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**A Study of Family, Child Care and Well-Being in
Young Canadian Families**

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by

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Abstract

Child care arrangements may have significant impact upon young children's developmental outcomes. This study examined three research topics: the type of child care arrangements that are being used by children in Canadian families; the family characteristics that may predict child care use and arrangements, and; the effects that child care may have upon the development of the child as measured by cognitive and behavioural indicators. Overall, the study examined the effects of child care arrangements on child development. Although previous research indicates that the quality of child care is a key factor influencing child outcomes, the data could not be used to determine the quality of these arrangements in this study.

Data from the National Longitudinal Survey of Children and Youth (NLSCY) collected in cycle one, cycle two and cycle three were used in this study. Children under four in cycle 1 were selected to study. PPVT-R (Peabody Picture Vocabulary-Revised) test score for children four and above and MSD (Motor and Social Development) score for children under four were used as the measure of cognitive development; measures of social and emotional development were based on responses to questions asked of the PMK (Person most knowledgeable about the child) assessing emotional and behavioural development of the child including prosocial behaviour, hyperactivity, emotional disorder and physical aggression. General linear model, survival and hazard analysis were employed to examine the research questions.

The results of this study show that Canadian families mainly use centre-based child care and non-relative (sitter) child care for their children other than home care by mother. Mother's working status, and family structures are the two important predictors of use of child care. Children of mothers who work are more likely to be in child care than children of mothers who do not work. Similarly, children of single mothers who work are more likely to be in centre-based child care than children of two biological parents. Furthermore, most children entered child care around two years of age and once in child care tended to remain in child care. In general, the effects on child development seem minimal with effect sizes that ranged from negligible to moderately small. However, children in the lowest income group who attended sustained child care did have higher PPVT scores than those who did not, suggesting that children who are economically disadvantaged may benefit from child care.

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Foreword

The National Longitudinal Survey of Children and Youth (NLSCY) is a unique Canadian survey designed to follow a representative sample of children from birth to early adulthood. It is conducted in partnership by Human Resources Development Canada (HRDC) and Statistics Canada. Statistics Canada is responsible for data collection, while HRDC, the major funder, directs and disseminates research. Data collection began in 1994 and continues at two-year intervals.

The survey for the first time provides a single source of data for the examination of child development in context, including the diverse life paths of normal development. The survey and the research program were developed to support evidence-based policy, using a human development view of the early decades of life. This research paper is part of an ongoing series of papers emanating from a program of research that examines NLSCY data collected in the first three cycles (1994-95, 1996-97, 1998-99) of the survey.

1. Introduction

In the last 50 years there has been a rapid expansion in our understanding of the importance of the quality of early experience for future development. Developmental researchers emphasize that the interactions between children and adults and other children are among the most important external determinants of their social, emotional, and cognitive development (Blau, 1999).

Coinciding with our increase in knowledge of early development there has been a dramatic change in the approach to child rearing over the past three decades. Women's growing involvement in the workforce has been accompanied by a steady increase in the use of non-maternal child care, even during the infant's first year of life. Researchers report increasing numbers of infants, preschool- and school-aged children receiving non-parental care. It is thought that a large number of preschool-aged children in Canada have mothers who work which has resulted in unprecedented numbers of families in need of child care for their young children. While the number of day care centre places has increased dramatically, it is estimated that only 20% of children whose mothers work can be accommodated. Whether because of choice or necessity, the majority of children in non-parental care in Canada continue to be cared for in unregulated homes.

The body of Canadian research on child care has grown rapidly over the past 10 to 15 years. There have been a number of large scale national studies into the child care needs and preferences of parents (Lero, Pence, Goelman, and Brockman, 1985), the historical development, socio-geographic context, availability, and regulation of day care (Pence, 1992), the demographic characteristics and wages and working conditions of those who work in day care (Canadian Day Care Advocacy Association/Canadian Child Day Care Federation, {CDCAA/CCDCF} 1992, 2000), and family day care (Center for Families, Work and Well-Being, 2000). However, there is little known about the formal and informal child care arrangements of Canadian families who use non-parental child care. Most of the data which inform current perspectives on child care policy and its effects on child development have come from studies of care in other places, mostly from the USA (e.g., Burchinal, Roberts, Riggins, Zeisel, Neebe, and Bryant, 2000; Blau, 1999; The NICHD Early Child Care/Research Network, 1998a; Burchinal, Roberts, Nabors, and Bryant, 1996) and from Europe (e.g., Belsky, 2001; Wessels, Lamb, and Hwang, 1996).

Literature on the relationship between day care attendance and social behaviour has examined a broad range of social behaviours such as cooperation and aggression (Schwarz, Strickland and Krolick, 1974), attentiveness and social responsiveness (Schwartz et al., 1981), compliance and assertiveness (Rubenstein, Howes and Boyle, 1981), negative interactions (Raph, Thomas, Chess and Korn, 1968), perspective-taking and level of confidence in social interactions (Clarke-Stewart, 1984). The results of these studies are as varied as the aspects of social behaviour studied. It has been reported that children who begin child care in the first year of life are more aggressive and less cooperative as they grow older (Haskins, 1985; Schwartz, Strickland and Krolick, 1974). Belsky (1986, 1988, 1990, 2001) argues that early and extensive non-maternal care carries risk in terms of increasing the probability of insecure infant parent attachment relationships and promoting aggression and non-compliance during the toddler, preschool, and early primary school years. Bates, Marvinnen, Kelly, Dodge, Bennett, and Pettit, (1994) reported, after controlling for SES, family stress, family structure, and marital quality, that children who spent more time in child care during their first five years scored lower on a composite measure of positive adjustment (i.e., peer popularity, teacher-rated peer competence) and higher on a composite measure of maladjustment (i.e., teacher-rated behaviour problems, peer-related aggression, peer dislike, observed aggression) than children with less child-care experience.

Belsky and Eggebeen (1991) examined the large National Longitudinal Survey of Youth (NLSY). Their findings indicate that children enrolled in early non-maternal care were rated by their mothers as less compliant, more insecure, and as having more behavioural problems compared with mothers' ratings of children not enrolled in early non-maternal care.

In contrast, other studies indicate that early day care does not lead to developmental difficulties and that children with early day-care experiences are more independent and confident and less anxious than children who experience day care at an older age (Andersson, 1989, 1992; Clarke-Stewart, 1988, 1989). Other researchers also failed to discern relations between early child-care experiences and non-compliance, aggression, or problem behaviour (e.g., Howes, 1988; Macrae and Herbert-Jackson, 1976; McCartney and Rosenthal, 1991; Prodromidis, Lamb, Sternberg, Hwang and Broberg, 1995).

The National Institute of Child Health Development Study of Early Child Care (NICHD) Research Network (1998b) was designed to examine multiple features of care (i.e., quality, quantity, age of entry, stability, type). It was hypothesized that problems would be fewer and cooperation greater when child care was of a higher quality and fewer child-care arrangements were experienced (i.e., greater stability). This research focused upon, among other characteristics, the effects of cumulative child-care experience across the first 2 and 3 years of life. Their findings indicate little evidence that early, extensive, and continuous care was related to problematic child behaviour. In addition, their research also showed that higher quality of care is associated with enhanced language and cognitive development during the first 3 years of life (NICHD Early Child Care Research, 2000a).

Studies have shown consistently that when quality of care is high, any adverse effects associated with early, extensive, and/or continuous care are mitigated, if not eliminated entirely (Howes and Olenick, 1986; Howes, Phillips, and Whitebook, 1992). Kohen, Hunter, Pence and Goelman (2000) reported that early daycare experiences were associated with verbal abilities in early childhood and competencies in early and late adolescence. Schuetze, Lewis and DiMartino (1999) found that high quality daycare can enhance cognitive development in infants. Moreover, Reynolds and Temple (1998) suggested that participation in day care for extended periods of time should benefit children because a long period of time is needed to affect meaningful changes in cognitive, social and emotional outcomes especially for disadvantaged children; a stable and predictable learning environment is conducive to learning and that day care provides a transition to kindergarten at a critical and sensitive point in the child's life.

Since the 1980s more attention has been given to examining the relationship between the quality of the child care and children's social and intellectual development. Quantifiable variables of quality (e.g., group size, staff-child ratio, caretaker training) have been shown to be modestly to moderately related to language development across a large number of studies involving toddlers and preschoolers. Many studies report that children who experience high-quality child care demonstrate more positive social outcomes than children who experience low-quality child care (Goelman and Pence, 1987; McCartney, 1984; Peterson and Peterson, 1986; Phillips, McCartney and Scarr, 1987; Schlucker, White, and Jacobs, 1991). In contrast, others report that children's social behaviours are not related to ratings of quality of the day care environment (Bryant, Lau,

Burchinal, & Sparling (1994). In a number of studies the effects of quality of care on child development are less clear or moderated when family background variables are taken into account. Scarr in her review of child care, concluded that widely varying qualities of care have little or no meaningful effects on children's development (Scarr, 1998).

Since a relation between poverty, suboptimal cognitive development, and academic failure has long been established (e.g., Birch, Richardson, Baird, Horobin, & Illsley, 1970; Jencks, 1972; Patterson, Kupersmidt, & Vaden, 1990; Ramey & Finkelstein, 1981; White, 1982) there have been more studies of early educational programmes for children at risk of developmental, social and/or academic problems due to their social and economic circumstances than child/day care. Campbell and Ramey (1994, 1995) and Campbell, Pungello, Sparling, & Miller-Johnson (2002) found that participation in an extended preschool intervention program led to high cognitive development and achievement scores up to age 21. Positive reports of early-childhood intervention programs have been prevalent and persistent (Laser, Darlington, Murray, Royce, & Snipper, 1987; Marcon, 2000; Xiang, Schweinhart, Hohmann, Smith, Storer, & Oden, 2000). However, the magnitude of the effects is not always clear since a statistically significant difference does not necessarily imply a substantial or practical difference and in many studies information on the magnitude of the effects is lacking (McCartney & Rosenthal, 2000).

It seems that family factors and processes are typically more predictive of child functioning, and children's developmental well-being than child-care factors (see NICHD-SECC, 1999; Deater-Deckard, Pinkerton, & Scarr, 1996). Some researchers also have suggested that child care may serve as a protective factor for children at risk, but it is also possible that it functions as a risk factor for children without family and child risk (Desai, Chase-Lansdale, & Michael, 1989). Families who rely upon early child care differ in many ways from those that do not, and such differences could account for early findings linking early care with non-compliance (e.g., Rabinovich, Zaslow, Berman, & Hyman, 1987; Rubenstein, Howes, & Boyle, 1981) and problem behaviour (Schwartz, Strickland, & Krolick, 1974). Family and child characteristics are known to be related to child outcomes and are highly related to family choices about child care (e.g., Belsky & Eggebeen, 1991; Burchinal, Ramey, Reid & Jaccard, 1995; Dunn, 1993; Goelman & Pence, 1987; Hayes, Palmer, & Zaslow, 1990; Kontos & Fiene, 1987; Phillips, McCartney, & Scarr, 1987; Phillips, Voran, Kisker, Howes, & Whitebook, 1994). Children with poor learning

opportunities at home and without sufficient emotional support benefit from early childhood programmes (McCartney, Scarr, Phillips & Grajek, 1985), and the more intensive the intervention the better the results (Ramey & Ramey, 1992).

Many studies statistically partial out measured family characteristics from associates between child care and child outcomes and look at residual associations. When family and child-care qualities are truly confounded, it is impossible to partial out all family effects because one has only a limited set of measures of the families – typically parents' education, income, and occupation, and some personality, cognitive, or attitudinal test scores (Scarr, 1998).

Although the use of non-parental day care is becoming an accepted practice, there are many unanswered questions about longitudinal relationships between alternative forms of child care and later social and academic behaviours. The majority of studies examine the effects of day care and intervention programs and relatively few focus on other forms of non-parental child care. The NLSCY provides the opportunity to investigate the association between different forms of non-parental child care and its effects on child cognitive and social development through childhood and adolescence.

Our study considered three research questions: What child care arrangements are being used by children in Canadian families; what are the families characteristics that may predict child care use and arrangements, and; what effects does child care have upon the development of the child as measured by cognitive and behavioural indicators?

2. Method

Data from the National Longitudinal Survey of Children and Youth (NLSCY) collected in cycle one, cycle two and cycle three were used in this study. The NLSCY is a study of more than 20,000 children and their parents from across Canada.

The NLSCY participants were selected from Canadian households with at least one child under the age of 12 years who had been identified using the Statistics Canada Labour Force Survey and the National Population Health Survey. One child under the age of 12 in that household was selected for inclusion in the study and additional children in the same household were randomly selected for inclusion to a maximum of four children.¹ The first data collection (cycle one) occurred in 1994-95. The second data collection in 1996-97 included those children who participated in cycle one. In addition to those children who were in cycle two, the cycle three (1998-1999) sample included additional one- and five-year-old children. There was also an attempt to include those who responded in cycle one but not cycle two. The final result was a sample of 19,215 children. These children and families will be followed on a biennial basis through adolescence and young adulthood.

Only children under four years of age in cycle one were included in this study. Furthermore, only children who lived in two biological parent or single mother families were retained because of the low rates of occurrence of other types of family structures. This resulted in a sample size of 7,600 children (49% female and 51% male). Of these, 87% lived in two biological parent families. In cycle one, 27% of the children were under one year of age, 30% were 1 year of age, 23% were two years of age and 22% were three years of age.

Each participating household in the survey was categorized according to income adequacy as defined by Statistics Canada.² The income adequacy score is a five-point scale in which participants were categorized according to household income, region in which they lived and number of people in the household. The categories are described in Table 2.1.

¹ More information describing the NLSCY and sampling made be found at <http://www.hrdc-drhc.gc.ca/sp-ps/arb-dgra/nlscy-elnej/home.shtml>, and <http://www.chass.utoronto.ca/datalib/codebooks/cstdli/nlscy.htm>

² See for further description, see the NLSCY codebook.

Most of the children lived in middle (32%) and upper middle income (32%) families. The proportion of children in upper income families was 11%, while 17% of the children lived in lower middle income families and 4% lived in families in the lowest income category.

Table 2.1 Characteristics of income adequacy groupings

Group	Description	Income	Number of people
1 _a	Lowest	< 10,000	1-4
		< 15,000	5 or more
2 _a	Lower middle	10,000 - 14,999	1-2
		10,000 - 19,999	3-4
		15,000 - 29,999	5 or more
3	Middle	15,000 - 29,999	1-2
		20,000 - 39,999	3-4
		30,000 - 59,999	5 or more
4 _b	Upper middle	30,000 - 59,999	1-2
		40,000 - 79,999	3-4
		60,000 - 79,999	5 or more
5 _b	Upper	> 60,000	1-2
		> 80,000	3 or more

Note: Categories with similar subscripts were combined for analyses because of low frequency of occurrence in some family types.

The NLSCY used a variety of methods to gather information on children's development and performance. The person most knowledgeable (PMK) about the child (most often the mother) was interviewed to obtain information concerning many aspects of children's lives including socio-economic status, health and development, behaviour, relationships, family functioning and parenting, and child care arrangements. Assessments of children were completed by the interviewer and teachers also reported on various aspects of the school-aged child's development, but this information was not used in this study.

The PMK interview includes questions about family structure (single mother/two biological parent household). The family structure variable was a categorical variable which described whether the child lived with two biological parents or in a single biological mother household. While the survey did recognize other types of family arrangements (such as lone father, step families, and adoptive families) the low rates of occurrence precluded analyses involving modelling of higher order interactions, and consequently these family types were dropped from the analysis. Similarly, as analyses progressed to consider models with higher order interactions

involving family income, the low rates of occurrence of households in categories 1 and 5 of the income adequacy variable led to the subsuming of category 1 into 2 and category 5 into 4.

A number of questions on child care were used in this study including whether the child had ever been placed in child care, whether the child was currently in child care, type of primary child care arrangements used and the number of hours per week the child spent in the primary child care arrangements. Type of primary child care arrangements included being at home with the mother, in-home care by a relative, in-home care non –relative, out of home care by non-relative, centre care, licensed family day care. For the purposes of the analyses the type of child care arrangements used were recoded into three categories: home care by mother (no arrangements), centre care and care by a non-relative. Care by a relative was excluded because of low frequencies of occurrence in higher-order interactions.

The Peabody Picture Vocabulary Test-Revised (PPVT-R) is used as the measure of cognitive development. The PPVT-R was administered to each child who was 4-5 years of age as well as any child age 6 and older who was not yet in grade two at time of data collection. Some children completed the PPVT in two different cycles, but this number was not sufficiently large to permit growth models of the effects of care to be created. PPVT-R scores range from 50 to 160 with a sample age (month) mean of 100 and a standard deviation of 15 normed for each month of age from 48 to 60+ months.

Measures of social and emotional development were based on responses to questions asked of the PMK assessing emotional and behavioural development of the child(ren) including prosocial behaviour, hyperactivity, emotional disorder and physical aggression. While different forms of the emotional assessment inventory were used for children 0-1, 2-3 and 4-11 years of age a maximum likelihood factor analysis of scale scores followed by varimax rotation indicated that scales at age two and three tended not to be similar to the corresponding scales at age four. As shown in Table 2.2, the hyperactivity, prosocial behaviour, physical aggression and emotional disorder scales for children aged two and three loaded on one factor while those scales for children aged four and up loaded on another factor. This suggested that the scales, while similar in name, are assessing different constructs or different forms of the construct that may be age dependent. Consequently, only the scales administered at age four and five were utilized. A more detailed description of each scale may be found in the NLSCY guidebook.

Table 2.2 Results of a factor analysis of hyperactivity, prosocial behaviour, emotional disorder and physical aggression scores

Scale	Factor 1	Factor 2
Hyperactivity (2-3 years)	.97	
Prosocial behaviour (2-3 years)	.93	
Emotional disorder (2-3 years)	.97	
Physical disorder (2-3 years)	.96	
Hyperactivity (4-11 years)		.55
Prosocial behaviours (4-11 years)		.94
Emotional disorder (4-11 years)		.95
Physical aggression (4-11 years)		.95

The Motor and Social Development assessment test (MSD) was administered in each cycle to children younger than 48 months of age. The inventory consisted of 15 items that measured dimensions of the child's motor, social and cognitive development. Raw motor skills scores were scaled to a mean of 100 and a standard deviation of 15, normed by each month of age from 1 to 48 months.

3. Results

Initially, separate analyses were planned for two cohorts.³ However, two analyses suggested that the cohorts could be combined rather than be treated separately. First, it appeared that few children under the age of two were in care (see section 3.1). Thus, in considering the effects of child care on development it would be advantageous to consider the effects of care beginning at age two or three to avoid a loss of statistical power due to small sample size. Second, a general linear model analysis of cognitive development (as measured by the PPVT) yielded a statistically detectable cohort effect that was not substantive ($F_{1, 4040}=4.10$, $MS_e=208.44$, $p=.04$, $ES=.06$) and no statistically detectable cohort*care interaction ($F_{2, 4040}=.02$, $MS_e=208.44$, $p=.98$) suggesting there were no meaningful differences in cognitive development between cohorts. Subsequently the two cohorts were combined for analyses unless otherwise indicated.

3.1 Use of child care

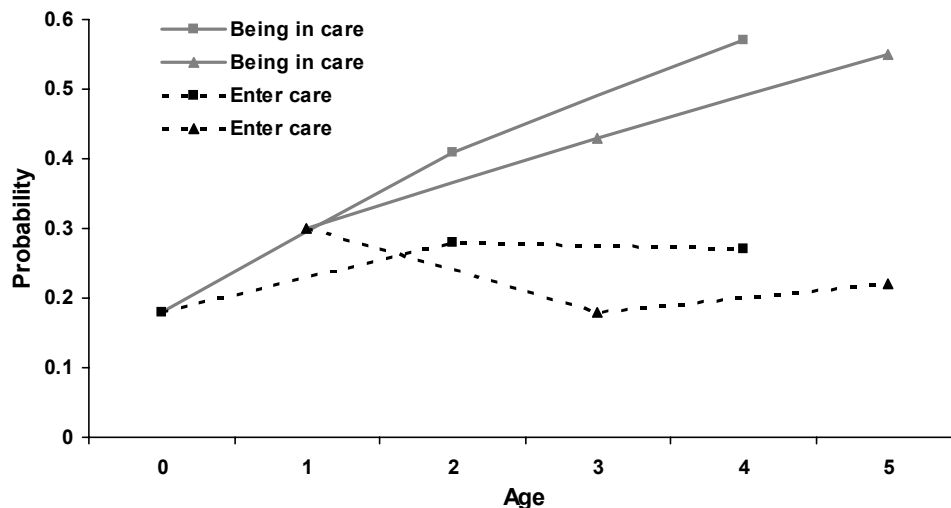
Survival and hazard analyses were undertaken to determine how many children were in care and when they entered care. While it is true that the childcare histories of the children are not exactly known and it is not possible to determine when children actually entered care it is possible to make a rough estimate of when the children entered care.⁴

The survival analysis was conducted using only children who were either under one year of age one or one year of age in cycle 1. From Figure 3.1.1 it is apparent that few children, approximately 18%, enter care under the age of one year and the likelihood of entering care increases with the child's age. Of those children who were under age one in cycle one, 40% have entered care at age two and 55% were in care by age four. Most children who were one year of age in cycle one were not likely to be in care; one in three children age one in cycle one were in care. Two years later, 40% of these children were in care and by age five 50% were in care.

³ Initially we planned analyses on data from children in two cohorts. Children in cohort 1 were four or five years of age in cycle three at which time they were administered the PPVT. Cohort 2 completed the PPVT in cycle two.

⁴ A child under one year of age in cycle one would be two years of age in cycle two and little would be known about that child's care history between cycles. In performing the survival analysis we assumed that the behaviour of these children at one year and three years of age would be similar to those children who were one year of age in cycle one and three years of age in cycle three. This would seem to be a reasonable assumption given that the sample was drawn using random selection.

Figure 3.1.1 The probability of entering and being in care by age



An estimate of when children entered care was established using hazard analysis (Figure 3.1.1). Children who were under one year of age in Cycle 1 were most likely to enter care at ages two or four (probability=.30). Children who were one year of age in cycle one were most likely to enter care at age one at which time approximately 30% of the children entered care.

Once a child entered care it was highly probable that the child would remain in care. A repeated measures analysis using children one year of age or younger in cycle 1 (Stokes, Davis & Koch, 2000) indicated that children in care remain in care and children outside of care remain outside of care. Conditional probabilities of being in child care are presented in Table 3.1.1.

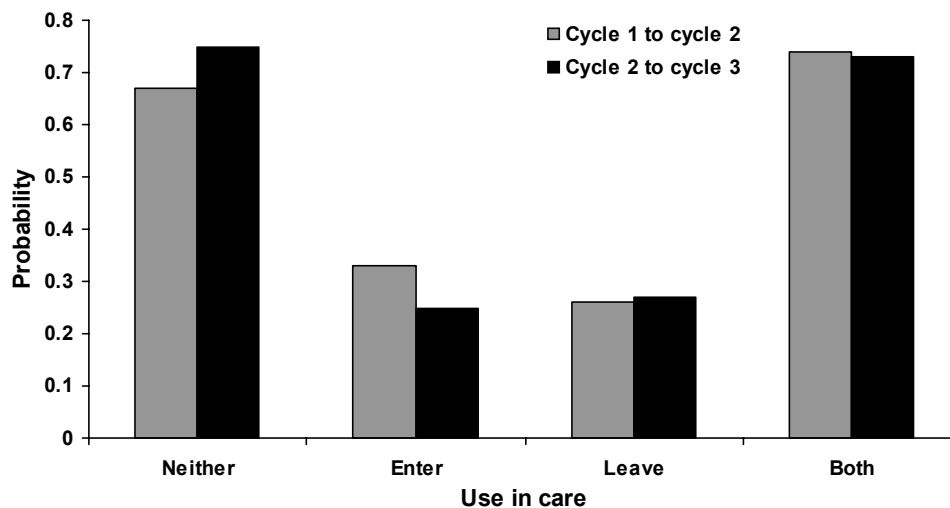
Table 3.1.1 Tendencies to remain in child care

Cycle 1							McNemar's	
Yes	No	Cycle 1 to Cycle 2	Neither	Enter	Leave	Both	Test	N
.48	.52		.67	.33	.26	.74	172.43*	3212
Cycle 2								
.46	.54	Cycle 2 to Cycle 3	.75	.25	.27	.73	4.66*	1735

Notes: Yes (No) refers to (not) being in care in the indicated cycle and represents column marginals. "Neither" means the child was not in care in the current cycle and the previous cycle. "Enter" means the child was not in care in the previous cycle but was in care in the current cycle. "Leave" means the child was in care in the previous cycle but not the current cycle. "Both" means the child was in care in both the previous and current cycle. Cell and marginal counts may be found by multiplying cell probability by N, with a margin of rounding error.

* Denotes $p < .05$.

Figure 3.1.2 **Probability of being in child care in one cycle given care use in the previous**



The proportions in Table 3.1.1 and the patterns in Figure 3.1.2 suggested that children who were in care in cycle one were likely to remain in care in cycle two, and those children outside of care were likely to remain outside of care (odds ratio=5.57, $p<.05$). There was a small trend for children not in care to enter care as suggested by the McNemar's test (odds=5.78, $p<.05$). This seems sensible since the survival analysis indicated increasing likelihood to enter care as children get older.

Repeated measures analysis indicated that children who were in care in cycle two were likely to be in care in cycle three (odds ratio=7.25, $p<.05$). McNemar's test of symmetry indicated a slight trend for children in care to be somewhat more likely to leave care than to enter care (odds=1.11). This might be explained by the fact that children who were 2-3 years of age in cycle one might tend to leave care when they enter school.

3.2 Type of care

Similar to the stability of the use of care, type of care also tended to remain the same across data collections. A repeated measures analysis (Stokes, Davis & Koch, 2000) indicated that children in center care in cycle one tended to remain in center care and children in non-relative care tended to remain in non-relative care (odds=23.39; Table 3.2.1, Figure 3.2.1). The statistically detectable McNemar's test suggested that some children in center care in cycle one tended to shift to care by non-relatives (odds=1.14, $p<.05$) but this trend is slight. Children in center care in cycle two were

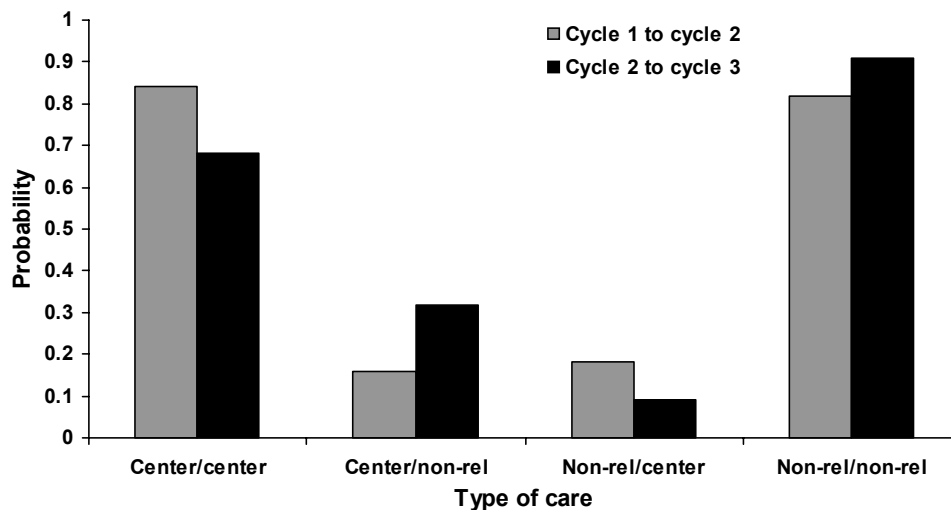
likely to remain in center care in cycle three (odds=22.09, $p < .05$). McNemar's test of symmetry indicated a trend in which children who were in center care shifted to non-relative care in cycle three. Yet this must not be emphasized too strongly because, as is shown in Figure 3.2.1, the likelihood of being in non-relative care in cycle three given non-relative care in cycle two is over .90.

Table 3.2.1 **Tendencies to remain in child care**

Cycle 1			Center		Non-rel		McNemar's	
Yes	No		Center	Non-rel	Center	Non-rel	Test	N
.20	.80	Cycle 1 to Cycle 2	.84	.16	.18	.82	41.02*	579
Cycle 2			Center		Non-rel		McNemar's	
.15	.85	Cycle 2 to Cycle 3	.68	.32	.09	.91	5.25*	973

Notes: * denotes $p < .05$. Yes (No) refers to (not) being in the indicated cycle and represents column marginals. "Center-center" means the child was in center care in the current cycle and the previous cycle. "Center/non-rel" means the child was in center care in the previous cycle but was in non-relative care in the current cycle. "Non-rel/center" means the child was in care by a non-relative in the previous cycle but in center care in the current cycle. "Non-rel/non-rel" means the child was in non-relative care in both the previous and current cycle. Family care was excluded because of low rates of occurrence. Cell and marginal counts may be found by multiplying cell probability by N, with a margin of rounding error.

Figure 3.2.1 **Probability of being in one type of care given type of care in the previous cycle**



3.3 Who uses care?

While there are many factors, such as availability of subsidies, parental attitudes and transportation that may influence decisions concerning child care it was postulated that mother's

work status, income group and family structure would be predictive of the use of child care in each cycle. To determine the effects of these three variables on child care use a series of categorical linear models (Stokes, Davis & Koch, 2000) was created in which mother's work status, income group and family structure were regressed on child care use. Specifically, five models were created: a fully saturated model, a main effects model, and three models containing higher order interaction terms.

As seen in Table 3.3.1, a number of models fit the data. Relative to the saturated model, the main effects model (model 1) did not represent the data well in any of the three cycles. In cycle two, model 3 did not fit the data and in cycle three model 4 did not fit the data while model 2 fit the data in all three cycles. Constructing confidence intervals around each parameter estimate in model 2 for each cycle indicated that confidence intervals for the parameters overlapped across cycles ($p < .01$) suggesting that the models were invariant across time.

The three-way interaction term in model 2 suggests that family types in different income groups and mother's work status differed in the likelihood of using child care. Following Stokes, Davis & Kock (2000), a nested model analysis suggested that mother's working status determined use of child care regardless of family type. If the mother worked, the child was likely to be in care. If the mother did not work, income level did not influence child care use. In non-working mother families, low income families were as likely to use care as high income families.

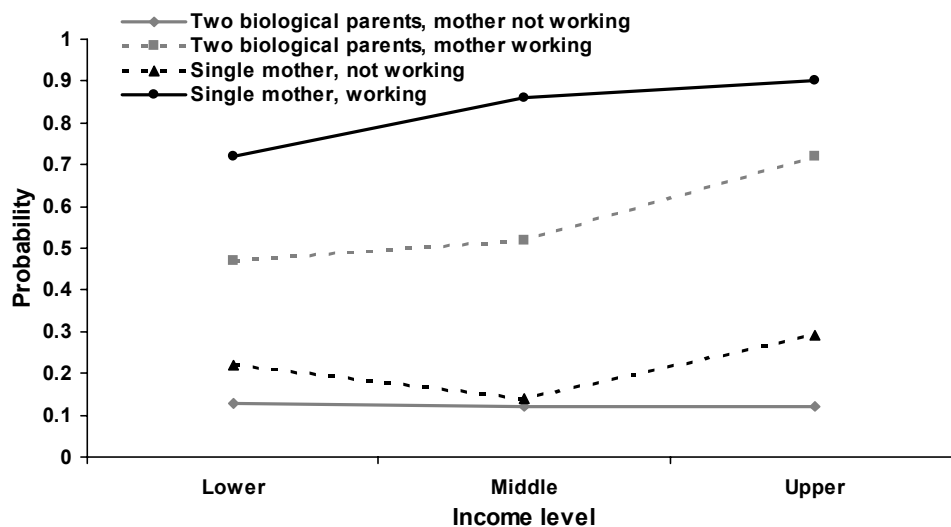
Figure 3.3.1 illustrates these differences. Children of single mothers who work are more likely to be in child care than children of single mothers who do not work regardless of income level (smallest $z=3.98$, $p < .001$). In single mother families in which the mother works, children in lower income families were less likely to be in care than middle or upper income families (smallest $z=3.51$, $p < .001$) and children in middle income families are as likely as children in upper income families to use care. If the mother does not work the income level does not influence child care use for children of single mothers.

Table 3.3.1 Predicting child care use from family type, income group and mother's working status

	Model 1 (χ^2)	Model 2 (χ^2)	Model 3 (χ^2)	Model 4 (χ^2)
Variables (Cycle 1)				
family	34.32	29.37	31.31	29.36
mother working	692.29	157.93	326.61	194.18
income group	6.99	14.06	14.09	14.32
family*mother's work		.21*		.24*
mother's work*income group		.05*		
family*income group				
family*mother's work*income group		3.52	16.13	16.30
Residual (df)	19.65 (7)	3.23* (2)	3.52* (5)	3.28*(4)
Variables (Cycle 2)				
family	44.87	64.31	58.64	65.17
mother working	845.55	119.80	321.93	144.55
income group	31.56	44.73	45.53	48.12
family*mother's work		6.64		10.15
mother's work*income group		.23*		
family*income group				
family*mother's work*income group		12.79	29.30	32.15
Residual (df)	43.69 (7)	4.02* (2)	14.40 (5)	4.25*(4)
Variables (Cycle 3)				
family	145.72	72.39	134.61	104.15
mother working	2329.24	695.69	903.97	737.33
income group	57.12	74.06	82.01	84.74
family*mother's work		25.57		13.21
mother's work*income group		18.97		
family*income group				
family*mother's work*income group		18.84	64.40	68.03
Residual (df) 1	97.12 (7)	.53* (2)	32.71 (5)	19.50 (4)

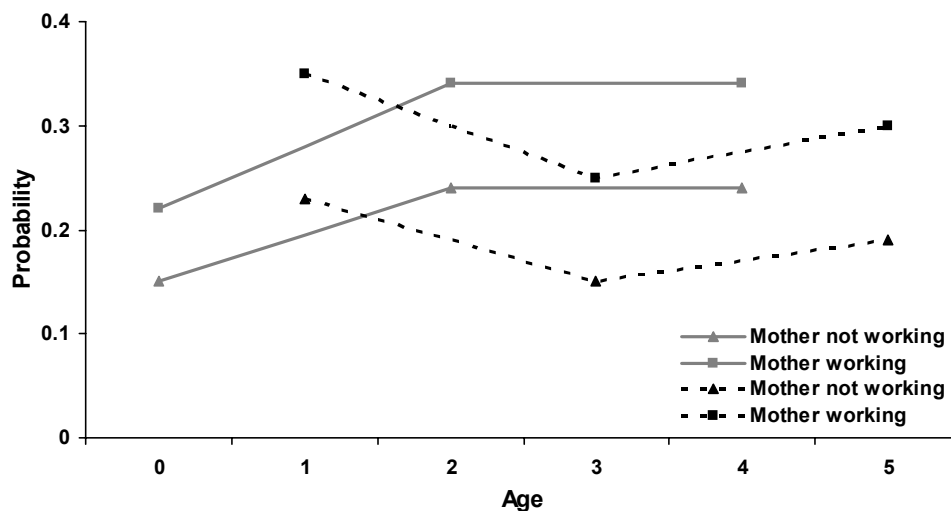
* indicates $p > .05$.

Figure 3.3.1 Probability of being in care by family, mother's working status and income group



In two biological families in which the mother does not work, income level does not seem to influence care. Children in upper income two biological parent families are as likely to be in care as children in middle and lower income families. If the mother in the two biological parent family works, then children in middle income families are as likely to be in care as children in lower income families, but children in upper income families are more likely to be in care than children in middle or lower income families (smallest $z=5.28$, $p<.001$).

Figure 3.3.2 The probability of entering care by mother's work status



A hazard analysis (Figure 3.3.2) indicated that children who were under one year of age in cycle one were likely to enter care at either age two or age four. However, if the mother was working the child was more likely to enter care than if the mother was not working ($p<.05$). If the child was one year of age in cycle one the child was most likely to enter care at age one. If the mother was working the child was more likely to enter care at any age than if the mother did not work ($p<.05$).

A main effects model was constructed in which type of care (center care or non-relative care) was predicted from family structure and income group for each cycle. As shown in Table 3.3.2, the main effects model fit the data in cycles two and three, but not cycle one. Comparisons of parameter estimates suggested that some parameter estimates from the cycle two and cycle three models overlapped but only partially overlapped with the cycle one model.

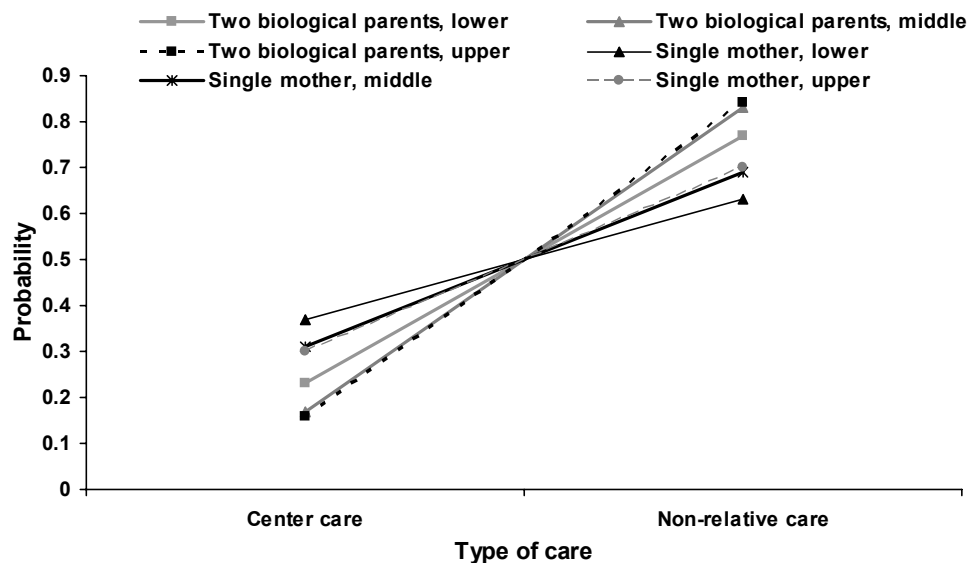
From Figure 3.3.3 it appears that children are more likely to be in non-relative care than in center care, and the statistically detectable effect for family suggested that children of single mothers are more likely to be in center care than children in two biological parent families. Income was not a statistically detectable effect on type of care. Families from different income groups did not differ in the type of care used. Yet, caution must be exercised because of the lack of invariance of the models across cycles.

Table 3.3.2 Predicting child care use from family type, income group and mother's working status

Variables (Cycle 1)	Cycle 1	Cycle 2	Cycle 3
family	34.25**	23.38**	19.30**
income group	18.57**	3.96	9.20
Residual (df)	9.15 (2)	.05* (2)	2.35* (2)

Note: * indicates $p > .05$. ** indicates $p < .05$.

Figure 3.3.3 Probability of use of different types of care by family type and income



3.4 Effects of child care on cognitive development

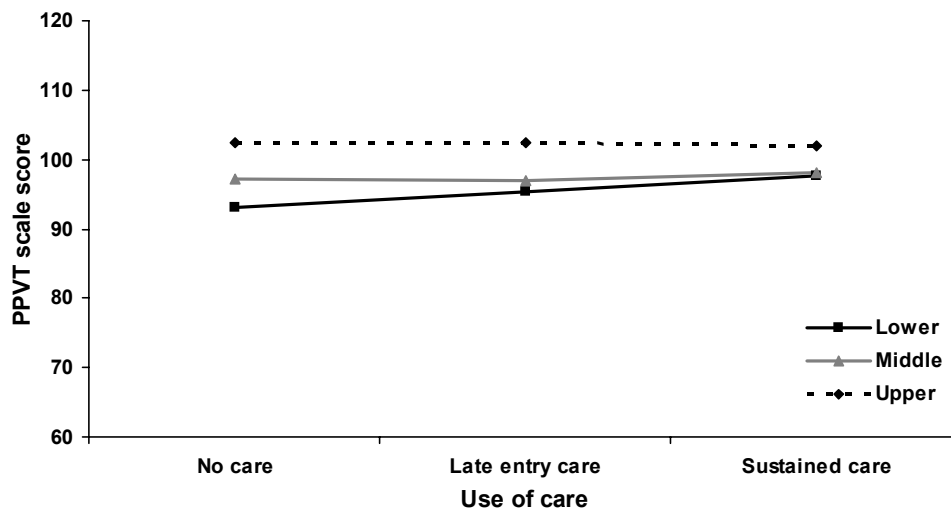
Previous research has indicated that the effects of care may be different for children in families of different income levels. Consequently, a linear model was constructed in which cognitive development was predicted from use of care and income level. The effects of child care on cognitive development were examined using general linear modelling which child care (no care, partial care, sustained care) and income (lower, middle, upper) were between groups factors

predicting care. Sustained care meant the child had been in care for the cycle in which the PPVT was administered and the previous cycle. Most children in sustained care would have been in care since age two or three. Later entry care was defined as being in care for only the cycle in which the PPVT was administered, when most children would have been four or five years of age. No care meant the child had not been in care in the cycle of or the cycle preceding administration of the PPVT.

Table 3.4.1 Descriptive statistics and model results for PPVT scale scores by care experience and income

	No care			Late entry care			Sustained care		
	M	SD	N	M	SD	N	M	SD	N
Lower	93.05	14.79	505	95.44	14.45	133	97.66	13.71	108
Middle	97.20	14.18	735	96.92	14.24	260	98.09	14.28	340
Upper	102.43	14.48	580	102.41	13.89	306	101.94	13.64	1079
Factor	df		MS _b		F		p		
Care use	2		155.83		.78		.46		
Income group	2		20,345.79		101.66		<.0001		
Care*income	4		553.31		2.76		.03		
Error	3925		207.31						

Figure 3.4.1 Effect of use of child care on child development



The results of the general linear model are presented in Table 3.4.1 and Figure 3.4.1. There was a statistically detectable interaction effect which suggested that children in different income groups benefit from different child care experiences. Post-hoc least squares contrasts indicated children in lower income groups who experienced sustained child care had statistically higher PPVT scores than those who were not in care ($p < .01$). However, the actual size of the effect was

moderately small ($ES=.33$, $R^2=.05$). Children in middle and upper income groups who were in care did not have PPVT scores that were statistically different from children not in care ($p>.01$).

While the effects of child care experience seem minimal, it may be the case that certain types of care may lead to greater gains than others. To examine the effects of different types of care a general linear model was created in which type of care (no care, center care and non-relative care) was one factor and income group (lower, middle, upper) was a second factor.

Results of the model (Table 3.4.2 and Figure 3.4.2) yielded no type of care*income group interaction meaning that children in different income groups do not benefit from different types of care. However, the main effects for both type of care and income group were statistically detectable. Post-hoc contrasts indicated that children who were not in care had statistically lower PPVT scores ($M=98.29$, $SD=14.71$) than those in center care ($M=100.72$, $SD=14.07$) and non-relative care ($M=100.21$, $SD=13.18$) but the actual effects were small (largest $ES=.17$; $R^2=.06$) meaning that while the differences were statistical they were not substantive. PPVT scores of children in center care were not different from those in non-relative care.

The effect of intensity of care on cognitive development was examined by constructing a general linear model in which intense care (no care, intense center care, and intense non-relative care) and income group were between group factors where care was considered intense if the child spent at least 20 hours per week in care in two consecutive cycles.

Results of the model (Table 3.4.3) showed no statistically detectable intensity*income group interaction suggesting that children of different income groups do not benefit differentially from spending considerable time in care. Furthermore, while the main effect for intensity was statistically detectable the magnitude of the effects were small (maximum $ES=.24$) meaning that spending a lot of time in child care has no substantial effect on cognitive development.

Table 3.4.2 Descriptive statistics and model results for PPVT scale scores by type of care and income

	No care			Center care			Non-relative care		
	M	SD	N	M	SD	N	M	SD	N
Lower	93.05	14.80	505	99.79	14.64	24	93.32	11.01	28
Middle	97.20	14.18	735	97.69	12.19	32	96.94	13.00	107
Upper	102.43	14.48	580	101.81	12.18	74	101.87	13.84	508
Factor	df	MS	F	p					
Type of care	2	2,321.83	11.58	<.0001					
Income group	2	13,626.28	167.98	<.0001					
Care*income	4	234.64	1.17	.32					
Error	2584	200.43							
R ² =.06									

Figure 3.4.2 Cognitive development by type of care and income group

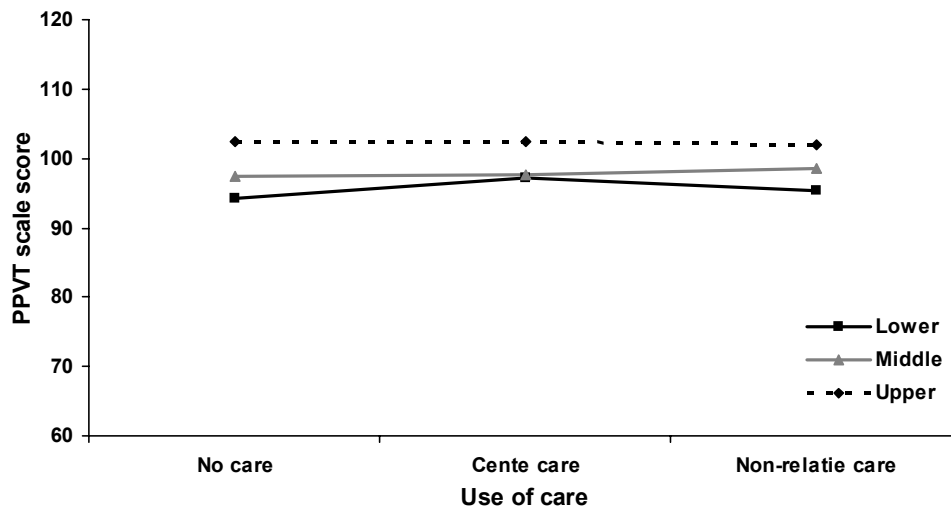


Table 3.4.3 Descriptive statistics and model results for PPVT scale scores by intensity of care and income

	No care			Intense center care			Intense non-relative care		
	M	SD	N	M	SD	N	M	SD	N
Lower	93.05	14.80	505	100.41	14.32	17	93.57	8.96	14
Middle	97.20	14.18	735	99.60	12.10	25	95.30	12.97	46
Upper	102.43	14.48	580	102.14	11.83	59	101.61	14.16	274
Factor	df	MS	F	p					
Type of care	2	1,481.61	7.27	.0007					
Income group	2	12,806.64	62.88	<.0001					
Care*income	4	207.24	1.02	.40					
Error	2246	203.68							
R ² =.06									

3.5 Effects of care on motor skills and emotional development

In addition to cognitive development, the effects of child care use on motor skills development and social skills were examined using a series of general linear models. Results (Table 3.5.1) showed a statistically detectable main effect for use of care on motor skills development but the magnitude of the effect was small (largest ES=.17). The care*income interaction effect for prosocial behaviour was statistically detectable and post-hoc contrasts showed that lower income children in sustained care had higher prosocial behaviour scores (M=12.91, SD=3.98, N=121) than children not in care from low (M=11.86, SD=3.91, N=579) and middle (M=11.78, SD=3.88, N=818) income families but the actual size of the effect was moderately small (largest ES=.29). In other words, it seems that children in care do not benefit in any significant way. The effects that did appear are not substantive.

A similar general linear model was constructed in which the effects of income and type of care on motor skills and social development were examined (Table 3.5.1). The results indicated no type of care * income interaction on any of the outcome variables. While there were statistically detectable main effects for income for motor skills, hyperactivity, physical aggression and prosocial behaviour post-hoc contrasts indicated no statistically detectable differences among group means.

Similar to type of care, intensity of care had no effect on motor skills or social development beyond a statistically detectable main effect for intense care on motor skills development ($F_{2, 1557}=8.54$, $MS_e=203.90$, $p=.0041$). While the effects were statistically detectable, the actual effects were not substantive in nature (largest ES=.16) suggesting no effects of intense care on motor skills and social development.

Table 3.5.1 **Results of model for motor skills and affect scores by use/type of care and income**

	Care	Income	Care*income	MSe
Motor skills	8.26*	10.93*	1.35	197.81
Emotional disorder	.92	.46	.61	4.79
Hyperactivity	.11	26.41*	1.57	11.21
Physical aggression	2.73	7.95*	.95	3.78
Prosocial behaviour	1.03	1.62	3.05*	15.08
	Type	Income	Type*income	MSe
Motor skills	8.54*	10.07*	1.08	197.31
Emotional disorder	.03	.55	.93	5.01
Hyperactivity	1.04	11.17*	.23	11.33
Physical aggression	1.21	6.02*	.46	3.92
Prosocial behaviour	.05	3.45*	1.73	15.08

* denotes $p < .05$.

3.6 Cognitive development and economic disadvantage

The preceding analyses showed no substantive interaction effects involving income indicating child care did not differentially benefit children in different income groups. Previous research has suggested that child care benefits those children who are most severely disadvantaged. Since the previous analyses involved combining some income categories potential effects of care on the most disadvantaged may be masked within the larger group. Thus analyses were undertaken to determine the effect of child care on those in the lowest income group. Children were separated into two income groups – Group 1 (defined as the lowest income group) and Group 2 (income higher than the lowest group).

The analyses, similar to those previously conducted, utilized general linear models using care (no care, partial care, sustained care) and group membership (lowest, other) as between groups factors. Results indicated both a statistically detectable main effect for group and a group *care interaction (Table 3.6.1). Post hoc contrasts suggested that children in the lowest income group who participated in sustained child care had statistically higher PPVT scores than those not in care ($p < .01$), but those in partial care did not ($p > .01$). This suggests that children in the lowest income group may benefit from care that is of relatively long duration. Furthermore, the size of the effects was substantial ($ES = .80$) and the PPVT scores were similar to children in sustained care who were in families with higher incomes. Post hoc contrasts also indicated that children who were not in the lowest income level and experienced sustained care had higher PPVT scores than those who were not in care ($p < .01$) but this effect was small ($ES = .18$).

If being in care had an effect on the cognitive development of children in the lowest income group, it may be the case that different types of care may have different effects. A general linear model with type of care (home with mother, centre care, non-relative care) and class (disadvantaged, not- disadvantaged) as between groups factors did not indicate a statistically detectable type of care*income group interaction. Children in the lowest income group do not benefit any more or less than other children in different types of care ($F_{1,1591} = .89$, $MS_e = 199.33$, $p = .35$). Likewise, intense care did not have a differential effect on cognitive development for children in the lowest income group ($F_{1,1361} = .87$, $MS_e = 206.15$, $p = .35$). Similar analyses showed no group*care interaction for motor skills development, emotional disorder, hyperactivity, physical aggression or prosocial behaviours (Table 3.6.2).

Table 3.6.1 Descriptive statistics and model results for PPVT scale scores by care and class

	No care			Late-entry care			Sustained care		
	M	SD	N	M	SD	N	M	SD	N
Group 1	90.08	15.05	78	96.76	13.64	21	101.65	10.49	20
Group 2	98.06	15.05	1742	99.11	14.45	678	100.77	13.77	1507
Factor	df		MS		F		p		
Group	1		3,416.27		16.46		<.0001		
Care	2		3,912.88		18.85		<.0001		
Care*group	2		737.76		3.53		.03		
Error	4040		207.53						
R ² =.01									

Figure 3.6.1 PPVT scores by child care experience and class

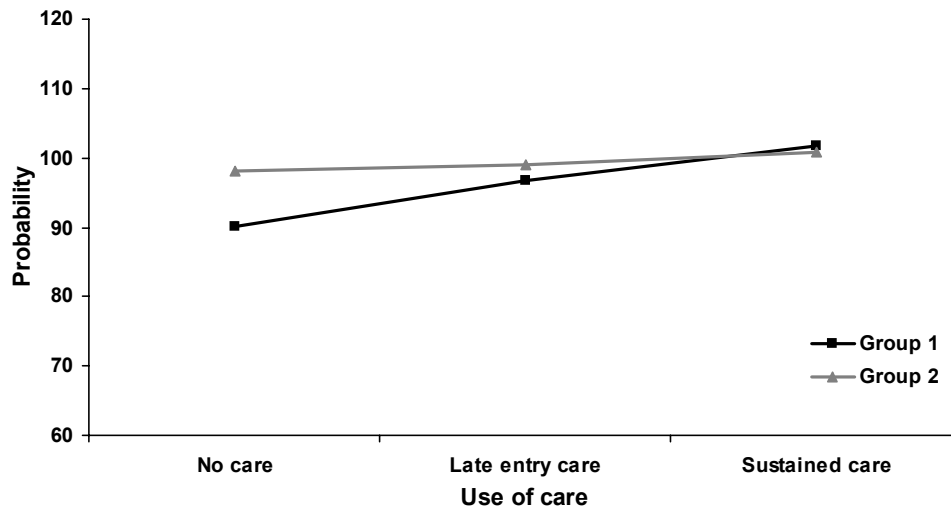


Table 3.6.2 Results of model for motor skills and affect scores by use of care and class

	Care	Class	Care*class	MSe
Motor skills	1,685.55*	650.46*	176.43	199.33
Emotional disorder	.92	.84	1.00	4.79
Hyperactivity	.11	2.23	.08	11.33
Physical aggression	2.73	.04	.49	3.79
Prosocial behaviour	1.03	.84	2.07	15.10

* Denotes $p < .05$.

4. Discussion

To summarize, children are likely to enter care around two years of age. Once they enter care they are likely to remain in care, and having chosen a particular type of care arrangement they are likely to remain in that type of care. Children of mothers who work are more likely to be in care than children of mothers who do not work, and mother's working status is a significant predictor of use of child care. Furthermore, children of single mothers who work are more likely to be in centre care than children of two biological parents. This may reflect the availability of subsidies for centre care available to families of low-income, a characteristic of the majority of lone mother families in Canada.

Overall the results seem to suggest that the effects of child care on child development seem minimal. While there were statistically detectable effects of child care on cognitive, motor skills, and emotional/social development the actual magnitude of the effects were small to negligible. The statistically detectable differences are, in part, an artefact of the large sample. However, high power aside, the lack of effects are consistent with previous research. It may be that family factors and processes are typically more predictive of child functioning and children's developmental well-being than child care factors (Deater-Deckard, Pinkerton & Scarr, 1996). It may also be explained by consideration of what occurs in child care. It may be that overall (and without any measure of the quality or environment being provided we can only speculate) the differences between the different care environments are not substantial. A child attending non-relative (sitter) care may not be experiencing any special intervention beyond that which might occur in a typical parent-child interaction. That is, it would be reasonable to expect that parents would be engaging in activities conducive to facilitating their children's development. Attending child care in a non-relative setting may not have much to offer above and beyond what most parents would reasonably provide. In centre care, children may experience a more structured routine, but that routine may not be sufficiently different from what parents have to offer to enhance cognitive development beyond "normal" growth. To date, research has not progressed to enable us to determine thresholds of quality (i.e., How good or poor must care be to effect development in any meaningful way?). Questions like this represent the next wave of child care research.

One effect did stand out. Children in the lowest income group who were in care during both cycle one and two had higher PPVT scores than those not in care, and their scores were as high as those of children not in the lowest income group. The effect was both statistical and substantial. No similar effect was seen for those children in the lowest income families who had a shorter time in child care. This finding is in keeping with the view of previous researchers that child care may be beneficial for those who come from more disadvantaged backgrounds and that care for an extended period of time is needed for meaningful changes in outcomes (e.g., Reynolds & Temple, 1998). If there is an advantage of non-maternal care for children (and perhaps for parents) in the lowest income level which persists into the school years and beyond it may be most beneficial for society to support more poor families to enable them to enrol their children out of home care or alternatively, to give families sufficient support to enable them to provide the kinds of environments that are conducive to maximizing their children's development.

The results here are suggestive but not causal. It cannot be asserted that being in child care for a sustained period of time causes PPVT scores of children in the lowest income group to be raised. To make a stronger causal claim it would be necessary to use a pretest-posttest design and create a growth model or utilize an experimental design. These results do indicate the importance of determining effect size and is consistent with the increasing requirement by academic publications that significance is not sufficient but that effect size should also be included.

If non-parental care does not enhance development, it does not hinder it either. Children who enter care during the preschool years are not at a disadvantage relative to those who do not attend care. Since most children in care have mothers who are working, this finding suggests that the children of mothers who work are not disadvantaged over those who do not work. It may be the case that having the mother work may be a benefit for the child because the mother's income, on average, would raise the economic level of the family which would enable the family to provide additional opportunities and resources for the child.

Bibliography

- Andersson, B. (1989). Effects of public day care: A longitudinal study. *Child Development, 60*, 857-866.
- Andersson, B. (1992). Effects of day care on cognitive and socio-emotional competence of 13-year-old Swedish schoolchildren. *Child Development, 63*, 20-36.
- Bates, J., Marvinnen, D., Kelly, T., Dodge, K., Bennett, T. and Pettit, G. (1994). Child-care history and kindergarten adjustment. *Developmental Psychology, 30*, 690-700.
- Belsky, J. (1986). Infant day care: A cause for concern? *Zero to three*.
- Belsky, J. (1988). The “effects” of infant day care reconsidered. *Early Childhood Research Quarterly, 3*, 235-272.
- Belsky, J. (1990). Parental and non-parental child care and children’s socio-emotional development: A decade in review. *Journal of Marriage and the Family, 52*, 885-903.
- Belsky, J. (2001). Emmanuel Miller Lecture: Developmental risks (still) associated with early child care. *Journal of Child Psychology and Psychiatry, 42*, 845-859.
- Belsky, J. and Eggebeen, D. (1991). Early and extensive maternal employment and young children’s socio-emotional development: Children of the National Longitudinal Survey of Youth. *Journal of Marriage and the Family, 53*, 1083-1110.
- Blau, D. (1999). The effect of child care characteristics on child development. *Journal of Human Resources, 34*, 786-822.
- Bryant, D., Burchinal, M., Lau, L. and Sparling, J. (1994). Family and classroom correlates of Head Start: Children’s developmental outcomes. *Early Childhood Research Quarterly, 289-309*.
- Burchinal, M., Ramey, S., Reid, M. and Jaccard, J. (1995). Early child care experiences and their association with family and child characteristics during middle childhood. *Early Childhood Research Quarterly, 10*, 33-61.
- Burchinal, M., Roberts, J.E., Nabors, L. and Bryant, D. (1996). Quality of center child care and infant cognitive and language development. *Child Development, 67*, 606-620.
- Burchinal, M., Roberts, J., Riggins, Jr., R., Zeisel, S., Neebe, E. and Bryant, D. (2000). Relating quality of center-based child care to early cognitive and language development longitudinally. *Child Development, 71*, 339-357.

- Campbell, F. and Ramey, C. (1994). Effects of early intervention on intellectual and academic achievement: A follow-up study of children from low-income families. *Child Development, 65*, 684-698.
- Campbell, F. and Ramey, C. (1995). Cognitive and school outcomes for high risk African-American students at middle adolescence: Positive effects of early intervention. *American Educational Research Journal, 32*, 743-772.
- Centre for Families, Work and Well-Being. Compendium 2001: 150 Canadian Statistics on work, family and well-being. Guelph, ON: 2001.
- Child Care Advocacy Association of Canada. (2001). Changing child care advocacy and policy in Canada. Ottawa: Author.
- Child Care Advocacy Association of Canada and Canadian Child Day Care Federation (1992) *Caring for a living: A study on wages and working conditions in Canadian child care*. Ottawa: Author.
- Clark-Stewart, K. (1984). Day care: A new context for research and development. In A. Collins (Ed.), *Minnesota Symposium on Child Psychology*. Hillsdale, NJ: Erlbaum.
- Clarke-Stewart, K. (1988). The effects of infant day care reconsidered: Risks for parents, children, and researchers. *Early Childhood Research Quarterly, 3*, 293-318.
- Clarke-Stewart, K. (1989). Infant day care: Maligned or malignant? *American Psychologist, 44*, 266-273.
- Cook, T. and Campbell, D. (1979). Quasi-experimentation: Design and analysis issues for field settings. London: Houghton Mifflin.
- Deater-Deckard, K., Pinkerton, R. and Scarr, S. (1996). Child care quality and children's behavioral adjustment: A four-year longitudinal study. *Journal of Child Psychology and Psychiatry, 37*, 937-948.
- Desai, S., Chase-Lansdale, P. and Michael, R. (1989). Mother market? Effects of maternal employment on the intellectual ability of 4-year-old-children. *Demography, 26*, 545-561
- Dunn, L. (1993). Proximal and distal features of day care quality and children's development. *Early Childhood Research Quarterly, 8*, 167-192

- Goelman, H. and Pence, A. (1987). Effects of child care, family, and individual characteristics on children's language development: The Victoria day care research project. In D. Phillips (Ed.), *Quality in child care: What does the research tell us?* (pp. 89-104). Washington, D.C: National Association for the Education of Young Children.
- Haskins, R. (1985). Public school aggression among children with varying day care experience. *Child Development, 56*, 689-703
- Hayes, C., Palmer, J. and Zaslow, M. (Eds.). (1990). *Who cares for America's children? Child care policy for the 1990s*. Washington, DC: National Academy Press.
- Howes, C. (1988). Relations between early child care and schooling. *Development Psychology, 24*, 53-57.
- Howes, C. and Olenick, M. (1986). Family and child care influences on toddlers' compliance. *Child Development, 57*, 202-216.
- Howes, C., Phillips, D. and Whitebook, M. (1992). Thresholds of quality: Implications for the social development of children in center-based child care. *Child Development, 53*, 449-460.
- Jencks, C. (1972). *Inequality: A reassessment of the effect of family and schooling in America*. New York: Harper Colophon.
- Kohen, D., Hunter, T., Pence, A., and Goelman, H. (2000). The Victoria day care research project: Overview of a longitudinal study of child care and human development in Canada. *Canadian Journal of Research in Early Childhood Education, 8*(2), 49-54.
- Kontos, S. and Fiene, R. (1987). Child care quality, compliance with regulations, and children's development: the Pennsylvania study. In D. Phillips (Ed.), *Quality in child care: What does research tell us?* (pp. 57-80). Washington, DC: National Association for the Education of Young Children.
- Lazar, L., Darlington, R., Murray, H., Royce, J., and Snipper, A. (1982). Lasting effects of early education: A report from the Consortium for Longitudinal Studies. *Monographs of the Society for Research in Child Development, 47* (2-3, Serial No. 195).
- Lero, D. Pence, A. Goelman, H., and Brockman, L. (1985). Parents' needs, preferences and concerns about day care: Case studies of 336 Canadian families. Ottawa: Status of Women Canada.
- Macrae, J., and Herbert-Jackson, E. (1976). Brief reports: Are behavioral effects of infant day care program specific? *Developmental Psychology, 12*, 269-270.

- Marcon, R. (2000). *Educational transitions in early childhood, middle childhood and early adolescence: Head start vs. public school prekindergarten graduates*. Paper presented at the National Head Start Conference (Washington, DC, June 2-July 1).
- McCartney, K. (1984). The effect of quality of day care environment upon children's language development. *Developmental Psychology, 20*, 244-260.
- McCartney, K. and Rosenthal, R. (2000). Effect size, practical importance and social policy for children. *Child Development, 71*, 173-180.
- McCartney, K. and Rosenthal, S. (1991). Maternal employment should be studied within social ecologies. *Journal of Marriage and the Family, 53*, 1103-1107.
- McCartney, K., Scarr, S., Phillips, D. and Gajek, S. (1985). Daycare as intervention: Comparisons of varying quality programs. *Journal of Applied Developmental Psychology, 6*, 247-260.
- NICHD Early Child Care Research Network. (1998a). Early child care and self-control, compliance, and problem behavior at twenty-four and thirty-six months. *Child Development, 69*, 1145-1170.
- NICHD Early Child Care Research Network (1998b). Relations between family predictors and child outcomes. *Developmental Psychology, 34*, 1119-1128.
- NICHD Early Child Care Research Network. (1999). *Developmental Psychology, 35*, 6, 1399-1413.
- NICHD Early Child Care Research Network. (2000). The relation of child care to cognitive and language development. *Child Development, 71*, 958-978.
- Patterson, C., Kupersmidt, J. and Vaden, N. (1990). Income level, gender ethnicity, and household composition as predictors of children's school-based competence. *Child Development, 61*, 485-494.
- Pence, A. (Ed.). (1992). *Canadian National child care study: Canadian child care in context: Perspectives from the provinces and territories*. Ottawa: Health and Welfare Canada.
- Peterson, C., and Peterson, R. (1986). Parent-child interaction and day care: Does quality of day care matter? *Journal of Applied Developmental Psychology, 7*, 1-15.
- Phillips, D., McCartney, K. and Scarr, S. (1987). Child care quality and children's social development. *Developmental Psychology, 23*, 537-543.

- Prodromidis, M., Lamb, M., Sternberg, K., Hwang, C. and Broberg, A. (1995). Aggression and noncompliance among Swedish children in center-based care, family day care, and home care. *International Journal of Behavioral Development*, 18, 43-62.
- Rabinovich, B., Zaslow, M., Berman, P. and Hyman, R. (1987). *Employed and homemaker mothers' perceptions of their toddlers compliance behavior in the home*. Poster presented at the meetings of the Society for Research in Child Development, Baltimore.
- Ramey, C., and Finkelstein, N. (1981). Psychosocial mental retardation: A biological and social coalescence. In M. Begab, H. Garber, and H.C. Haywood (Eds.), *Psychosocial influences and retarded performance: Strategies for improving social competence*, (Vol. 1, pp. 65-92). Baltimore: University Park Press.
- Ramey, C. and Ramey, S. (1992). Early educational intervention with disadvantaged children – to what effect? *Applied and Preventive Psychology*, 1, 131-140.
- Raph, J., Thomas, A., Chess, S. and Korn, S. (1968). The influence of nursery school on social interactions. *American Journal of Orthopsychiatry*, 38, 144-152.
- Reynolds, A., and Temple, J. (1998). Extended early childhood intervention and school achievement: Age thirteen findings from the Chicago Longitudinal study. *Child Development*, 69, 1, 231-246.
- Rubenstein, J., Howes, C., and Boyle, P. (1981). A two-year follow-up of infants in community-based day care. *Journal of Child Psychology and Psychiatry*, 22, 209-218.
- Scarr, S. (1998). American child care today. *American Psychologist*, 53, 95-108.
- Scheutze, P. Lewis, A., and DiMartino, D. (1999). Relation between time spent in day care and explanatory behaviors in nine-month -old infants. *Infant Behavior and Development*, 22 (2), 267-276.
- Schliecke, E., White, D. and Jacobs, E. (1991). The role of day care quality in the prediction of children's vocabulary. *Canadian Journal of Behavioral Science*, 23, 12-24
- Schwarz, J., Strickland, R. and Krolick, G. (1974). Infant day care: behavioral effects of preschool age. *Developmental Psychology*, 10, 502-506.
- Stokes, M., Davis, C. and Koch, G. (2000). *Categorical data analysis using the SAS system*. Cary, NC: SAS Institute, Inc.

- Wessels, H., Lamb, M. and Hwang, C. (1996). Cause and causality in daycare research: An investigation of group differences in Swedish child care. *European Journal of Psychology of Education, 11*, 231-245.
- White, K. (1982). The relations between socio-economic status and academic achievement. *Psychological Bulletin, 91*, 46-48.
- Xiang, Z., Schweinhart, L., Hohmann, C., Smith, C., Storer, E., and Oden, S. (2000). *Points of light: Third year report of the Michigan School Readiness Evaluation*. Ypsilanti, MI: High/Scope Educational Research Foundation.