contemporary family background, but also relate to long-term family environment the child experiences, we also control for family background history when available. For the sample of students with math scores we add previous transitions in family structure and PMK's past work status to the analysis. The first set of variables – two indicator variables indicating whether the child remained in a non-intact family or whether it experienced a change from intact to non-intact family between cycles 1 and 3 - will help control for problems preceding any family disruption, such as family conflict, that may have affected children's performance in a direct or indirect way. The second set of variables – two indicators for whether the PMK remained unemployed or whether she/he changed work status during cycles 1 through 3 - will help us control for previous parental involvement in children's education, as this may long-term consequences for school performance.

The basic equation we estimate for the OLS model is

$$y_{it} = \alpha_0 + \alpha_1 SP_{it} + \alpha_2 SF_{it} + \alpha_3 X_{it} + \delta_t + \gamma_p + \varepsilon_{it} \qquad (1)$$

where y_{it} represents child *i*'s reading or math score in cycle *t* (*t* = 1, 2, 3 in reading scores analysis and 4, 5, 6 in math scores analysis). SP_{it} and SF_{it} stand for Single parent or Step family. X_{it} is a group of control variables, which contains basic characteristics of the child, PMK and household, as well as – in the case of the math sample - previous changes in family structure and PMK's work status. δ_t and γ_p are year and province fixed-effects. ε_{it} is the error term and α is a vector of parameters to be estimated, with α_1 and α_2, being the primary focus of this analysis.

Despite the broad set of controls that we are able to include in the analysis, it is plausible that there are unobserved factors correlated with family structure that affect children's performance and introduce a bias in our analysis. Specifically, current reading and math skills are likely based on previously obtained skills. It is plausible that some (unobserved) action was taken in the past to change previous scores, such as engaging extra tutorial time in the school. If these actions are linked to changes in family structure, they might introduce a bias in our estimates. For instance, a bad score may induce parents in intact families to engage a tutor, but low grades may remain unaddressed in families struggling through divorce or separation. Hence, the adverse effect of separation may be related to lack of tutorial support, rather than the separation per se. These unobserved actions are incorporated in the regression through past scores, which account for the effect of past scores on current ones. The basic equation is:

$$y_{it} = \alpha_0 + \beta_0 y_{it-1} + \alpha_1 SP_{it} + \alpha_2 SF_{it} + \alpha_3 X_{it} + \delta_t + \gamma_p + \varepsilon_{it} \qquad (2)$$

where y_{it-1} represents child *i*'s reading or math scores in cycle *t-1* and the rest of the variables are as before. For the reading sample, *t*=2,3, whereas *t*=4,5 in the math sample.

Finally, it is possible that there are unobserved time invariant characteristics that influence performances, such as a child's innate reading or math ability. The panel dimension of our data allows eliminating the influence of such time-invariant characteristics through FE models, which isolates the effects of all time invariant characteristics.

$$y_{it} = \alpha_0 + \alpha_1 SP_{it} + \alpha_2 SF_{it} + \alpha_3 X_{it} + \delta_t + \gamma_p + c_i + \varepsilon_{it} \qquad (3)$$

where c_i is a person-specific indicator that controls for time invariant unobserved characteristics such as parental and children's abilities.

In each equation, the reference group is composed by children who remain in an intact family across all cycles, α_1 and α_2 are the parameters estimating the effect of single parent and step family

structures on reading or math scores relative to children in intact families. All models use a robust standard error regarding heteroskedasticity across children or families.

The above models are likely to capture the effect of family structure on reading and math performance of children under different assumptions regarding unobserved heterogeneity and the nature of the omitted variables. Note that these models take a static view on the effect of family structure, considering only whether the current family structure affects children's performances. As such, they do not consider that it is changes in family structure that might be the most disruptive for the child's living environment and performance (Wu and Martinson, 1993; Crosnoe et al., 2014; Obergruber, 2016). To take into account these aspects of family dynamics, in alternative specification we use the OLS and VA model to study whether transitions in family structure also affect reading and math scores. In those cases, we will replace SP_{it} and SF_{it} by a vector containing the four types of transitions in family structure mentioned above. That is (1) the child stayed in intact families in both adjacent cycles (reference group); (2) the child stayed in single-parent families in both adjacent cycles; (3) the child stayed in step-families in both adjacent cycles, and (4) the child experienced a change in family structure between two adjacent cycles.

3. Analysis

3.1 The Effect of Family Structure on Reading and Math Scores

Table 5 and 6 present the effect of family structure on reading and math performance, respectively. Column 1 reports the simple correlation between the score and family structure. Column (2) reports the results from an OLS model with a full set of controls, column (3) shows results for the value added (VA) model and column (4) reports the fixed effects (FE) model.

Children in single-parent families score between 4 and 18 points lower in their reading tests than those in intact families do (Table 5). The estimates are significant in both OLS and value-added models. Children in step families score between 1 and 5 points lower in their reading tests than those in intact families do, however, the estimate is never significant, except when no other controls are included in the regression. It is worth noting that previous reading scores have a significant and positive effect on current reading scores (column 3).

Table 6 shows that the initial (weak) correlation between math scores and non-intact family structure is no longer significant under any model once a full set of controls is added to account for confounding effects. This is consistent with previous studies also finding the effect of family structure almost disappearing when additional controls are introduced in the regression. Similarly, living in step families seems to have little effect on children's math outcomes across these models. Again, not surprisingly, previous math scores have a significant and positive effect on current math scores (column 3).

As mentioned, children's academic achievements depend heavily on the amount of resources, in either time or money, invested by the PMK. We think worth highlighting the role of household income and the PMK's work status in test scores. The role of PMK's engagement in the labour force on children's outcome has been the subject of much debate. On the one hand, the additional income brought in by the PMK may increase resources that can be devoted to the child's education or reduce the stress that money pressures can bring on the family and that can affect the child's cognitive performance. On the other hand, participation in the labour force will reduce the time that the PMK spends with the child, which is proven to have a beneficial influence on child measures of well-being. Hence, the PMK's work engagement is likely a good predictor of parental involvement in child's life and education, when analyzed together with household income. Comparing these two coefficients would help distinguish the potentially competing role of time and economic resources on children's outcomes. The results show that, conditional on a given income level, non-working PMKs have a positive effect on reading scores, although it is not statistically significant except in the fixed-effect model. Household income, on the other hand, is positively and significantly related to the child's reading score – conditional on the PMK's work status - but the effect is only significant in the OLS model.[16] Similarly, a non-working PMK and household income are both positively associated with higher math scores. The coefficient of the PMK work status is large although not significant in the FE model, while the effect of income is small in magnitude – although significant in the OLS and VA models.

The effect of other control variables is not reported here to save space. It is worth mentioning that some, such as past changes in family structure and past changes in PMKs' work status, have little or no effect on children's math achievements. Other, such as the basic demographic characteristics of children and PMKs - have an impact on children's reading and math scores. The PMK's education, or living in CMA have also positive effects on children's math outcomes, while having a learning disability has a negative effect.

Tables 7 and 8 show the effect of transitions in family structure on reading and math performances, respectively, using the OLS and VA models. Note that we have included a vector of transitions in PMK work status to account for the changes in parental resources that often accompany changes in family structure. Similarly to Tables 5 and 6, the first specification of the OLS model presents the regression results with no control variables, while the second one includes the full set of control variables for comparison. The VA model contains the full set of control variables.

[16] The coefficients of household income dummies in the reading scores analysis are not reported in Table 5 to save space.

Children who stay in non-intact families score between 2 and 6 points lower in their reading tests than those in intact families, the estimate is significant in both specifications of the OLS. Children who experienced a change in family structure score between 4 and 5 points lower in their reading tests than those in intact families and the estimate is significant in both OLS and value-added models (Table 7). Similarly, children who remain in single-parent families present a disadvantage in terms of their math performance compared to those who stay in intact families. However, when we control for the additional observable characteristics in the OLS or VA models, this negative effect diminishes and becomes non-significant. Somewhat surprisingly, changes in family structure do not seem to impact significantly math performance (Table 8).

The results of transition in PMKs' work status in tables 7 and 8 show that becoming non-employed significantly improves children's math and reading score, as does having additional income. Since the PMKs' work status is reported in hours and the household income is measured in dollars, we stablish a correspondence between these two measures to facilitate comparisons. For example, persistently staying in non-employment is potentially equivalent to about 2,080 hours per year that could be spent with the child.[17] The average annual earnings of the PMK in our sample is about $24,500. Hence, becoming non-employed allows the PMK to spend 2,080 more hours with their children, at the expense of $24,500. In terms of the coefficients of the OLS model reported in table 8, becoming a non-employed PMK is associated with an increase of 26.03 additional points in the math test, but an increase of $24,500 in household income only improves math scores by 3.19 points (increasing household income by $1,000 increases math score by 0.13 point).[18]

3.2 The Effect of Family Structure on math and reading outcomes by Gender

So far, our results show that the family structure has a somewhat significant effect on children's reading performance, but we find little impact of family structure on children's math performance. It is plausible however, that this is the result of aggregation, which might mask differential effects in different subgroups of the population. In particular, it is plausible that family structure has a differential effect in young boys and girls. Numerous studies find that boys behave differently than girls, particularly if raised in disadvantaged circumstances (Autor et al., 2016). In addition, since mothers (fathers) tend to spend more time parenting daughters (sons), daughters may receive more parental attention than boys in single parent households typically led by women – or less attention in step-families if the mother remarries (Baker and Milligan, 2016; Bertrand and Pan, 2013). To

[17] We use 40 working hours per week and 52 weeks per year to calculate the total working hours per year.
[18] Since the household income is a categorical variable in cycles 1 through 3, we are not able to perform similar exercise for the analysis of reading performance.

address this possibility, we include an interaction between the family structure (change in family structure) indicators and an indicator for female child in our models.

Table 9 shows the effect of family structure on the child' s reading (columns 1-3) and math (columns 4-6) sample by gender using the OLS, VA and FE models. The coefficient of *Single parent family* or *Step family* represents now the effect on the reading /math scores of boys living in single parent family or step family respectively. The sum of the coefficients of *Single parent family* and *Female*Single parent family* (the sum of the coefficients of *Step family* and *Female*Step family*) represents the effect on the reading /math scores of girls in the specified families. The interaction coefficient, *Female*Single parent family* or *Female*Step family,* then shows the differential effect that family structure has on girls relative to boys.

Table 9 (Columns 1-3) shows that boys in single parent families score between 8 and 19 points lower in their reading tests than boys in intact families; the estimate is significant in both OLS and value-added models and remains large, though not significant in the FE model. Similarly, girls in single parent families score between 9 (-8.32 - 0.75 = -9.07 (SE 7.37)) and 17 (-18.49 + 1.70 = -16.79 (SE 3.87)) points lower in their reading tests than girls in intact families, the estimate is significant in both OLS and value-added models. Living in step families has little effect on both boys' and girls' reading scores.[19]

Table 9 (Columns 4-6) on the other hand reveals that living in single parent families has relatively little effect on both boys' and girls' math performance.[20] Boys in step families have no significant differences on math scores compared to boys in intact families. Family structure has a differential effect in the math scores of boys and girls living in step families. Girls score between 16 and 31 points lower than boys in similar living arrangements. Although the results from the FE are not significant, the magnitude of the coefficient is rather large, so it is likely that the imprecise estimates relate to the small number of transitions in the data. The total effect on math scores for girls in step families relative to girls in intact families is large in magnitude, around 20 (SE 7.90) and 13 (SE 8.58) and 22 (SE 17.07) points lower in the OLS, VA and FE models respectively, although only the OLS result is statistically significant. In summary, the family structure seems to affect boys and girls differently but the differences do not affect boys and girls differently on their reading and math performances.

[19] The total effect on reading scores for girls in step families relative to girls in intact families is, in the OLS model, -1.03 - 0.70 = -1.73 and statistically insignificant (SE 2.49). The value-added and fixed-effect estimates are qualitatively similar to those from the OLS.

[20] The total effect on math scores for girls in single parent families relative to girls in intact families is, in the OLS model, -8.73 - 0.05 = -8.78 and statistically insignificant (SE 6.63). The value-added and fixed-effect estimates are qualitatively similar to those from the OLS.

Table 10 shows the effect of transitions in family structure on the child' s reading (column 1 and 2) and math (column 3 and 4) sample by gender using the OLS and VA models. Here the diversity of effects by gender are even more noticeable. There are negative and significant effects for boys who remain in a non-intact family in terms of their reading scores - with scores 6.26 points lower than boys in intact families – or experienced a change in family structure - between 4 and 5 points lower scores than boys remaining in intact families. Girls who remained in non-intact families or experienced a change in family structure, on the other hand, have no significant differences on their reading scores compared to girls in intact families. Neither have they showed a differential score with respect to boys with similar family dynamics.[21] The math scores analysis shows that girls remaining in step families, as well as those who have experienced a change in family structure, have (significantly) lower scores relative to girls remaining in intact families.[22] However, this is not the case for boys. This finding is consistent with Sanchez et al. (2004) who, using US data, indicates that teenage boys were more interested in studying math than teenage girls were.

Overall, these findings seem to suggest that boys are more affected by family instability than girls in terms of their reading performance. On the other hand, we find that girls are more sensitive than boys are to marital instability or to persistently living in a step-family in terms of their math performances. As the literature suggests, this could be related to that parental allocation of time and resources by gender of the offspring (Bertrand and Pan (2013), Baker and Milligan (2016), Lundberg (2017)). If fathers spend more time with their biological male children and mothers with their biological female children, boys who have experienced divorce might have lower reading skills due to the absence of a (biological) father figure since the development of this skill requires much parental involvement. This finding is consistent with the literature which suggests that boys' performances are more likely to be affected by their father absence than girls' (Autor et al. (2016), Lundberg (2017)). In addition, a mother's divorce or remarriage may limit the resources (both familial and economic resources) she previously devoted to the female offspring from a previous relationship. Therefore, girls who have experienced marital instability might have lower math skills due to this lack of resources. Moreover, many studies indicate that girls have more emotional

[21] The total effect on reading scores for girls remaining in non-intact families relative to girls remaining in intact families is, in the OLS model, -6.26 + 2.41 = -3.85 and statistically insignificant (SE 2.37). The total effect on reading scores for girls who have experienced a change in family structure relative to girls remaining in intact families is, in the OLS model, -4.27 + 0.39 = -3.88 and statistically insignificant (SE 2.09). The value-added estimates are qualitatively similar with that in the OLS.

[22] The total effect on math scores for girls remaining in step families relative to girls remaining in intact families is, in the OLS model, -2.25 - 25.91 = -28.16 and statistically significant (SE 9.83). The total effect on math scores for girls experienced a change in family structure relative to girls remaining in intact families is, in the OLS model, 4.76 - 25.60 = -20.84 and statistically significant (SE 9.41). The value-added estimates are qualitatively similar with that in the OLS.

problems in step families than boys do and the long-term relationship of stepfather-son is better than that of stepfather-daughter (Clingempeel et al. (1984), Bray and Berger (1993), Lundberg (2017)). Thus, persistently living in a step family might disrupt girls' performances more than boys'.

3.3 The Effect of Family Structure on math and reading outcomes by religious /cultural group

Another dimension that can have significant effect on the child academic performance relates to the parenting style as influenced by the parent's cultural ancestry. Different cultures put different stress on the role of parents in child's development and education. For instance, traditional cultures tend to promote a strict division of labour in terms of child rearing, emphasize the nurturing role of mothers and relegating fathers to a secondary role in early childhood development. If that is the case, the effect of family dissolution on these families may create a larger vacuum in the time and resources available to the child than in families with a more equal distribution of tasks. For instance, mothers could be ill prepared to assume an active role in the labour market, or if forced to do so, have difficulty balancing work and family life. Similarly, fathers may have difficulties with shared custody if they are ill equipped to take care of children. While these skills can be learned, it may take a longer time for "specialized" parents to adjust to the new parameters of parenthood, than for parents that already have an equal partnership in child rearing before family dissolution. Culture may also affect the attitudes towards family dissolution per se. For instance, a strong position against divorce may intensify conflict in the family before or after family dissolution, with the subsequent effect on children (Obergruber (2016)). We use the religious affiliation of the PMK and the cultural group the PMK identifies him/herself with, to explore whether culture mediates the effect of the family structure on child performance.

We identify the religious affiliation of the PMK as Catholic, or non-Catholic to understand whether religion mediates the effect of family structure on the reading and math performance of children. It is not clear what the direction of the effect would be. Traditionally, one could expect Catholic families to avoid divorce, if it is perceived as a stigma, increasing the possibility of conflict around family dissolution. It is unclear if these traditional views are aligned with the way modern Catholics practice their religion. We introduce an interaction of religious affiliation with family structure to identify whether Catholic PMKs show a differential effect of family structure on children's performance.

In the NLSCY, PMKs are also asked to identify themselves with different ethnic/cultural groups. *"To which ethnic or cultural group(s) did your ancestors belong?"* respondents are offered different possible answers to which they answer "*Yes*" or "*No"*. The first offered answer is "*Canadian?*", followed by "*French?"*, successive answers (up to nineteen possibilities) cover

the majority of traditional and new ethno-cultural groups arriving to Canada. Multiple affirmative answers are possible and the PMK can identify him/herself with several of these cultural groups.

This structure makes it difficult to construct a precisely defined variable for cultural identity. We choose to distinguish between *Canadian* and *French* heritage because they may best reflect differences in social values that are mimicked by policy institutions as discussed in Beaujot et al. (2013). Moreover, although a substantial fraction of our sample (around 80%) identifies with more than one cultural identity, more than half the PMKs identify themselves with at least one of these groups (Canadian or French). This makes these two groups of particular interest in terms of exploring heterogeneity. The results we present below are robust to slight modifications of the definition of *Canadian* heritage to include those who identify themselves as uniquely from "British", Scottish or "Irish", since these groups very rarely identify the PMK uniquely.

To try isolating the effect of these two cultural identities on cognitive performance, we estimate regressions separately for those families where the PMK identifies him/herself as *Canadian* and those families where the PMK identifies him/herself as *French*, and include an indicator for whether the PMK identifies him/herself with a unique cultural group. [23] Approximately one third of the *Canadian* responses correspond to a unique identifier, whereas a little under one fifth of the *French* responses do. The coefficient of this "unique" identifier is negative and insignificant in the *Canadian* heritage sample and significant, but small for the French heritage sample in the VA models. It is worth noting that the distribution of respondents across provinces, Quebec versus Rest of Canada (RoC), is surprisingly even, with a 50/50 split among those with a Canadian identifier, and 63/37 distribution among those with a French identifier. Remember that all our specifications include provincial and CMA indicators, so the coefficients are to be interpreted net of any provincial/CMA idiosyncratic effect (particularly differences in schooling systems).

The characteristics of families by religious affiliation or cultural group and can be found in the Appendix Tables B1 (for the reading sample) and B2 (for the math sample). In general, the three groups share similar characteristics with the exception of the proportion of PMKs who are Canadian born, which is smaller among Catholic families than in the cultural groups. In the math sample, the average household income is slightly higher in Catholic families than in other cultural groups. Although some studies indicate that parents in Catholic family are more willing to stay together under the same conditions compared to those in a Non-Catholic family (Obergruber

[23] Self-identification is an endogenous choice of the individual and could be correlated with unobservable characteristics that affect cognitive performance. We do not have a way to address this source of endogeneity, hence we opt to estimate the effect of family structure separately for the two groups.

(2016)), this is not the case in our study. The distribution of family structure is similar for Catholic and Non-Catholic families in our sample (Tables B3 and B4 in Appendix).

Results for Catholic PMKs are presented in Tables 11 and 12 for the reading and math sample respectively. Results for *Canadian* and *French* heritage groups are presented in Tables 13 and 14.

Regarding Catholicism as a marker of cultural identity, Table 11 (Columns 1-3) finds that, consistenly with the literature, single parenthood is associated with a significant decline between 11 and 20 points in reading scores, but the impact is mostly similar between Catholic and non-Catholic PMKs (Arker, 2012). Using the estimates of the OLS model, children in non-Catholic, single parent families score almost 20 points (significantly) lower on reading tests than children in non-Catholic intact families, whereas children in catholic, single parent families score 21 points (significantly) lower relative to those in catholic intact families. The value-added and fixed-effect estimates are qualitatively similar to those from the OLS model.

The last two columns in table 11 showing the effects of transitions in family structure convey the same results, small negative effects of both, staying in non-intact families and experiencing a change in family structure.

In Table 12 (Columns 1-3), we find a strong and significant negative effect of single parenthood on math scores, between 14 to 18 points (significantly) lower for non-Catholic families. However, here children in catholic, single parent families show an advantage relative to other children in single parent families. In fact, there is no difference between these children and those remaining in catholic, intact families. For instance, in the OLS model, the former group scores 2.4 points lower in math tests than the later (-16.16 + 13.74 = -2.42) and the effect is statistically insignificant. The results are qualitatively similar in the value-added and fixed-effect models.

We observe similar results regarding transitions in family structure in the last two columns of table 12. Remaining in single parent families is associated with a significant decline in math scores, between 14 to 21 points, for non-Catholic families, an effect that almost disappears when comparing single parent to intact families among those of catholic affiliation. In general, the impact of family structure on math performance differs between children in Catholic families and those in Non-Catholic families, whereas the influence on reading performance is similar for these two groups.

Tables 13 and 14 present the effect of family status on reading and math scores, respectively for *French* (columns 2,4, and 6) and *Canadian* (columns 1, 3, and 5) self-identified respondents. Panel A shows results for family structure and panel B shows results for transitions in family structure.

Regarding reading scores, we continue to document the disadvantage of children in single parent families, who score between 6 and 14 points lower than children in intact families (Table 13, panel A). These results are quite robust, even in the FE model, where the results are similar although less precisely estimated. Most significantly, both cultural affiliations perform similarly in the tests. The effects of family transition (Panel B) points toward a significant negative effect of changes in family structure for both cultural affiliations.

The results for math scores in Table 14 are somewhat surprising, relative to those obtained for the whole sample. Recall that in general, non-intact families perform worse relative to intact families. In our sample of *Canadian* self-identified PMKs (column 1 in table 14 panel A) we observe a similar patter, with children of single parents/step families scoring 17/15 points below of children in intact families with the same heritage. However, among children of PMKs claiming *French* cultural affiliation (column 2 in table 14 panel A), those in single parent households score 14 points below children in intact families, but children in step families score 11 points higher. These numbers are not precisely estimated, most likely due to small sample sizes, but the larger (and positive) estimates are robust through the OLS and VA specifications and when considering transitions in family structure in panel B. The coefficient is not positive in the FE specification, but it is substantially lower than what is shown for the *Canadian* group. We interpret this result as suggestive that step families within the context of *French* cultural identification have an advantage to non-intact families of *French* cultural identification that it is not apparent among those claiming *Canadian* heritage. Similar patterns appear in panel B, table 14 showing the effect of transitions in family structure on math scores for the two heritage groups: 1) Staying in step families has a negative effect for *Canadian* self-identified respondents and an opposite effect on families claiming *French* affiliation; 2) Changes in family structure have much larger effects on the children of *Canadian* PMKs, but the results are close to zero for the *French* group.

In summary, when looking into differential effects across cultural/religious affiliations of family structure on cognitive performance, we typically observe differential effects in math, but no reading scores. The differences are large but not precisely estimated.

4. Conclusion

We investigate the role of family structure on cognitive outcomes of children using the NLSCY. Previous work does not report (surprisingly) a large, significant connection between a child's academic performances and family/changes in family structure. However, we find that this general result hides some heterogenous effects. Boys are more affected by their parental marital instability than girls in terms of their reading performance. On the other hand, girls are more sensitive than boys are to the marital instability of their parents or to the presence of step-family members in terms of their math performances. Additionally, initial exploration of cultural and religious

affiliation reveals that family structure affects children of different heritage groups differently on their math performances, whereas the impact on reading scores is similar across different groups.

Our research reveals that further exploring the heterogeneity of children's performance responses to family disruption might be an important factor in assessing the benefits of programs aimed at increasing the well-being of children.

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Table1. Distribution of Children by Family Structure, PMKs' Work Status, and Average Reading and Math Scores

	Cycle 1	Cycle 2	Cycle 3	Cycle 4	Cycle 5	Cycle 6
Family Structure (%)						
Two Biological Parents	88.47	83.23	78.47	76.80	74.04	71.20
Single Parent	10.13	13.92	15.02	16.92	18.89	19.37
Step Family	1.41	2.85	6.49	6.28	7.08	9.42
PMKs' Work Status (%)						
Employed	70.32	73.59	78.72	81.73	82.45	87.08
Non-employed	29.68	26.41	21.28	18.27	17.55	12.92
Outcomes	**Average Reading Scores by Gender (SD)**			**Average Math Scores by Gender (SD)**		
Boys	100.56	100.83	101.29	383.10	459.86	525.38
	(14.64)	(15.42)	(16.07)	(72.94)	(68.21)	(92.58)
Girls	102.37	100.64	98.40	380.66	454.35	512.02
	(14.90)	(14.07)	(14.67)	(80.16)	(71.13)	(95.49)
Number of observations	990	1962	972	2227	2227	2227

Table 2. Distribution of Children by Transition in Family Structure and Transition in PMKs' Work Status between adjacent cycles

Panel A. Distribution of Children by Transitions in Family Structure and in PMKs' Work Status

	Reading Sample		Math Sample	
Transition in Family Structure (%)	Cycles 1-2	Cycles 2-3	Cycles 4-5	Cycles 5-6
Stay in Intact Family	83.23	78.49	74.04	71.20
Stay in Non-intact Family	10.99	12.27	-	-
Stay in Single Parent	-	-	15.42	15.92
Stay in Step Family	-	-	5.44	6.67
Change in Family Structure	5.78	9.24	5.10	6.21
Transition in PMKs' Work Status (%)				
Stay in Employment	63.65	67.40	76.94	79.03
Stay in Nonemployment	6.39	5.92	4.36	3.10
Employment - Nonemployment	9.94	11.32	5.51	8.05
Nonemployment - Employment	20.03	15.36	13.19	9.82

Panel B. Distribution of Children in cycles 4 through 6 by cycles 1-3 transition in Family Structure

Previous Transition in Family Structure (%)	Math Sample
Stay in Intact Family through cycles 1-3	80.04
Stay in Non-intact Family through cycles 1-3	8.13
Change in Family Structure through cycles 1-3	11.83
Previous Transition in PMKs' Work Status (%)	
Stay in Employment through cycles 1-3	58.35
Stay in Nonemployment through cycles 1-3	12.27
Change in Employment Status through cycles 1-3	29.38

Table 3. Summary Statistics of Reading Sample (St. Dev.)

	All	Intact Family	Single Parent Family	Step Family
Reading Skill (Scores)	100.69	101.46	96.77	96.64
	(14.90)	(14.80)	(14.95)	(14.11)
Child's characteristics				
Child's age in months	66.37	65.25	69.17	82.41
	(22.60)	(22.57)	(22.00)	(18.12)
Girls (%)	50.35	52.02	40.36	47.67
	(0.50)	(0.50)	(0.49)	(0.50)
% with educational disability	1.14	1.00	2.03	-
	(0.11)	(0.10)	(0.14)	-
Number of siblings	1.29	1.34	0.94	1.26
	(0.98)	(0.98)	(0.94)	(0.95)
PMKs' characteristics				
PMK age	34.37	34.75	32.97	30.55
	(5.37)	(5.18)	(6.06)	(4.67)
Women (%)	93.45	93.44	92.93	95.43
	(0.25)	(0.25)	(0.26)	(0.21)
% of native-born	86.73	85.35	92.22	99.04
	(0.34)	(0.35)	(0.27)	(0.10)
Age at birth	30.12	29.57	32.49	34.29
	(9.57)	(4.78)	(19.13)	(25.68)
% teenage parent	2.40	1.26	7.96	8.87
	(0.15)	(0.11)	(0.27)	(0.28)
% high school education or less	68.77	70.88	57.38	61.07
	(0.46)	(0.45)	(0.49)	(0.49)
PMK's depression score	4.79	4.31	7.55	5.97
	(9.09)	(8.66)	(10.21)	(12.18)
Households' characteristics				
N. adults (exclude parents)	0.11	0.10	0.16	0.02
	(0.46)	(0.46)	(0.48)	(0.14)
CMA (%)	71.69	71.09	76.86	67.03
	(0.45)	(0.45)	(0.42)	(0.47)
% low-income Family	22.73	15.06	69.31	31.86
	(0.42)	(0.36)	(0.46)	(0.47)
Family functioning score	8.47	7.87	12.26	8.87
	(9.44)	(7.87)	(15.26)	(11.80)
Number of observations	5886	4907	765	214

Table 4. Summary Statistics of Math Sample (St. Dev.)

	All	Intact Family	Single Parent Family	Step Family
Math Skill (Scores)	457.13	456.25	454.70	471.40
	(98.73)	(98.98)	(94.70)	(104.62)
Child's characteristics				
Child's age in months	139.13	137.94	140.97	146.19
	(26.09)	(25.86)	(26.46)	(26.01)
Girls (%)	48.72	49.90	50.06	34.15
	(0.50)	(0.50)	(0.50)	(0.47)
% with educational disability	3.20	3.30	3.01	2.71
	(0.18)	(0.18)	(0.17)	(0.16)
Number of siblings	1.46	1.57	1.07	1.34
	(1.02)	(1.02)	(0.94)	(1.04)
PMKs' characteristics				
PMK age	40.33	40.60	40.43	37.49
	(5.08)	(4.72)	(5.77)	(5.74)
Women (%)	97.93	99.78	91.98	94.46
	(0.14)	(0.05)	(0.27)	(0.23)
% of native-born	83.49	83.43	77.90	97.52
	(0.37)	(0.37)	(0.42)	(0.16)
Age at birth	30.22	29.09	34.19	31.58
	(10.95)	(4.32)	(19.54)	(20.31)
% teenage parent	2.08	1.07	3.29	8.84
	(0.14)	(0.10)	(0.18)	(0.28)
% high school education or less	64.30	66.97	60.40	47.93
	(0.48)	(0.47)	(0.49)	(0.50)
PMK's depression score	3.87	3.23	6.59	3.55
	(4.98)	(4.22)	(6.56)	(5.19)
Households' characteristics				
N. adults (exclude parents)	0.24	0.22	0.35	0.16
	(0.66)	(0.58)	(0.72)	(0.43)
CMA (%)	77.90	76.68	83.91	75.21
	(0.41)	(0.42)	(0.37)	(0.43)
Household income ($)	75913	85256	39772	73031
	(57653)	(59146)	(39841)	(42965)
Family functioning score	8.16	7.98	9.42	6.87
	(4.83)	(4.76)	(4.87)	(4.81)
Number of observations	6681	5202	979	500

Table 5. Effect of Family Structure on Reading Performance (Robust SE)

	OLS		VA	FE
	(1)	(2)	(3)	(4)
Reading (t-1)	-	-	0.59***	-
	-	-	(0.03)	-
Family structure				
Single parent family	-4.44***	-17.85***	-16.02***	-8.43
	(1.17)	(3.77)	(2.32)	(7.04)
Step family	-4.84***	-1.38	-1.99	-3.28
	(1.52)	(1.62)	(1.56)	(2.90)
PMK's employment status				
Nonemployment	-	0.86	1.36	2.42**
	-	(0.91)	(0.97)	(1.02)
Household Income (7 indicators**)**	NO	YES	YES	YES
Other child and PMK's characteristics	NO	YES	YES	YES
R-squared	0.02	0.14	0.44	0.83
Number of observations	3924	3924	1962	1962

Note: Children remained in an intact family across all cycles are the reference groups. The full set of controls includes PMKs' work status, child' s age and gender, whether child has an education disability, number of siblings, PMK's age and gender, whether PMK has high school or less education, PMK's age at birth of the child, PMK's place of birth, PMK's was a teen parent, CMA residence, number of adults in the household, household income dummies, PMKs' depression, family functioning scores, year fixed effects, and province fixed effects. The child longitudinal weights provided in the NLSCY are used in the analysis.

* Significance at 10% ** Significance at 5% *** Significance at 1%

Table 6. Effect of Family Structure on Math Performance (Robust SE)

	OLS		VA	FE
	(1)	(2)	(3)	(4)
Math (t-1)	-	-	0.53***	-
	-	-	(0.03)	-
Family structure				
Single parent family	-8.88*	-8.65	-6.80	-9.57
	(4.37)	(5.93)	(6.08)	(10.18)
Step family	1.34	-6.37	-2.42	-7.20
	(7.33)	(7.57)	(7.79)	(12.08)
PMK's employment status				
Nonemployment	-	1.49	7.53	8.26
	-	(4.26)	(4.95)	(5.47)
Household income (thousand**)**	-	0.09***	0.07**	-0.01
	-	(0.03)	(0.03)	(0.03)
Previous Family Structure	NO	YES	YES	-
Previous PMK's employment status	NO	YES	YES	-
Other child and PMK's characteristics	NO	YES	YES	YES
R-squared	0.34	0.65	0.61	0.87
Number of observations	6681	6681	4454	2227

Note: Children remained in an intact family across all cycles are the reference groups. The full set of controls includes PMKs' work status, family structure history, PMKs' work status history, child' s age and gender, whether child has an education disability, number of siblings, PMK's age and gender, whether PMK has high school or less education, PMK's age at birth of the child, PMK's place of birth, PMK's was a teen parent, CMA residence, number of adults in the household, household income, PMKs' depression, family functioning scores, year fixed effects, and province fixed effects. The child longitudinal weights provided by the NLSCY are used in the analysis.

* Significance at 10% ** Significance at 5% *** Significance at 1%

Table 7. Effect of Transition in Family Structure on Reading Performance (Robust SE)

	OLS		VA
	(1)	(2)	(3)
Reading (t-1)	-	-	0.59***
	-	-	(0.03)
Transitions in family structure			
Stay in Nonintact family	-5.19***	-5.18**	-2.50
	(1.47)	(2.25)	(2.08)
Change in Family Structure	-4.76***	-4.10**	-4.22**
	(1.63)	(1.89)	(1.72)
Transitions in PMK's employment status			
Stay in Nonemployment	-	0.11	0.12
	-	(1.17)	(1.09)
Employment - Nonemployment	-	3.57**	4.02***
	-	(1.76)	(1.41)
Nonemployment - Employment	-	-0.17	-1.23
	-	(1.21)	(1.26)
Household Income (7 indicators**)**	NO	YES	YES
Other child and PMK's characteristics	NO	YES	YES
R-squared	0.02	0.14	0.44
Number of observations	2934	2934	1962

Note: Children remained in an intact family across all cycles are the reference groups. The full set of controls includes transitions in PMKs' work status, child' s age and gender, whether child has an education disability, number of siblings, PMK's age and gender, whether PMK has high school or less education, PMK's age at birth of the child, PMK's place of birth, PMK's was a teen parent, CMA residence, number of adults in the household, household income dummies, PMKs' depression, family functioning scores, year fixed effects, and province fixed effects. The child longitudinal weights provided in the NLSCY are used in the analysis.

* Significance at 10% ** Significance at 5% *** Significance at 1%

Table 8. Effect of Transition in Family Structure on Math Performance (Robust SE)

	OLS		VA
	(1)	(2)	(3)
Math (t-1)	-	-	0.53***
	-	-	(0.03)
Transitions in family structure			
Stay in Single parent family	-10.18*	-11.10	-7.23
	(6.02)	(7.46)	(6.47)
Stay in Step family	3.51	-9.04	-5.21
	(10.30)	(9.25)	(8.05)
Change in Family Structure	-3.19	-7.59	-5.18
	(9.01)	(8.22)	(7.46)
Transitions in PMK's employment status			
Stay in Nonemployment	-	-3.59	-0.41
	-	(6.34)	(5.32)
Employment - Nonemployment	-	26.03***	23.48***
	-	(9.08)	(9.32)
Nonemployment - Employment	-	-9.26	-5.89
	-	(6.90)	(7.26)
Household income (thousand**)**	-	0.13***	0.07**
	-	(0.03)	(0.03)
Previous Family Structure	NO	YES	YES
Previous PMK's employment status	NO	YES	YES
Other child and PMK's characteristics	NO	YES	YES
R-squared	0.15	0.53	0.61
Number of observations	4454	4454	4454

Note: Children remained in an intact family across all cycles are the reference groups. The full set of controls includes transitions in PMKs' work status, family structure history, PMKs' work status history, child' s age and gender, whether child has an education disability, number of siblings, PMK's age and gender, whether PMK has high school or less education, PMK's age at birth of the child, PMK's place of birth, PMK's was a teen parent, CMA residence, number of adults in the household, household income, PMKs' depression, family functioning scores, year fixed effects, and province fixed effects. The child longitudinal weights provided in the NLSCY are used in the analysis.

* Significance at 10% ** Significance at 5% *** Significance at 1%

Table 9. Effect of Family Structure on Reading and Math Performance by Gender (Robust SE)

	Reading			Math		
	OLS	VA	FE	OLS	VA	FE
Reading (t-1)	-	0.59***	-	-	-	-
	-	(0.03)	-	-	-	-
Math (t-1)	-	-	-	-	0.53***	-
	-	-	-	-	(0.03)	-
Child-female	-0.25	-2.54***	-	-4.85*	-5.10*	-
	(0.75)	(0.80)	-	(2.79)	(3.04)	-
Family structure						
Single parent family	-18.49***	-17.70***	-8.32	-8.73	-5.35	-3.07
	(3.84)	(2.49)	(7.33)	(6.96)	(7.61)	(11.83)
Step family	-1.03	-1.57	-4.24	0.86	3.59	8.42
	(2.01)	(2.06)	(3.52)	(8.44)	(8.53)	(14.00)
Female*Single parent family	1.70	4.14*	-0.75	-0.05	-2.75	-10.51
	(1.81)	(2.41)	(3.98)	(6.78)	(8.42)	(18.60)
Female*Step family	-0.70	-0.85	1.70	-21.10***	-16.67*	-30.73
	(3.12)	(2.79)	(5.16)	(8.10)	(8.68)	(21.46)
PMKs' employment status	YES	YES	YES	YES	YES	YES
Household Income	7 indicators	7 indicators	7 indicators	Thousands	Thousands	Thousands
Previous Family Structure	-	-	-	YES	YES	-
Previous PMK's employment status	-	-	-	YES	YES	-
Other child and PMK's characteristics	YES	YES	YES	YES	YES	YES
R-squared	0.14	0.44	0.83	0.65	0.61	0.87
Number of observations	3924	1962	1962	6681	4454	2227

Note: Children remained in an intact family across all cycles are the reference groups. Other child and PMK's characteristics are as in table 5. The child longitudinal weights provided in the NLSCY are used in the analysis.

* Significance at 10% ** Significance at 5% *** Significance at 1%

Table 10. Effect of Transition in Family Structure on Reading and Math Performance by Gender (Robust SE)

	Reading		Math	
	OLS	VA	OLS	VA
Reading (t-1)	-	0.59***	-	-
	-	(0.03)	-	-
Math (t-1)	-	-	-	0.53***
	-	-	-	(0.03)
Child-female	-1.28	-2.54***	-6.32*	-5.20*
	(0.89)	(0.79)	(3.54)	(3.03)
Transitions in family structure				
Stay in Nonintact family	-6.26**	-3.46	-	-
	(2.65)	(2.70)	-	-
Stay in Single parent family	-	-	-14.60	-9.30
	-	-	(9.07)	(8.34)
Stay in Step family	-	-	-2.25	-1.13
	-	-	(10.81)	(9.07)
Changed family structure	-4.27*	-5.24**	4.76	5.01
	(2.47)	(2.14)	(10.61)	(9.61)
Female*Stay in Nonintact family	2.41	1.92	-	-
	(2.21)	(2.77)	-	-
Female*Stay in Single parent family	-	-	4.84	2.61
	-	-	(9.40)	(9.22)
Female*Stay in Step family	-	-	-25.91**	-15.92
	-	-	(11.26)	(9.69)
Female*Changed family structure	0.39	2.32	-25.60**	-21.02*
	(2.63)	(2.58)	(13.13)	(12.08)
Transitions in PMKs' employment status	YES	YES	YES	YES
Household Income	7 indicators	7 indicators	Thousands	Thousands
Previous Family Structure	-	-	YES	YES
Previous PMK's employment status	-	-	YES	YES
Other child and PMK's characteristics	YES	YES	YES	YES
R-squared	0.14	0.44	0.53	0.62
Number of observations	2934	1962	4454	4454

Note: Children remained in an intact family across all cycles are the reference groups. Other child and PMK's characteristics are as in table 5. The child longitudinal weights provided in the NLSCY are used in the analysis.

* Significance at 10% ** Significance at 5% *** Significance at 1%

Table 11. Effect of (Transitions in) Family Structure on Reading Performance - by Catholic affiliation (Robust SE)

	Basic			Transitions	
	OLS	VA	FE	OLS	VA
Reading (t-1)	-	0.58***	-	-	0.58***
	-	(0.03)	-	-	(0.03)
PMK - Catholic	-0.96	-0.59	-	-1.06	-0.34
	(0.94)	(1.08)	-	(1.09)	(1.07)
(Transitions in) Family structure					
Single parent	-19.58***	-12.95***	-11.25**	-	-
	(3.88)	(3.02)	(4.56)	-	-
Step family	-3.93*	-3.39	-4.61	-	-
	(2.37)	(2.61)	(3.74)	-	-
Stay in Nonintact family	-	-	-	-4.63*	-1.57
	-	-	-	(2.62)	(2.41)
Change in fam. structure	-	-	-	-4.17*	-2.79
	-	-	-	(2.38)	(2.34)
Catholic*Single parent	-0.93	-5.22*	-2.05	-	-
	(2.11)	(2.72)	(3.43)	-	-
Catholic*Step family	2.99	1.62	0.65	-	-
	(3.05)	(3.13)	(5.06)	-	-
Catholic*Stay in Nonintact family	-	-	-	1.12	-2.34
	-	-	-	(2.55)	(3.33)
Catholic*Change in fam. structure	-	-	-	-1.60	-3.44
	-	-	-	(2.76)	(2.60)
(Transitions in) PMKs' employment status	YES	YES	YES	YES	YES
Household Income	YES	YES	YES	YES	YES
Other child and PMK's characteristics	YES	YES	YES	YES	YES
R-squared	0.14	0.44	0.83	0.14	0.44
Number of observations	3924	1962	1962	2934	1962

Note: Children remained in an intact family across all cycles are the reference groups. Other child and PMK's characteristics are as in table 5. The child longitudinal weights provided in the NLSCY are used in the analysis.

* Significance at 10% ** Significance at 5% *** Significance at 1%

Table 12. Effect of (Transitions in) Family Structure on Math Performance - by Catholic affiliation (Robust SE)

	Basic			Transitions	
	OLS	VA	FE	OLS	VA
Math (t-1)	-	0.53***	-	-	0.53***
	-	(0.03)	-	-	(0.03)
PMK - Catholic	-7.32**	-4.88	-	-7.05*	-4.87
	(3.15)	(3.52)	-	(3.91)	(3.50)
(Transitions in) Family structure					
(Stay in) Single parent	-16.16**	-14.35*	-18.01*	-20.95**	-13.92*
	(7.24)	(7.60)	(10.78)	(8.74)	(8.11)
(Stay in) Step family	-8.33	-3.41	-1.79	-16.20	-10.44
	(8.93)	(9.32)	(12.37)	(10.90)	(9.40)
Change in fam. structure	-	-	-	-7.96	-6.73
	-	-	-	(12.56)	(10.93)
Catholic*(Stay in) Single parent	13.74*	14.34*	20.17	17.73*	12.13
	(7.07)	(8.67)	(14.64)	(9.42)	(9.17)
Catholic*(Stay in) Step family	2.90	1.60	-6.79	12.97	9.75
	(8.97)	(9.24)	(13.16)	(12.77)	(10.38)
Catholic*Change in fam. structure	-	-	-	-0.81	2.18
	-	-	-	(13.45)	(12.41)
(Transitions in) PMKs' employment status	YES	YES	YES	YES	YES
Household Income	YES	YES	YES	YES	YES
Previous Family Structure	YES	YES	-	YES	YES
Previous PMK's employment status	YES	YES	-	YES	YES
Other child and PMK's characteristics	YES	YES	YES	YES	YES
R-squared	0.65	0.61	0.87	0.53	0.61
Number of observations	6681	4454	2227	4454	4454

Note: Children remained in an intact family across all cycles are the reference groups. Other child and PMK's characteristics are as in table 5. The child longitudinal weights provided in the NLSCY are used in the analysis.

* Significance at 10% ** Significance at 5% *** Significance at 1%

Table 13. Reading Performance by Cultural Affiliation (Robust SE)

Panel A. Effect of Family Structure on Reading Performance by Cultural Affiliation						
	OLS		VA		FE	
	Canadian	French	Canadian	French	Canadian	French
Reading (t-1)	-	-	0.58***	0.60***	-	-
	-	-	(0.05)	(0.06)	-	-
Family structure						
Single-parent family	-6.29**	-12.28***	-11.51**	-13.98***	-11.83	-10.00
	(2.54)	(4.44)	(4.70)	(4.52)	(8.82)	(6.82)
Step-family	-1.05	-1.12	-3.03	-1.73	-8.12*	1.82
	(2.33)	(2.19)	(2.35)	(1.98)	(4.55)	(3.67)
PMKs' employment status	YES	YES	YES	YES	YES	YES
Household Income	YES	YES	YES	YES	YES	YES
Other child and PMK's characteristics	YES	YES	YES	YES	YES	YES
R-squared	0.20	0.23	0.45	0.50	0.83	0.84
Number of observations	1580	1070	790	535	790	535

Panel B. Effect of Transitions in Family Structure on Reading Performance by Cultural Affiliation				
	OLS		VA	
	Canadian	French	Canadian	French
Reading (t-1)	-	-	0.57***	0.60***
	-	-	(0.05)	(0.05)
Transition in Family structure				
Stay in Nonintact family	-1.40	-0.82	-1.03	-1.59
	(3.12)	(3.24)	(2.95)	(3.58)
Change in fam. structure	-2.98	-2.83	-4.97**	-3.87*
	(2.72)	(2.46)	(2.34)	(2.17)
Transitions in PMKs' employment status	YES	YES	YES	YES
Household Income	YES	YES	YES	YES
Other child and PMK's characteristics	YES	YES	YES	YES
R-squared	0.20	0.24	0.45	0.50
Number of observations	1144	760	790	535

Note: Children remained in an intact family across all cycles are the reference groups. Other child and PMK's characteristics are as in table 5. The child longitudinal weights provided in the NLSCY are used in the analysis.

* Significance at 10% ** Significance at 5% *** Significance at 1%

Table 14. Math Performance by Cultural Affiliation (Robust SE)

Panel A. Effect of Family Structure on Math Performance by Cultural Affiliation						
	OLS		VA		FE	
	Canadian	French	Canadian	French	Canadian	French
Math (t-1)	-	-	0.47***	0.67***	-	-
	-	-	(0.05)	(0.04)	-	-
Family structure						
Single-parent family	-17.09**	-13.95	-16.41**	-17.67*	-29.25***	-26.67
	(8.67)	(10.40)	(8.65)	(9.96)	(11.12)	(16.21)
Step-family	-15.40	10.70	-9.80	13.26	-25.27*	-13.18
	(11.96)	(14.04)	(11.71)	(13.40)	(15.20)	(19.46)
PMKs' employment status	YES	YES	YES	YES	YES	YES
Household Income	YES	YES	YES	YES	YES	YES
Previous Family Structure	YES	YES	YES	YES	-	-
Previous PMK's employment status	YES	YES	YES	YES	-	-
Other child and PMK's characteristics	YES	YES	YES	YES	YES	YES
R-squared	0.65	0.64	0.59	0.65	0.87	0.88
Number of observations	2907	1860	1938	1240	969	620

Panel B. Effect of Transitions in Family Structure on Math Performance by Cultural Affiliation				
	OLS		VA	
	Canadian	French	Canadian	French
Math (t-1)	-	-	0.46***	0.66***
	-	-	(0.05)	(0.04)
Transition in Family structure				
Stay in Single parent	-17.52	-24.35	-13.95	-19.48*
	(10.83)	(14.78)	(9.44)	(11.09)
Stay in Step family	-20.04	11.13	-15.20	14.39
	(12.33)	(17.41)	(10.98)	(14.27)
Change in fam. structure	-16.89	-2.12	-14.43	0.69
	(12.93)	(16.09)	(11.44)	(13.63)
Transitions in PMKs' employment status	YES	YES	YES	YES
Household Income	YES	YES	YES	YES
Previous Family Structure	YES	YES	YES	YES
Previous PMK's employment status	YES	YES	YES	YES
Other child and PMK's characteristics	YES	YES	YES	YES
R-squared	0.53	0.51	0.60	0.55
Number of observations	1938	1240	1938	1240

Note: Children remained in an intact family across all cycles are the reference groups. Other child and PMK's characteristics are as in table 5. The child longitudinal weights provided in the NLSCY are used in the analysis.

* Significance at 10% ** Significance at 5% *** Significance at 1%

Appendix

Appendix A: Dataset Description

Table A1: Dataset Description

Cycle	Survey year	Age of children
Initial cycle	1994-1995	1-5
Second cycle	1996-1997	3-7
Third cycle	1998-1999	5-9
Fourth cycle	2000-2001	7-11
Fifth cycle	2002-2003	9-13
Sixth cycle	2004-2005	11-15

Appendix B: The Characteristics of Families by Cultural Group Category

Table B1: Summary Statistics - by Cultural and Religious Affiliation in the Reading Scores Analysis

	Canadian	French	Catholic
Reading Skill (Scores)	101.62	101.42	100.80
Child's characteristics			
Child's age in months	66.63	66.92	66.69
Girls (%)	49.39	47.20	49.80
% with educational disability	0.82	0.78	1.09
Number of siblings	1.19	1.13	1.21
PMKs' characteristics			
PMK age	34.14	33.93	34.55
Women (%)	91.41	92.83	93.17
% of native-born	98.87	96.12	85.97
Age at birth	30.33	29.54	30.15
% teenage parent	2.63	3.22	2.06
% high school education or less	69.40	67.37	67.82
PMK's depression score	4.97	5.00	4.95
Households' characteristics			
N. adults (exclude parents)	0.04	0.06	0.12
CMA (%)	69.06	67.27	72.74
% low-income family	20.89	24.64	22.25
Family functioning score	7.67	7.47	8.33
% Unique cultural affiliation	35.88	19.34	-
N	1580	1070	1730

Table B2: Summary Statistics - by Cultural and Religious Affiliation in the Math Scores Analysis

	Canadian	French	Catholic
Math Skill (Scores)	459.40	461.13	458.80
Child's characteristics			
Child's age in months	139.41	140.13	139.16
Girls (%)	46.20	47.02	48.12
% with educational disability	3.63	2.87	2.26
Number of siblings	1.34	1.33	1.40
PMKs' characteristics			
PMK age	40.26	39.75	40.36
Women (%)	97.74	99.06	98.09
% of native-born	98.97	98.11	85.22
Age at birth	30.22	28.89	30.25
% teenage parent	2.13	3.08	1.95
% high school education or less	63.17	59.20	61.17
PMK's depression score	3.73	3.96	3.79
Households' characteristics			
N. adults (exclude parents)	0.14	0.16	0.23
CMA (%)	74.16	73.53	77.16
Household income ($)	70147	70494	73492
Family functioning score	7.82	8.01	8.19
% Unique cultural affiliation	33.20	15.95	-
N	2907	1860	3179

Table B3: Distribution of Children by Family Structure and Cultural Groups across Cycles 1-3

	Cycle 1			Cycle 2			Cycle 3		
	Intact	Single-parent	Step-family	Intact	Single-parent	Step-family	Intact	Single-parent	Step-family
Canadian	87.95%	9.96%	2.09%	82.25%	14.04%	3.81%	76.32%	15.76%	7.91%
Non-Canadian	89.40%	10.09%	0.51%	84.96%	12.89%	2.14%	81.04%	13.64%	5.32%
French	86.04%	12.33%	1.63%	81.85%	14.80%	3.36%	77.46%	14.48%	8.06%
Non-French	89.83%	9.10%	1.06%	84.42%	12.86%	2.72%	79.46%	14.66%	5.88%
Catholic	89.81%	8.82%	1.37%	84.94%	12.07%	2.99%	78.43%	15.01%	6.56%
Non-Catholic	87.85%	11.09%	1.07%	82.55%	14.65%	2.80%	79.52%	13.87%	6.61%

Table B4. Distribution of Children by Family Structure and Cultural Groups across Cycles 4-6

	Cycle 4			Cycle 5			Cycle 6		
	Intact	Single-parent	Step-family	Intact	Single-parent	Step-family	Intact	Single-parent	Step-family
Canadian	76.10%	17.37%	6.54%	74.21%	18.15%	7.64%	69.87%	19.42%	10.71%
Non-Canadian	77.43%	16.48%	6.10%	73.97%	19.35%	6.67%	72.68%	18.82%	8.51%
French	76.24%	18.01%	5.74%	74.30%	17.98%	7.72%	71.66%	15.87%	12.47%
Non-French	77.09%	16.41%	6.50%	73.99%	19.17%	6.84%	71.37%	20.32%	8.32%
Catholic	75.96%	18.73%	5.32%	72.88%	20.71%	6.40%	71.73%	17.86%	10.41%
Non-Catholic	77.64%	15.13%	7.24%	75.19%	17.06%	7.75%	70.78%	20.78%	8.44%

Tables B3 and B4 present the distribution of children by family structure and cultural groups across Cycles 1-3 and across Cycles 4-6, respectively. For instance, the first row of Table B3 shows the family structure distribution among Canadian families in Cycles 1-3, while the second row shows this distribution among Non-Canadian families. Comparing these two rows, we find that the distribution is similar for Canadian and Non-Canadian families. Similarly, the third and fourth rows indicate the distribution of family structure among French families and Non-French families, respectively. And the fifth and sixth rows are for Catholic and Non-Catholic families. As with the Canadian and Non-Canadian families, the family structure distribution is similar between French and Non-French, as well as between Catholic and Non-Catholic. This trend is also shown in Table B4 where presenting the distribution of family structure by cultural groups in Cycles 4-6.