

**PARENTAL LEAVE AND CHILD CARE ARRANGEMENTS  
DURING THE FIRST 12 MONTHS OF LIFE ARE ASSOCIATED WITH  
CHILDREN'S DEVELOPMENT FIVE YEARS LATER**

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**Abstract:** Infancy and early childhood are critical periods of development. Social policies, such as maternity and parental leave, play an important role in enabling Canadian parents to care for their children during this time. Using *Early Development Instrument* (EDI) and *Kindergarten Parent Survey* (KPS) data from Brantford and Brant County, Ontario, this study examined the association between parental leave and type of care during the first 12 months of life and children's development in senior kindergarten. The EDI assesses physical, social, emotional, and cognitive development as well as future academic vulnerability. The KPS collects information about children's preschool experiences. Parental care during the first year of life was associated with better child development on some, but not all, developmental variables among children attending senior kindergarten in 2011-2012 in Brant.

**Keywords:** early childhood development, maternal leave, parental leave, child care, social policies

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Healthy child development depends upon nurturing and stable relationships with caring adults beginning from birth. Parents' ability to provide the sensitive care required for optimal child development depends on a number of factors, including the ability to be both physically and emotionally present. Over the last 50 years, Canadians have witnessed a number of profound social, economic, and cultural changes which have altered family dynamics, parental stress levels, and the way children are cared for during their first few years of life. Because these factors have been shown to be related to child development, social policies such as maternity and parental leave are designed to enable mothers and fathers to act as the primary caregivers to their children for at least some time after birth. The purpose of the present research is to examine the association between parental leave practices and children's physical, emotional, social, and cognitive development among a cohort of senior kindergarten students living in Brant.

### **Biological Basis of Early Development and the Importance of Attachment Relationships**

While the importance of a child's relationship with his or her mother and other close adults has been known for some time, it is only recently that neuroscience has been able to demonstrate that a child's brain architecture reflects the quality of these early relationships (National Scientific Council on the Developing Child, 2004). According to Dr. Daniel Siegel, a founding member of the Center for Culture, Brain and Development at the University of California at Los Angeles, "human connections create neuronal connections," and the environmental factors shaping these key brain circuits are the child's attachment relationships (Siegel, 1999, p. 85). These interpersonal relationships allow the immature brain to use the mature functions of the parent's brain in order to organize its own processes (Siegel, 1999). As a result, abnormal and impoverished rearing environments dramatically slow growth and decrease the number of synapses per brain, simultaneously resulting in dysfunctional brain circuits associated with stress responses, emotional self-regulation, impulse control, attention, and decision-making (Joseph, 1999).

Newborns and young infants experience distress when they are hungry, cold, wet, or uncomfortable and positive emotions when they are fed, soothed, and held. These emotional experiences are then wired into multiple regions of the nervous system with enormous consequences over the course of a lifetime (National Scientific Council on the Developing Child, 2004). School readiness does not equal simply fostering literacy and numeracy, but also the ability to develop and sustain positive and co-operative relationships with teachers, peers, and other adults (National Scientific Council on the Developing Child, 2004). As such, events that interfere with attachment, such as parental stress or early separation, can have long-term negative impacts on cognitive, emotional, and social development (Baydar & Brooks-Gunn, 1991; Maté, 2009; Mercer, 2006; Bowlby, 2007).

Adults' ability to be present and provide sensitive, responsive, and consistent parenting is impacted by many factors, including social, cultural, and economic factors. Within a Canadian context, several changes have occurred which have impinged upon the amount of time parents are able to spend with their families. For example, between 1976 and 2008, the total weekly employment hours of couples increased from 57.6 to 64.8 (Marshall, 2009) and in 2001, 77% of women with infants at home had been employed in the year prior to the birth of their child

(Marshall, 2003). In addition, the proportion of lone-parent families has increased from 8.4% in 1961 to 16.3% in 2011 (Statistics Canada, 2013a). Of these, 80.1% are single mother households (Statistics Canada, 2013b). As a result of these changes in employment patterns, increasing attention must be paid to social policies which enable parents to act as the primary caregivers for their children for as long as possible. The provision of paid maternity and parental leave is one social policy designed to support parents in this way.

Although the first Canadian maternity leave legislation was passed by the Province of British Columbia in 1921, national policies did not come into place until 50 years later. Starting in 1971, mothers who had a minimum of 20 insurable weeks were eligible for up to 15 weeks of benefits. In 1990, 10 weeks of parental leave benefits were added, which could be used by either parent or split between both parents. In 1996, the Unemployment Insurance Act was renamed the Employment Insurance Act. In December 2000, Bill C-32 increased parental leave from 10 to 35 weeks, which resulted in a total maternity plus parental paid leave time of approximately one year. In addition, the eligibility requirement was reduced from 700 to 600 hours of insurable employment. The rate of the benefit has remained unchanged at 55% of average insured earnings (Marshall, 2003) up to a maximum of \$514 per week in 2014. In addition, additional occupational benefits are often negotiated through collective agreements. These benefits are available almost exclusively to women who are already eligible for employment insurance benefits, and included approximately 20% of mothers in 2001 (Pulkingham & van der Gaag, 2004).

With respect to the leave practices of Canadian parents, data from the 2010 Survey of Young Canadians indicated that 90% of children aged 1 to 3 years living outside of Quebec had mothers who took some type of leave at the time of the child's birth or adoption (Findlay & Kohen, 2012). However, the length of leave varied greatly: 36% of children had mothers who took two weeks of leave or less; 48% took between 25 and 52 weeks; and 9% took more than 52 weeks; 21% of women took unpaid leave only. Mothers were more likely to take paid leave if they worked full-time, were not self-employed, and worked regular hours as opposed to shift work. When it comes to fathers, 26% of children had fathers who took at least some leave. The average length of leave for fathers was 2.4 weeks. With respect to the type of leave, 13% of fathers reported paid leave whereas 14% reported taking unpaid leave. Fathers were more likely to take leave if they worked in the public sector compared to the private sector. In addition, fathers working full time were less likely to take leave compared to fathers working part-time (Findlay & Kohen, 2012).

### **Maternity and Parental Leave and Child Development**

The majority of studies examining the relationship between maternal employment, child care arrangements, and child development have used longitudinal population-based data from the United States. In general, most of these studies have demonstrated negative effects of first-year maternal employment. For example, Baydar and Brooks-Gunn (1991) found that maternal employment in the first year after birth was associated with more problem behaviours and poorer language development among 3- to 4-year-old children. Berger, Hill, and Waldfogel (2005) reported that returning to work within 12 weeks after giving birth was associated with more problem behaviours at age 4. Brooks-Gunn, Han, and Waldfogel (2002) found that school

readiness scores among 3-year-old children was significantly lower among those whose mothers started working by the ninth month and worked 30 or more hours per week by that point compared to children whose mothers only worked part-time. The same effect was found for children whose mothers began working by the sixth month.

In a study designed to explore whether the negative effects of maternal employment persist over time, Han, Waldfogel, and Brooks-Gunn (2001) followed one group of children from ages 3 to 4, to ages 5 to 6, and to ages 7 to 8. Consistent with previous studies (Baydar & Brooks-Gunn, 1991; Berger, Hill, & Waldfogel, 2005), Han and colleagues found that maternal employment in the first year of life negatively impacted cognitive and behavioural development at age 3 or 4. These effects persisted to age 5 or 6, and to ages 7 or 8. Specifically, having a mother who worked during the first year of a child's life was related to lower math achievement at age 7 to 8 and lower reading recognition at both ages 5 to 6 and 7 to 8. Belsky et al. (2007) examined the effects of early childcare arrangements through to the sixth grade and found that children who spent more time in non-maternal child care centre settings manifested more problem behaviours. These results confirmed previous findings that overall time in non-relative care was associated with increased problem behaviours at 4.5 years of age (van IJzendoorn et al., 2004, as cited in Belsky et al., 2007).

### **Purpose and Hypotheses**

While evidence suggests that early maternal employment and non-parental care is associated with poorer child development outcomes, the majority of this research examined data from the United States. Given the differences between American and Canadian parental leave policies, it is unknown whether similar relationships exist in Canada. Thus, the purpose of this study is to contribute to knowledge about the relation between parental leave and child care arrangements in the first year of life and children's development five years later using data from Brant. We hypothesized that children whose mother, father, or both parents took parental leave lasting 6 to 12 months would demonstrate better developmental outcomes compared to children whose parents did not take leave. Furthermore, we extended our examination to type of child care and hypothesized that children whose main type of child care is parental care and who spent less time in non-parental child care would have better developmental outcomes compared to children whose main type of care is non-parental care (and, in particular, paid unlicensed care). Based on previous findings, all differences were expected to be more pronounced for boys.

### **Methods**

#### ***Participants***

Participants were children aged 5 to 6 from Brant, who attended senior kindergarten during the 2011-2012 school year. Students were from one of 51 schools belonging to the Grand Erie District School Board, the Brant Haldimand Norfolk Catholic District School Board, or the Conseil Scolaire de District Catholique Centre-Sud (French Catholic School Board).

## **Measures**

**Early development instrument.** Child development variables were obtained from the 2012 Early Development Instrument or EDI (Janus & Offord, 2007). The EDI is a population-based measure of children's early development as it influences their readiness to learn at school and the survey is completed by senior kindergarten teachers for all students in Ontario (Offord Centre for Child Studies, 2013). The EDI uses 103 questions to assess child development in five domains: *physical health and well-being*, *social competence*, *emotional maturity*, *language and cognitive development*, and *communication skills and general knowledge*. Each EDI domain is scored from 0 to 10, with a score of 10 indicating the most advanced developmental skills. Domain scores are calculated as the mean score of all the answers in that section. Children who fall in the lowest 10th percentile on one or more domains are considered vulnerable with respect to school readiness, or more likely to experience poorer academic outcomes (Janus & Duku, 2007). The EDI has been established as a psychometrically sound indicator of child well-being. Studies have demonstrated adequate parent-teacher and inter-rater reliability, concurrent validity, and convergent validity (Janus & Offord, 2007).

**Kindergarten parent survey.** Information on parental leave, leave length, the main type of child care during the first 12 months of life, and time spent in the main type of child care setting was obtained from the 2012 Kindergarten Parent Survey (KPS). The KPS was developed by the Offord Centre for Child Studies to act as a companion document to the EDI and provide additional information on family characteristics and the early life experiences of kindergarten children (Gaskin, Duku, & Janus, 2008). Because the KPS collects data on a wide range of topics, subjecting it to the same type of rigorous psychometric evaluation as the EDI is not warranted. However, a study conducted in 2005 demonstrated consistent responses over time indicating good test-retest reliability (Gaskin et al., 2008). *Parental leave* was characterized as: "Yes, mother", "Yes, father", "Yes, both parents shared", and "None". *Length of leave* was categorized as: "Under 6 months", "6 months to 1 year", "Over 1 year", and "Not applicable". Response options for children's *main type of child care* were: "None – parent care only", "Licensed care in a centre", "Licensed care in someone's home", "Paid, unlicensed care", and "Unpaid care (e.g., relative or friend)". Response options for *time spent in main type of child care setting* included: "None – parent care only", "Less than 20 hours per week", "21 to 30 hours per week", and "More than 30 hours per week".

## **Covariates**

Based on previous research linking children's EDI scores to socioeconomic factors (Janus & Duku, 2007), all models controlled for two major predictors of children's readiness to learn in school: income and parental education.

## **Procedures**

Ethical approval for the EDI and KPS was received from the Review Ethics Board of McMaster University. Participant recruitment was conducted by the three school boards located in Brant. A letter of information signed by each school's principal was sent home with all senior kindergarten students. A passive consent process was utilized, whereby parents were asked to

contact the school or local EDI coordinator should they wish their child to be excluded. There were no requests for exclusion during the 2012 implementation resulting in a 100% participation rate. Between January 27, 2012 and March 27, 2012, 90 teachers completed a total of 1,372 EDI questionnaires. Two months later, in May 2012, a KPS package was sent home with all senior kindergarten students. This package contained a letter of information, the KPS questionnaire, a blank return envelope, and a free children's book as a "thank you" gift. One week later, a reminder letter was sent home. Parents were asked to complete the questionnaire, place it in the blank envelope, and return the sealed envelope with their child to his or her classroom teacher.

### ***Statistical analyses***

All analyses were conducted using IBM SPSS version 21. All analyses were conducted first for all children and then by gender. The relationship between type and duration of parental leave, main type of child care arrangement, and time spent in main type of child care during the first 12 months and children's development was examined using Analysis of Covariance (ANCOVA) procedures. The dependent variables were the five EDI domain scores (*physical health and well-being, social competence, emotional maturity, language and cognitive development, and communication skills and general knowledge*) and the total number of domains on which child scored low. The fixed factors (independent variables) were: (a) type of parental leave; (b) leave length; (c) main type of child care during the first 12 months of life; and (d) time spent in the main type of child care. All analyses controlled for parental income and education. Post-hoc tests (Bonferroni corrected for multiple comparisons) were used to test for differences between the different levels of the independent variable.

## **Results**

### ***Participants***

Of the 1,372 EDI questionnaires completed by teachers, 1,259 (91.8%) students met the EDI eligibility criteria (for more information, see Gaston, 2012). Of these 1,259 eligible students, 883 returned their KPS questionnaire ( $M_{\text{age}} = 5.63$ ;  $SD = 0.27$ ; 48.8% girls), resulting in a response rate of 70.1%. Due to some missing data on parental leave and child care variables, the final analyses included between 728 and 749, depending on the variable examined.

### ***Preliminary analyses***

Pearson bivariate correlations demonstrated that the proposed covariates (parental education and income) were related to the variables of interest. Significant linear relationships emerged between parental education and the variables of interest ( $r_s = .11 - .23$ ;  $p_s = .001 - .001$ ) as well as between parental income and the variables of interest ( $r_s = .11 - .26$ ;  $p_s = .001 - .003$ ) for all children and boys and girls separately. As expected, parental education and income were also significantly correlated ( $r_s = .15 - .36$ ;  $p_s = .000 - .003$ ). However, this correlation was not sufficiently large for multicollinearity to be an issue, so both covariates were used throughout the analyses (Tabachnick & Fidell, 2013).

### ***Leave-taking and child care patterns***

Our results indicate that 77.8% of children had at least one parent who took parental leave (see Table 1 below). More mothers took parental leave compared to fathers (68.5% vs. 2.8%, respectively) and 6.5% reported that both parents had shared the leave. Approximately half (51.1%) of respondents had parental leaves that ranged from 6 to 12 months in duration (see Table 2 below).

With respect to child care, parental care was the main type of child care for the majority (87.1%) of children (see Table 3 below). Among children whose main type of care was non-parental care, 48.4% reported unpaid-unlicensed care (i.e., relative/friend) (Table 3). Among children whose main type of child care was non-parental care, the highest proportion of children spent fewer than 20 hours per week in non-parental care (42.5%), followed by over 30 hours per week (34.5%), and 21 to 30 hours per week (23.0%) (see Table 4 below).

### ***Results related to study hypotheses***

Overall, children whose mothers took parental leave had significantly higher *social competence* and *communication and general knowledge* scores compared to children without a parent who took parental leave. For *communication and general knowledge*, children whose parents both took parental leave also scored significantly higher than children without a parent who took parental leave. As hypothesized, these differences were more pronounced for boys than they were for girls. Boys whose mothers took parental leave had higher scores on five of the six variables examined whereas girls whose mothers took parental leave had higher scores on only one variable (see Table 1).

Children whose parents took a leave lasting from 6 months to 1 year scored higher in *physical health and well-being*, *social competence*, and *communication and general knowledge* scores compared to children without a parent who took leave. For *social competence*, a second significant post-hoc difference emerged so that children whose parents took 6 to 12 months leave also scored higher than children whose parents took a longer leave (over 1 year) (see Table 2). For girls, significant differences in the same direction emerged for one of the six variables and for boys on two of the six variables.

Children whose main type of care had been parent care scored higher than children whose main type of care had been paid-unlicensed care with respect to the *number of domains on which child scored low*. There was no significance for girls. Boys who had received parental care scored higher than boys who had been in unlicensed paid care on two domains: *language and cognitive development* and *number of domains on which child scored low*.

With respect to time spent in child care, children whose main type of care was parental care scored *lower on fewer domains* compared to children who spent over 30 hours per week in alternate child care.

Among girls, those who spent 21 to 30 hours per week in non-parental care had higher *language and cognitive development* scores compared to their counterparts who spent under 20 hours per week in non-parental care. For *communication and general knowledge*, girls who had received parental care only scored higher than girls who spend under 20 hours per week in non-parental care.

Among boys, significant differences emerged for three of the six variables examined. In general, boys who received either parental care or spent under 20 hours per week in non-parental care had higher scores in *social competence, emotional maturity, language and cognitive development*, and scored *low on fewer domains* compared to boys who spend over 30 hours per week in non-parental care.



Table 1

Results from the Analysis of Covariance (ANCOVA) procedures for parental leave by parent and EDI scores from the Kindergarten Parent Survey and Early Development Instrument scores for children in Brantford and Brant County, Ontario in 2011-12 (*N* = 749).

	Parental leave				ANCOVA			
	Neither	Mother	Father	Both	<i>F</i> <sup>2</sup>	<i>p</i> -value	Effect size ( $\eta^2$ )	Post-hoc <sup>3</sup>
	Mean ( <i>SD</i> )	Mean ( <i>SD</i> )	Mean ( <i>SD</i> )	Mean ( <i>SD</i> )				
<b>All, <i>n</i> (%)</b>	166 (22.2)	513 (68.4)	21 (2.8)	49 (6.5)				
<b>Physical Health and well-being</b>	<b>8.66 (1.40)</b>	<b>9.02 (1.15)</b>	<b>8.32 (1.61)</b>	<b>9.27 (0.93)</b>	<b>3.41</b>	<b>.02</b>	<b>.01</b>	<b>All <i>p</i> &gt; .05</b>
<b>Social competence</b>	<b>8.29 (1.92)</b>	<b>8.79 (1.46)</b>	<b>8.39 (1.73)</b>	<b>8.58 (1.64)</b>	<b>3.06</b>	<b>.03</b>	<b>.01</b>	<b>Mother&gt;neither*</b>
Emotional maturity	8.03 (1.73)	8.43 (1.40)	8.17 (1.51)	8.33 (1.30)	2.03	.11	.01	-
Language and cognitive development	8.73 (1.56)	9.02 (1.36)	8.64 (1.32)	9.11 (1.19)	.92	.43	.00	-
<b>Communication and general knowledge</b>	<b>7.34 (2.46)</b>	<b>8.30 (2.09)</b>	<b>7.53 (2.46)</b>	<b>8.53 (1.78)</b>	<b>6.38</b>	<b>.00</b>	<b>.03</b>	<b>Mother&gt;neither**</b> <b>Both&gt;neither*</b>
<b>Number of domains on which child scored low</b>	<b>0.62 (1.17)</b>	<b>0.33 (0.78)</b>	<b>0.67 (1.06)</b>	<b>0.25 (0.85)</b>	<b>2.81</b>	<b>0.04</b>	<b>0.01</b>	<b>All <i>p</i> &gt; .05</b>
<b>Girls, <i>n</i> (%)</b>	89 (24.1)	249 (67.3)	9 (2.4)	23 (6.2)				
Physical Health and well-being	8.87 (1.07)	9.11 (1.15)	8.63 (1.26)	9.38 (0.90)	1.27	.28	.01	-
Social competence	8.87 (1.44)	9.08 (1.30)	9.23 (0.88)	9.07 (1.02)	0.77	.51	.01	-
Emotional maturity	8.59 (1.34)	8.73 (1.33)	9.20 (0.69)	8.70 (1.04)	0.81	.49	.01	-
Language and cognitive development	9.13 (1.16)	9.28 (1.20)	8.72 (1.63)	9.46 (0.81)	0.63	.59	.01	-
<b>Communication and general knowledge</b>	<b>7.91 (2.27)</b>	<b>8.63 (1.98)</b>	<b>7.36 (2.43)</b>	<b>8.83 (1.52)</b>	<b>2.97</b>	<b>.03</b>	<b>.02</b>	<b>Mother&gt;neither*</b>
Number of domains on which child scored low	0.33 (0.75)	0.23 (0.60)	0.67 (0.87)	0.04 (0.21)	2.01	.11	.02	-

Boys, <i>n</i> (%)	75 (20.4)	258 (70.3)	10 (2.7)	24 (6.5)				
<b>Physical Health and well-being</b>	<b>8.42 (1.71)</b>	<b>8.91 (1.15)</b>	<b>7.88 (1.93)</b>	<b>9.15 (1.00)</b>	<b>.52</b>	<b>.03</b>	<b>.03</b>	<b>mother&gt;father*</b>
<b>Social competence</b>	<b>7.63 (2.20)</b>	<b>8.50 (1.57)</b>	<b>7.50 (2.02)</b>	<b>8.06 (1.98)</b>		<b>.008</b>	<b>.03</b>	<b>Mother&gt;neither*</b>
<b>Emotional maturity</b>	<b>7.43 (1.91)</b>	<b>8.13 (1.42)</b>	<b>7.02 (1.33)</b>	<b>7.93 (1.47)</b>	<b>3.73</b>	<b>.01</b>	<b>.03</b>	<b>mother&gt;neither*</b>
Language and cognitive development	8.27 (1.85)	8.75 (1.47)	8.58 (1.20)	8.72 (1.41)		.51	.01	-
<b>Communication and general knowledge</b>	<b>6.65 (2.52)</b>	<b>7.98 (2.15)</b>	<b>7.63 (2.66)</b>	<b>8.33 (1.96)</b>	<b>4.54</b>	<b>.004</b>	<b>.04</b>	<b>Mother&gt;neither*</b>
<b>Number of domains on which child scored low</b>	<b>0.97 (1.46)</b>	<b>0.42 (0.92)</b>	<b>0.80 (1.32)</b>	<b>0.46 (1.18)</b>	<b>2.60</b>	<b>.05</b>	<b>.02</b>	<b>mother&gt;neither*</b>

*Note.* <sup>1</sup>Number of girls and boys may not always add up to the total sample size due to a small number (1.3%) of missing values for gender. <sup>2</sup>All =  $F(5, 743)$ ; Girls =  $F(5, 364)$ ; Boys =  $F(5, 361)$ . <sup>3</sup>Post-hoc tests Bonferroni adjusted for multiple comparisons. **Boldface indicates significant differences.** All analyses controlled for parental income and education. \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$ ; †  $p < .10$ .

Table 2

Results from the Analysis of Covariance (ANCOVA) procedures for length of parental leave and Early Development Instrument scores using data from the 2011-12 Kindergarten Parent Survey and Early Development Instrument scores for children in Brantford and Brant County, Ontario ( $N = 742$ ).

	Length of parental leave				ANCOVA			
	None - no leave taken	< 6 months	6-12 months	Over 1 year	$F^2$	$p$ -value	Effect size ( $\eta^2$ )	Post-hoc <sup>3</sup>
	Mean ( $SD$ )	Mean ( $SD$ )	Mean ( $SD$ )	Mean ( $SD$ )				
<b>All, <math>n</math> (%)<sup>1</sup></b>	166 (22.4)	47 (6.3)	379 (51.1)	150 (20.2)				
<b>Physical health and well-being</b>	<b>8.73 (1.38)</b>	<b>8.67 (1.51)</b>	<b>9.18 (1.03)</b>	<b>8.80 (1.25)</b>	<b>5.32</b>	<b>.001</b>	<b>.02</b>	<b>6-12 months &gt; none*</b> <b>6-12 months &gt; Over 1 year**</b>
<b>Social competence</b>	<b>8.38 (1.80)</b>	<b>8.64 (1.38)</b>	<b>8.87 (1.46)</b>	<b>8.59 (1.60)</b>	<b>2.87</b>	<b>.03</b>	<b>.01</b>	<b>6-12 months &gt; none*</b>
Emotional maturity	8.12 (1.63)	8.33 (1.32) 7.94, 8.71	8.46 (1.35) 8.32, 8.59	8.34 (1.51) 8.10, 8.59	1.37	.25	.00	-
Language and cognitive development	8.80 (1.45)	8.80 (1.44) 8.37, 9.22	9.09 (1.29) 8.96, 9.22	8.93 (1.40) 8.70, 9.16	1.03	.38	.00	-
<b>Communication and general knowledge</b>	<b>7.43 (2.43)</b>	<b>8.20 (2.12)</b> <b>7.58, 8.83</b>	<b>8.40 (2.03)</b> <b>8.19, 8.60</b>	<b>8.13 (2.23)</b> <b>7.77, 8.49</b>	<b>5.56</b>	<b>.001</b>	<b>.02</b>	<b>6-12 months &gt; none***</b>
<b>Number of domains on which child scored low<sup>†</sup></b>	<b>0.55 (1.05)</b>	<b>0.45 (0.90)</b> <b>0.18, 0.71</b>	<b>0.27 (0.74)</b> <b>0.20, 0.35</b>	<b>0.44 (0.90)</b> <b>0.30, 0.59</b>	<b>2.39</b>	<b>.06</b>	<b>.01</b>	-
<b>Girls, <math>n</math> (%)</b>	86 (23.8)	27 (7.5)	179 (49.4)	70 (19.3)				
<b>Physical health and well-being<sup>†</sup></b>	<b>8.93 (1.03)</b>	<b>8.87 (1.25)</b>	<b>9.24 (1.07)</b>	<b>8.88 (1.29)</b>	<b>2.22</b>	<b>.09</b>	<b>.01</b>	
Social competence	8.87 (1.42)	8.97 (1.12)	9.20 (1.20)	8.91 (1.42)	1.34	.26	.01	
Emotional maturity	8.59 (1.31)	8.71 (1.07)	8.78 (1.22)	8.72 (1.46)	0.37	.77	.00	
<b>Language and</b>	<b>9.21 (1.02)</b>	<b>8.82 (1.52)</b>	<b>9.42 (0.96)</b>	<b>9.06 (1.52)</b>	<b>2.54</b>	<b>.05</b>	<b>.02</b>	<b>All <math>p &gt; .05</math></b>

<b>cognitive development</b>								
<b>Communication and general knowledge</b>	<b>7.89 (2.32)</b>	<b>8.17 (2.67)</b>	<b>8.82 (1.83)</b>	<b>8.33 (2.20)</b>	<b>3.72</b>	<b>.01</b>	<b>.03</b>	<b>6-12 months &gt; none**</b>
<b>Number of domains on which child scored low<sup>†</sup></b>	<b>0.30 (0.70)</b>	<b>0.44 (0.85)</b>	<b>0.16 (0.47)</b>	<b>0.33 (0.74)</b>	<b>2.17</b>	<b>.09</b>	<b>.02</b>	
<b>Boys, <i>n</i> (%)</b>	78 (21.2)	17 (4.6)	194 (52.7)	79 (21.5)				
<b>Physical health and well-being</b>	<b>8.53 (1.69)</b>	<b>7.94 (1.72)</b>	<b>9.13 (1.00)</b>	<b>8.71 (1.22)</b>	<b>5.03</b>	<b>.002</b>	<b>.04</b>	<b>6-12 months &gt; under 6 months**</b>
Social competence	7.85 (2.03)	7.88 (1.52)	8.56 (1.62)	8.31 (1.71)	1.82	.14	.02	
Emotional maturity	7.64 (1.77)	7.50 (1.34)	8.14 (1.41)	8.02 (1.49)	1.26	.29	.01	
Language and cognitive development	8.35 (1.71)	8.64 (1.43)	8.79 (1.49)	8.80 (1.29)	.55	.65	.01	
<b>Communication and general knowledge</b>	<b>6.92 (2.47)</b>	<b>7.94 (1.99)</b>	<b>8.05 (2.13)</b>	<b>7.94 (2.26)</b>	<b>2.72</b>	<b>.04</b>	<b>.02</b>	<b>6-12 months &gt; none*</b>
Number of domains on which child scored low	0.82 (1.29)	0.53 (1.07)	0.39 (0.92)	0.54 (1.02)	1.03	.38	.01	

*Notes.* <sup>1</sup>Number of girls and boys may not always add up to the total sample size due to a small number (1.3%) of missing values for gender. <sup>2</sup>All =  $F(5, 736)$ ; Girls =  $F(5, 356)$ ; Boys =  $F(5, 362)$ . <sup>3</sup>Post-hoc tests Bonferroni adjusted for multiple comparisons. **Boldface indicates significant differences.** All analyses controlled for parental income and education. \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$ ; <sup>†</sup>  $p < .10$ .

Table 3

Results from the Analysis of Covariance (ANCOVA) procedures for main type of child care during the first 12 months of life and Early Development Instrument scores using data from the 2011-12 Kindergarten Parent Survey and Early Development Instrument scores for children in Brantford and Brant County, Ontario ( $N = 734$ ).

	Type of main childcare				ANCOVA			
	Parent care	Paid - licensed (centre or home)	Paid - unlicensed	Unpaid - unlicensed	F <sup>2</sup>	p-value	Effect size ( $\eta^2$ )	Post-hoc <sup>3</sup>
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)				
<b>All, n (%)<sup>1</sup></b>	639 (87.1)	25 (3.4)	24 (3.3)	46 (6.3)				
Physical health and well-being	8.97 (1.19)	8.75 (1.67)	8.94 (1.36)	8.77 (1.42)	.30	.83	.00	
Social competence	8.70 (1.55)	8.42 (1.70)	8.19 (1.98)	8.55 (1.95)	1.02	.39	.00	
Emotional maturity	8.36 (1.44)	8.21 (1.40)	8.03 (2.00)	8.07 (1.95)	.63	.60	.00	
<b>Language and cognitive development</b>	<b>8.99 (1.32)</b>	<b>8.40 (1.80)</b>	<b>8.32 (2.16)</b>	<b>9.01 (1.72)</b>	<b>3.50</b>	<b>.02</b>	<b>.01</b>	<b>All p &gt; .05</b>
Communication and general knowledge	8.11 (2.15)	8.58 (2.26)	7.55 (2.65)	8.10 (2.20)	.94	.42	.00	
<b>Number of domains on which child scored low</b>	<b>0.40 (0.81)</b>	<b>0.56 (0.87)</b>	<b>0.83 (1.63)</b>	<b>0.63 (1.40)</b>	<b>3.01</b>	<b>.03</b>	<b>.01</b>	<b>Parent care &lt; unlicensed paid*</b>
<b>Girls, n (%)</b>	320 (88.2)	12 (3.3)	10 (2.7)	23 (6.3)				
Physical health and well-being	9.07 (1.10)	8.49 (2.01)	9.23 (0.99)	9.18 (1.13)	1.32	.27	.01	-
Social competence	9.04 (1.28)	9.18 (1.37)	8.98 (0.91)	9.30 (1.22)	0.31	.82	.00	-
Emotional maturity	8.69 (1.28)	9.26 (0.63)	8.90 (1.33)	8.51 (1.86)	0.95	.41	.01	
<b>Language and cognitive development<sup>†</sup></b>	<b>9.22 (1.22)</b>	<b>8.78 (1.59)</b>	<b>9.35 (0.87)</b>	<b>9.73 (0.34)</b>	<b>2.33</b>	<b>.07</b>	<b>.02</b>	-
Communication and general knowledge	8.38 (2.09)	9.11 (2.17)	7.68 (2.35)	8.86 (1.90)	1.25	.29	.01	-

Number of domains on which child scored low <sup>†</sup>	0.26 (0.64)	0.50 (0.90)	0.20 (0.63)	0.17 (0.49)	0.84	.47	.01	
<b>Boys, n (%)</b>	310 (86.8)	13 (3.7)	14 (3.9)	20 (5.6)				
Physical health and well-being	8.85 (1.28)	8.99 (1.32)	8.74 (1.58)	8.15 (1.59)	0.91	.44	.01	-
Social competence	8.34 (1.72)	7.71 (1.70)	7.62 (2.35)	7.60 (2.35)	1.81	.15	.02	
Emotional maturity	8.01 (1.51)	7.24 (1.19)	7.42 (2.21)	7.42 (2.01)	1.99	.11	.02	
<b>Language and cognitive development</b>	<b>8.76 (1.40)</b>	<b>8.05 (1.97)</b>	<b>7.58 (2.51)</b>	<b>8.11 (2.32)</b>	<b>4.07</b>	<b>.007</b>	<b>.03</b>	<b>Parent &gt; paid - unlicensed**</b>
Communication and general knowledge	7.83 (2.18)	8.08 (2.30)	7.46 (2.92)	6.78 (2.86)	0.96	.41	.01	
<b>Number of domains on which child scored low</b>	<b>0.47 (0.96)</b>	<b>0.62 (0.87)</b>	<b>1.29 (1.98)</b>	<b>1.25 (1.92)</b>	<b>5.00</b>	<b>.002</b>	<b>.04</b>	<b>Parent &lt; paid – unlicensed**</b>

Notes. <sup>1</sup>Number of girls and boys may not always add up to the total sample size due to a small number (1.3%) of missing values for gender. <sup>2</sup>All =  $F(5, 730)$ ; Girls =  $F(5, 359)$ ; Boys =  $F(5, 351)$ . <sup>3</sup>Post-hoc tests Bonferroni adjusted for multiple comparisons. **Boldface indicates significant differences.** All analyses controlled for parental income and education. \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$ ; <sup>†</sup> $p < .10$ .

Table 4

Results from the Analysis of Covariance (ANCOVA) procedures for time spent in main type of child care during the first 12 months of life and Early Development Instrument scores using data from the 2011-12 Kindergarten Parent Survey and Early Development Instrument scores for children in Brantford and Brant County, Ontario ( $N = 728$ ).

	Parental care only	Time spent in non-parental care			ANCOVA			
		Under 20 hours/week	21-30 hours/week	Over 30 hours/week	$F^2$	$p$ -value	Effect size ( $\eta^2$ )	Post-hoc <sup>3</sup>
	Mean ( $SD$ )	Mean ( $SD$ )	Mean ( $SD$ )	Mean ( $SD$ )				
<b>All, <math>n</math> (%)<sup>1</sup></b>	615 (84.5)	48 (6.6)	26 (3.6)	39 (5.4)				
Physical health and well-being	8.96 (1.19)	8.85 (1.29)	8.61 (1.73)	8.86 (1.46)	.88	.45	.00	-
Social competence	8.68 (1.59)	8.84 (1.29)	8.58 (1.69)	8.20 (1.93)	1.54	.20	.01	-
Emotional maturity	8.35 (1.47)	8.34 (1.27)	8.33 (1.62)	8.02 (1.49)	.66	.56	.00	-
<b>Language and cognitive development</b>	<b>9.00 (1.31)</b>	<b>8.65 (1.55)</b>	<b>8.71 (2.16)</b>	<b>8.52 (2.13)</b>	<b>2.54</b>	<b>.05</b>	<b>.01</b>	<b>All <math>p &gt; .05</math></b>
Communication and general knowledge	8.10 (2.18)	7.90 (2.39)	8.39 (2.43)	8.00 (2.52)	.33	.81	.00	-
<b>Number of domains on which child scored low<sup>†</sup></b>	<b>0.31 (0.77)</b>	<b>0.33 (0.69)</b>	<b>0.58 (0.97)</b>	<b>0.69 (1.45)</b>	<b>4.01</b>	<b>.01</b>	<b>.02</b>	<b>None &lt; over 30 hours/week<sup>**</sup></b>
<b>Girls, <math>n</math> (%)</b>	311 (88.6)	19 (5.4)	11 (31.3)	20 (5.7)				
Physical health and well-being <sup>†</sup>	9.10 (1.06)	8.50 (1.51)	8.92 (1.77)	9.04 (1.35)	1.88	.13	.02	-
Social competence	9.06 (1.29)	8.84 (1.34)	9.20 (1.44)	9.06 (1.11)	0.23	.88	.00	-
Emotional maturity	8.66 (1.34)	8.67 (1.02)	8.94 (1.66)	9.08 (0.86)	0.70	.55	.01	-
<b>Language and cognitive development</b>	<b>9.27 (1.15)</b>	<b>8.62 (1.66)</b>	<b>9.90 (0.18)</b>	<b>8.98 (1.55)</b>	<b>3.32</b>	<b>.02</b>	<b>.03</b>	<b>21-30 hours/week &gt; under 20 hours/week<sup>*</sup></b>
<b>Communication and general knowledge</b>	<b>8.48 (2.02)</b>	<b>7.14 (2.70)</b>	<b>9.03 (2.02)</b>	<b>8.56 (2.26)</b>	<b>2.96</b>	<b>.03</b>	<b>.02</b>	<b>Parent care &gt; under 20 hours/week<sup>*</sup></b>

Number of domains on which child scored low <sup>†</sup>	0.24 (0.60)	0.42 (0.96)	0.46 (0.82)	0.25 (0.72)	0.95	.42	.01	-
<b>Boys, n (%)</b>	298 (83.0)	28 (7.8)	14 (3.9)	19 (5.3)				
Physical health and well-being	8.81 (1.30)	9.04 (1.11)	8.27 (1.73)	8.66 (1.57)	1.71	.16	.01	-
<b>Social competence</b>	<b>8.29 (1.78)</b>	<b>8.80 (1.29)</b>	<b>8.01 (1.76)</b>	<b>7.31 (2.22)</b>	<b>3.33</b>	<b>.02</b>	<b>.03</b>	<b>Under 20 hours/week &gt; 21-30 hours/week**</b>
<b>Emotional maturity</b>	<b>8.01 (1.52)</b>	<b>8.06 (1.36)</b>	<b>7.82 (1.52)</b>	<b>6.91 (2.03)</b>	<b>3.43</b>	<b>.02</b>	<b>.03</b>	<b>Parent care &gt; over 30 hours/week** Under 20 hours/week &gt; over 30 hours/week*</b>
<b>Language and cognitive development</b>	<b>8.71 (1.42)</b>	<b>8.63 (1.51)</b>	<b>7.74 (2.59)</b>	<b>8.03 (2.56)</b>	<b>2.85</b>	<b>.04</b>	<b>.02</b>	<b>All <math>p &gt; .05</math></b>
Communication and general knowledge	7.71 (2.27)	8.35 (2.06)	7.77 (2.69)	7.40 (2.69)	1.29	.27	.01	-
<b>Number of domains on which child scored low</b>	<b>0.51 (1.05)</b>	<b>0.36 (0.67)</b>	<b>0.78 (1.12)</b>	<b>1.16 (1.86)</b>	<b>3.77</b>	<b>.01</b>	<b>.03</b>	<b>Parent care &gt; over 30 hours/week* Under 20 hours/week &gt; over 30 hours/week**</b>

Notes. <sup>1</sup>Number of girls and boys may not always add up to the total sample size due to a small number (1.3%) of missing values for gender. <sup>2</sup>All =  $F(5, 724)$ ; Girls =  $F(5, 355)$ ; Boys =  $F(5, 353)$ . <sup>3</sup>Post-hoc tests Bonferroni adjusted for multiple comparisons. **Boldface indicates significant differences.** All analyses controlled for parental income and education. \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$ ; <sup>†</sup> $p < .10$ .



## Discussion

This study examined the relation between parental employment and child care arrangements in the first year of life and children's development five years later among a cohort of children from Brant County, Ontario, Canada. For the majority of variables examined, no significant group differences emerged. However, for those variables where significant differences did emerge, they were consistent with our hypotheses and indicated that children whose mothers took parental leave lasting 6 to 12 months and who were cared for primarily by their parents had better developmental outcomes in senior kindergarten compared to the children of mothers who did not take parental leave or who received non-parental care. Greater differences emerged for boys compared to girls, confirming previous findings that the association between child care and development may be gender-specific. Beyond these generalized conclusions, several issues merit discussion.

With respect to leave-taking patterns, 78% of participants indicated that at least one parent had taken parental leave and 87% of respondents indicated that parental care was the main type of child care during their child's first year of life (Table 3). This latter proportion is in line with results from the 2010 Survey of Young Canadians, which found that 90% of children had a mother who took some type of leave after birth (Findlay & Kohen, 2012). With respect to fathers, our results indicate that fewer fathers took leave compared to national statistics. Specifically, approximately 10% of children in our sample had fathers who took at least some type of leave compared to 26% of fathers who participated in the 2010 Survey of Young Canadians (Findlay & Kohen, 2012). These differences likely reflect regional differences in employment patterns, since occupation strongly predicts the leave-taking practices of mothers and fathers (Findlay & Kohen, 2012). For example, compared to Ontario as a whole, Brant has a higher proportion of babies born to teenage mothers (8.1% vs. 3.6% between 2006 and 2009 in Brant and Ontario, respectively) and a higher Aboriginal population (3.5% vs. 2.0% in Brant and Ontario, respectively) (Brant County Health Unit, 2010).

With respect to parental leave, group differences emerged for two of the six variables overall, one variable among girls, and five of the six variables for boys. All significant findings confirmed previous research that children whose parents took parental leave demonstrated better developmental outcomes compared to children whose parents did not take parental leave (Baydar & Brooks-Gunn, 1991; Berger et al., 2005; Brooks-Gunn, Han, & Waldfogel, 2002; Han et al., 2001). In addition, leaves of 6 to 12 months were associated with the best developmental outcomes among children on four of the six variables examined. This relationship emerged even though a significant proportion of parents who did not report taking leave still acted as the primary caregivers to their children. There are a number of reasons why this may be the case. First, although we controlled for parental education and income, it is possible that other characteristics of parents who did not take parental leave, or who took leaves shorter than 6 months, were related to more impoverished rearing environments. Optimal infant brain development is fostered by interactions with attuned, non-stressed adult caregivers (Maté, 2009). Young parents, for example, are less likely to have the emotional maturity necessary for providing the rich type of attuned attention that fosters infant brain development.

Although young parents represent a significant proportion of Brant parents, we were not able to control for parental age as this was not assessed as part of the Kindergarten Parents Survey. Second, in order to qualify for paid parental leave benefits, parents must have 600 hours of insurable employment. Evidence exists that, income aside, stable employment (i.e., job security) is associated with lower stress and more positive mental health characteristics (Sverke, Hellgren, & Näswall, 2002). Perhaps parents who reported taking 6 to 12 months parental leave were in more stable employment situations, less stressed, and more capable of being emotionally present and providing attuned care to their infants.

While we were not able to examine child care quality, we did examine main child care type, a variable which may be related to quality. Although few significant differences emerged for child care type, our results were in line with previous findings that parent care is associated with improved development compared to centre-based care and that this relationship is stronger for boys compared to girls (Baydar & Brooks-Gunn, 1991; Berger et al., 2005; Han et al., 2001; van IJzendoorn et al., 2004). However, these results as well as those of previous studies cannot be used to draw conclusions regarding the influences of particular child care arrangements. It is likely, for example, that parents who were unable to act as the primary caregivers to their children due to economic or social reasons were also more likely to use unlicensed centre-based care.

Among boys, spending some, but fewer than 20 hours per week, in non-parental care was associated with the highest scores on three out of the six variables examined and among girls, spending 21 to 30 hours per week in non-parental care was associated with the highest scores on two variables. In contrast, spending over 30 hours per week in non-parental care was associated with poorer developmental outcomes among both boys and girls. These results are in line with Belsky et al.'s (2007) findings that children who spent a greater number of hours per week non-maternal care had poorer social, cognitive, and emotional development at 4.5 years of age and Brooks-Gunn and colleague's (2002) finding that children whose mothers worked more than 30 hours per week in the first year of life had poorer cognitive performance at 3 years of age. Since time spent in non-parental care can be related to numerous third factors which may also be related to the quality of the home environment, these results cannot be used to draw conclusions about the direct effects of child care on children's development.

### **Strengths and Limitations**

This study has numerous strengths. First, to the best of our knowledge this is the first study to examine the relation between parental leave and child care arrangements in the first year of life and child development outcomes five years later using a large cohort of children in a community setting. Second, our study used a comprehensive, psychometrically sound measure of child development which assessed physical, emotional, social, and cognitive development as well as future academic vulnerability. We are not aware of any previous research which included such a broad and thorough assessment of child development in multiple domains.

Despite these strengths, this study is not without limitations. First, the data on parental leave collected as part of the KPS was retrospective and thus subject to recall bias. Second, KPS response options prevented us from knowing the employment status of parents at the time of

birth and from examining length of leave in greater detail (e.g., children whose parents took 6 to 9 months versus 9 to 12 months of leave). Third, although the KPS response rate was fairly high (approximately 70%), this still excludes approximately one-third of parents. Fourth, only “main type of child care” was assessed. As a result, we are not able to examine children’s experiences in greater detail. For example, some children may have spent time in non-parental care even though their main type of care was parental care. Fifth and finally, the correlational nature of this study and our inability to account for more “third variables” precludes us from drawing any cause-effect conclusions regarding the effects of parental leave and child care on children’s development. As such, an effort was made to avoid causal language and any use of the term “effects” referred only to the statistical effects of parental leave and child care predictor variables.

### **Conclusions**

This study examined the association between parental care during the first year of life and child development among children attending senior kindergarten in Brant in 2011-2012. The majority of parents reported taking parental leave (78%) and acting as the primary caregivers for their children (87%). As hypothesized, children whose parents took parental leave or who were looked after by their parents scored better on some, but not all, of the variables examined. Further research is needed, however, before conclusions can be drawn regarding the effects of child care on children’s development.

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