Applied Research Branch
Strategic Policy
Human Resources Development Canada

Direction générale de la recherche appliquée
Politique stratégique
Développement des ressources humaines Canada

Mediating Factors
in Child Development Outcomes:
Children in Lone-Parent Families
W-98-8E

by

David P. Ross, Paul A. Roberts and Katherine Scott

October 1998

■

First edition/Première édition - Internet 1998

ARB publishes papers within the following thematic areas:
Changing Nature of Work; Employment Insurance Renewal; Exclusion, Marginalization and Overcoming Barriers; Investing in Children and Families; Labour Market Adjustment; Lifelong Learning; Macroeconomic/Labour Market Analysis Services; Skills Requirements in the Knowledge-Based Economy; Social Union: The Knowledge and Information Aspects; and Youth Transitions.

A complete list of publications is available upon request, or by visiting our Web site as listed below.

La DGRA publie les documents selon les domaines thématiques suivants :
Adaptation au marché du travail; Apprentissage continu; Compétences requises dans l'économie axée sur le savoir; Exclusion, marginalisation, et obstacles à surmonter; Investir dans les enfants et les familles; L'union sociale : connaissances et information; Nature changeante du travail; Renouvellement de l'assurance-emploi; Services d'analyse macroéconomique/du marché du travail; et Transitions chez les jeunes.

Une liste complète des publications est disponible sur demande, ou en visitant notre site Web à l'adresse ci-dessous.

■

Executive Summary

A growing number of Canadian children are living in households headed by one parent whose social and economic conditions are often considerably different from those of two-parent families. While most of the existing research has focussed on the differences in development outcomes between children growing up with two parents compared with those growing up with only one parent, little is known about the range of difference among children in lone-parent families.

This paper asks: to what extent does vulnerability (higher, moderate or lower) among lone-parent children differ according to such important factors as family income, parental resources, community resources, and family characteristics. Three age-related indexes of developmental vulnerability based on a child's ranking on various outcome distributions are developed as our dependent variables for 2 to 3 year-olds, 4 to 5 year-olds, and 6 to 11 year-olds. The results of the analysis show that family income, parental resources, community resources and family characteristics contribute strongly to explaining variations in the vulnerability of lone-parent children. Importantly, *parental resources* appear to be the most influential. In particular, hostile-ineffective parenting was found to be strongly related to negative outcomes for all three age groups.

From a policy perspective, lone-parent families warrant more attention, but since most lone-parent children are not faring poorly, policy initiatives can be relatively selective. For the 2 to 3 year-old children, policies that support parenting skills (at work, home and in the community) appear extremely important, but support for other factors such as income, parental education, and communal neighbourhoods also appear particularly effective in mediating good outcomes . For 4 to 5 year-olds, in addition to the importance of supporting parenting skills, other important factors requiring support are income, assistance for parents with activity restrictions, and fostering neighbourhoods with fewer problems such as drugs, public drinking, and racism. For the 6 to 11 year-old group, while still important, support for parenting skills diminishes in importance.

Sommaire

Au Canada, un nombre croissant d'enfants vivent dans des ménages dirigés par un parent seul dont la situation socio-économique est souvent très différente de celle des familles biparentales. Même si la plus grande partie de la recherche existante a porté sur les différences dans les résultats développementaux d'enfants qui grandissent avec deux parents par rapport à des enfants qui grandissent avec un seul parent, on sait très peu de chose sur l'ampleur des différences *entre* les enfants de familles monoparentales

Ce document examine la question suivante : dans quelle mesure la vulnérabilité (élevée, modérée ou faible) des enfants de familles monoparentales diffère-t-elle selon des facteurs importants comme le revenu familial, les ressources parentales, les ressources communautaires et les caractéristiques familiales? Trois indices associés à l'âge ont été établis pour la vulnérabilité développementale en fonction du classement obtenu par l'enfant selon les diverses distributions des résultats; ils sont utilisés comme variables dépendantes pour les enfants de 2 à 3 ans, de 4 à 5 ans et de 6 à 11 ans. Les résultats de l'analyse montrent que le revenu familial, les ressources parentales, les ressources communautaires ainsi que les caractéristiques familiales jouent un rôle important lorsqu'il s'agit d'expliquer les variations dans la vulnérabilité des enfants de familles monoparentales. Et, ce qui est encore plus important, les ressources parentales semblent avoir la plus grande influence. On a notamment constaté une forte corrélation entre un style parental hostile-inefficace et des résultats négatifs dans les trois groupes d'âge.

D'un point de vue stratégique, il conviendrait d'accorder plus d'attention aux familles monoparentales, mais comme la plupart des enfants de familles monoparentales n'obtiennent pas de mauvais résultats, les initiatives stratégiques peuvent être relativement sélectives. Pour les enfants de 2 à 3 ans, les politiques qui appuient les compétences parentales (au travail, à la maison et dans la collectivité) paraissent extrêmement importantes, mais le soutien d'autres facteurs, notamment le revenu, l'éducation parentale et les quartiers conviviaux, semble aussi particulièrement efficace lorsqu'il s'agit d'obtenir de bons résultats. Pour les 4 à 5 ans, en plus de soutenir les compétences parentales, il faut également apporter du soutien à l'égard d'autres facteurs de premier plan comme le revenu et l'aide aux parents dont les activités sont restreintes, et favoriser des quartiers qui ont moins de problèmes tels la drogue, la consommation d'alcool en public et le racisme. Pour le groupe des 6 à 11 ans, même s'il est encore important, le soutien des compétences parentales n'est plus aussi capital.

Acknowledgements

Table of Contents

1.   Introduction

By any measure, Canadian children and youth enjoy one of the highest standards of living in the world. For the most part, children and youth are healthy and learning well; yet wide disparities continue to exist. We know, for example, that the gap between the well-being of the poorest children and those living in families with greater financial resources is wide, and in some instances, growing. Current research points to the powerful link between social and economic conditions and well-being.[1] Poverty, unemployment, education, living and working conditions, families, friends, and social supports all affect well-being. How or why this happens, however, is not always well-understood.

The experiences of children living in lone-parent families demand particular attention. A growing number of Canadian children are living in households headed by one-parent whose social and economic conditions are often considerably different from those of two-parent families. While most of the existing research has focussed on the differences in development outcomes between children growing up with two parents compared with those growing up with only one parent, little is known about the range of difference *among* children in lone-parent families. The ultimate objective of our research is to examine variation in developmental and intervening outcomes among children living in lone-parent families, drawing upon cycle 1 of the National Longitudinal Survey of Children and Youth (NLSCY), 1994-1995. The NLSCY provides a unique opportunity to explore and document these differences among Canadian children. Moreover, the NLSCY can also yield important information about the complex range of factors which influence and explain the observed variations in the child development outcomes.

---

[1]   Duncan, G. *et al*. 1994. See other articles in this special issue of *Child Development: Children and Poverty*.

2. Children Living in Lone-Parent Families

Single parenthood has become increasingly common in most industrialized countries. The growth in lone-parent families has been one of Canada's most significant social trends. In 1995, there were over 1.1 million lone-parent families, an increase of 60 percent from 1981. By the mid nineties, lone-parent families made up 14 percent of all families in Canada, and over 20 percent of families with children.[2] While in the past, most lone-parent families were created when one parent died, divorce and separation are now the major causes.[3]

What have been the consequences of these changing family patterns for children? Researchers have been preoccupied with this question for the past twenty years. Social scientists from many countries have conducted a large number of studies comparing the well-being and development of children living in lone-parent and two-parent households. These studies suggest that children living with a lone-parent are on average at increased risk for physical and mental health problems and have lower levels of well-being, competence, and attainment than children from intact two-parent families.

Children from lone-parent households, for example, typically tend to score lower than children in two-parent households on measures of academic achievement, and higher on measures of psychiatric disorders.[4] A recent American study concludes that lone-parent children are twice as likely to drop out of high school, twice as likely to become parents themselves before age 20, and one and a half times as likely to be idle (out of work and out of school) in their late teens and early twenties than children from intact families.[5] Consistent with these findings, these children attain lower status jobs and earn less money in adulthood.[6]

---

[2]   Statistics Canada. 1996. p. 4.

[3]   Vanier Institute of the Family. 1994. p. 50.

[4]   Blum, Munroe H. *et al.* 1985. pp. 245-254. See also Wadsworth, J. *et al*. 1985.

[5]   McLanahan, S. and G. Sandefur. 1994.

[6]   Amato, P. and B. Keith. 1991. pp. 187-206.

The weight of evidence clearly reveals differences on a number of measures between children growing up in lone-parent families and two-parent families. However, there is controversy concerning why lone-parent children are more vulnerable to poorer developmental outcomes. Many researchers have focussed on the role of low income in explaining why lone-parent children are worse off. Others have explored factors such as the cause of lone-parenthood, time spent in a lone-parent household, race, parents' educational status, social networks, and community resources.

In the search for what it is about the structure of lone-parent families that raises barriers to healthy child development, this body of work tends to present children in these families as a homogenous group. We lose sight of the fact that while lone-parent children are at higher risk for certain poor developmental outcomes compared to their counterparts in two-parent households, the clear majority grow up healthy. Analysing the NLSCY, Lipman, Offord and Dooley find that "for all types of problems, the majority of children from single-mother families did not have problems."[7] This conclusion points to the variation that exists among children living in lone-parent families.

Instead of focussing on comparisons between lone-parent families and two-parent families - and the question of family structure *per se* - our research sets out to explore the range in outcomes within the lone-parent group. Our report examines the relationship between certain environmental factors of lone-parent children and the developmental outcomes they experience. To do so, we have developed three age-related indexes/scales of "vulnerability" based on a child's ranking in the various outcome distributions. Using a vulnerability index is deemed preferable to examining single outcomes because doing poorly on a single or even a few outcomes does not necessarily mean a child is vulnerable or at "risk" for a poor overall development outcome. A poor outcome along one or two dimensions of development does not necessarily presage potential development difficulties. But if a child ranks at the bottom of many single outcome measures, the likelihood increases that the child is vulnerable to poor or unhealthy development. Conversely, if a child consistently places near the top of each outcome distribution, the likelihood increases that the child is less vulnerable to poor development.

---

[7]   Lipman, E. *et al*. 1996. p. 86.

2.1   Methodology

The variation evident among lone-parent children in our paper "Variations in Child Development Outcomes Among Children Living in Lone-Parent Families"[8] raises a number of questions regarding what enters into fostering healthy child development. Does living in a low-income household - or with parents who have inconsistent parenting styles, or in unsafe neighbourhoods - adversely affect child outcomes? Certainly past research and common sense suggest that these factors do not work to the advantage of the child. But the question remains as to which factors account for the successes and failures that young people - in this instance, lone-parent children - experience.

In order to address this question, we have adapted a framework developed by Robert Haveman and Barbara Wolfe in their book, *Succeeding Generations* (1994).[9] Haveman and Wolfe argue that child development is determined by three primary factors:

> The choices made by the society, primarily governments, regarding opportunities available to children and their parents (the "social investment in children"); the choices made by the parents regarding resources to which their children will have access (the "parental investment in children"); and the choices that the child makes given the investments in and opportunities available to him or her.

Society invests in children by providing schools, safe streets, and income supports to name a few examples. Within this context, parents make decisions about how to raise their children, decisions that are influenced by their own stock of resources such as education or income. And finally, children, once they reach their adolescence, begin to make life decisions for themselves, again shaped by the choices of their parents and their society.

In our paper, we adopt Haveman and Wolfe's investment framework to group different independent factors which may influence developmental outcomes among lone-parent children. Specifically, we identify three groups of resources - family financial resources; parental resources; and community resources - plus a fourth group combining a variety of other family characteristics

---

[8]   Ross, David P. *et al.* 1998.

[9]   Haveman, Robert and Barbara Wolfe. 1994.

that influence child development. This set of resources and characteristics are viewed as key investments in our children. Our goal is to identify those factors that exacerbate negative development (children exhibiting high vulnerability index scores), and those that mediate or contribute to positive development (resulting in a low vulnerability index score).

The main purpose of this report is to discover which factors are associated with good outcomes for lone-parent children (as measured with our index). To do this we use information from the first cycle of the NLSCY, 1994-1995. The data are manipulated to isolate those children from lone-parent families who are aged between 2 years-old and 11 years-old. This age range corresponds to the outcome and environmental factors which compose our model.

Our analysis is divided into two sections. The first section sets out descriptive cross-tabulations of selected environmental factors with our different vulnerability index scores. For example, it demonstrates the proportions of children from low, middle and high-income families according to their vulnerability index scores. This method is extremely useful for giving a more visual picture of the distribution of vulnerability according to the possible explanatory factors. However, these distributional portraits are limited in revealing how much each simple factor inter-acts with others to produce various outcomes.

The second section determines which factors in combination with others are associated with certain outcomes, and investigates which variables provide the basic influences, by using a more rigorous multi-variate regression analysis. This permits isolation of the separate effects of multiple independent variables, as well as analysis of their combined effect.

2.2   Index Construction

To investigate the outcome differences among lone-parent children, we constructed an index to reflect the concept of "vulnerability." The variables used to construct our vulnerability index have been investigated in our paper "Variations in Child Development Outcomes Among Children Living in Lone-Parent Families." To develop a continuous index based on the results of up to 30 outcome variables,[10] each of which may have used a different scoring/ranking system, we assigned scores to children based on where they placed in each of the individual outcome distributions. The index for each age group is then based on the cumulative scores of children for each of these outcomes. The more times a child places at or near the bottom of the distribution, the greater their vulnerability index score will be, and vice versa for a child who consistently places near the top.

So as to obtain more homogenous input and outcome effects, the sample of lone-parent children was divided into three separate age groupings (2 to 3 year-olds, 4 to 5 year-olds, and 6 to 11 year-olds). These age groups roughly correspond to important developmental milestones and serve to differentiate those in and outside the school system. Furthermore, the data in the NLSCY were structured, in many cases, along these age lines. We have constructed vulnerability indices corresponding to each of the three age groups.

In order to simplify the analysis, it was decided that each of the variables should be equally weighted, since this is exploratory research and no prior investigations indicate whether certain of the outcome variables should be weighed more heavily as outcome indicators than others. Is hyperactivity in 4 to 5 year-old lone-parent children, for instance, more important than whether they get along with other children? Without knowing the answer to such questions, it was our decision to avoid differentially weighting the possible index items.

To construct our vulnerability indices a number of different approaches were considered, each with its own strengths and weaknesses. The first method considered for use, was to simply sum all the relevant outcome variables into one large index, without changing the range of scores.

---

[10]   Some potentially important environmental factors were not included in this analysis [see Appendix A].

However, this would yield a very clumsy and unwieldy index, notwithstanding the fact that dichotomous and small scale variables would have less influence in the final index than variables with a greater number of response categories. For example, a discrepancy of influence would occur by adding together the variables 'ever repeated a grade' (a dichotomous variable) with 'hyperactivity-inattention' (a scale with a range of scores from zero to 14) in 6 to 11 year-olds. Without transforming the outcome variable score ranges, we would be giving more emphasis to the scale scores.

A second, and more complicated technique, we considered was factor analysis. As a data reduction process, it would allow us to derive an underlying vulnerability factor as our dependent variable. The problem with this method is the relatively strict procedures for the types of variables to be included in the factor analysis. Dichotomous variables should not really be used in factor analysis, though many researchers do use them as proportions. However, the fact that many of our outcome variables have highly skewed distributions also makes them less than optimal for use in factor analysis.

In the end, the approach we decided to employ sections each outcome variable into three parts (where possible) and then simply sums together these transformed outcome variables. By sectioning the outcome variables into thirds, we were attempting to equalize the amount of the variation inherent in many of the variables used in the index construction. In addition, we hoped to provide a more accurate depiction of the concept "vulnerability" by using the 'tails' or extremes of each variable's distribution, and a middle or 'average' element. The portion of the variable distribution thought to indicate the lowest vulnerability was given an item score of zero, the middle portion was assigned an item score of one, and the portion with the highest vulnerability was given an item score of two.

Our cut-offs for dividing the variables into three parts varied depending upon the type of variable (see Appendix B for a listing of all the variables). Scale variables were divided into three parts containing equal numbers of the covered population, and labelled low, medium and high vulnerability. For categorical variables, the top two categories were collapsed, as were the bottom two, with the middle segment(s) remaining, rendering a new three-category variable to which the item scores could be applied. Lastly, if pre-existing cut-offs existed for a particular

variable, these were used and the item scores then applied. Dichotomous variables were simply left in that state, with low vulnerability scoring a zero, and high vulnerability scoring a one.[11]

An example of the item scoring will clarify our approach. The variable *abecs01* is a scale which measures hyperactivity-inattention in children aged 2-3 years (see Appendix B). The distribution of this variable was divided into three roughly equal portions, based on the frequency distribution. Children scoring in the lowest part of the distribution (scale score 0 through 3) were assigned an index score of zero, those scoring in the middle part (scale score 4 through 6) were assigned an index score of one, and those children scoring in the highest part of the distribution (scale score 7 thorugh 14) were assigned an index score of two. Those children scoring zero were judged as having lower vulnerability, those scoring one were judged as having an average vulnerability, while those scoring two were judged as having high vulnerability.

Summing the age-relevant variables together using this scoring procedure yielded our index for each age group and these are presented in Figures 2.1, 2.2 and 2.3. As can be observed, there are a wide range of scores corresponding to the summation of the age-relevant outcome variables. The possible vulnerability index scores for 2 to 3 year-olds, based on our eleven outcome variables, ranges from a low of 0 to a high of 19 (Figure 2.1). However, none of the lone-parent children scored a zero, or above an item score of 15. Slightly over 55 percent of 2 to 3 year-olds obtained vulnerability index scores between 1 and 7. Observing the distribution of the index, it seems to be approximately normally distributed, although there is some 'clumping' of scores in the middle of the distribution.

---

[11]   Obviously, this method of item scoring tends to make the contribution or impact of the dichotomous variables slightly less "weighty" or important in comparison to the non-dichotomous. It was, however, decided not to give the dichotomous variables item scores of zero and two (as opposed to zero and one), since this would over-emphasize their effect. Our approach is a more conservative one. In any event, there are no more than three dichotomous variables in any age group.

Figure 2.1

Vulnerability Index Scores - 2 to 3 Year-Olds

%
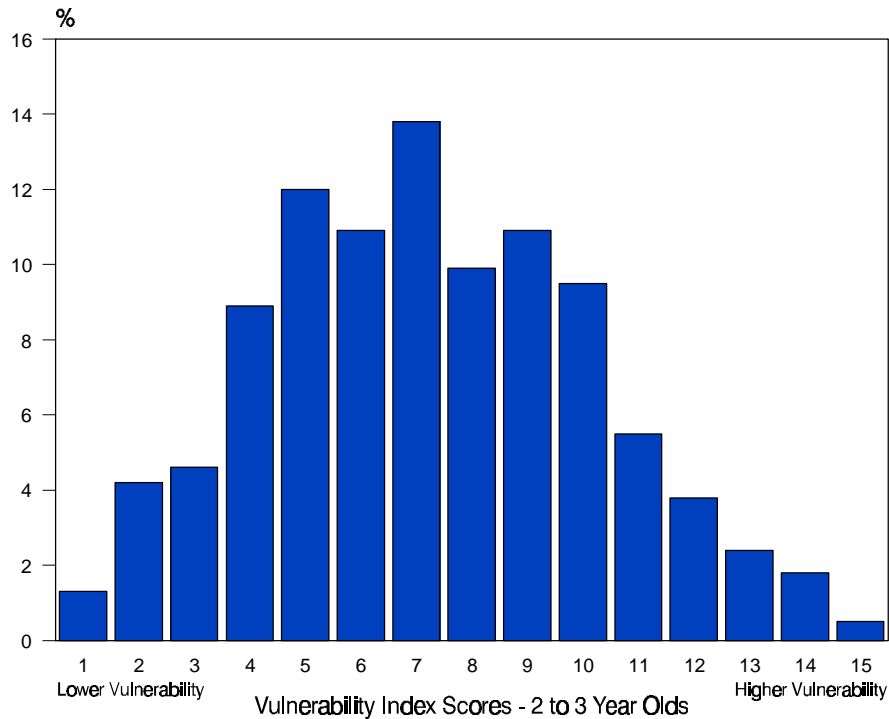
Our vulnerability index for lone-parent 4 to 5 year-olds utilized eighteen variables, resulting in a range of possible scores from 0 to 34, and an actual score range from a low of 3 to a high of 30 (Figure 2.2). These scores are ranged over a wider number of categories than the scores for 2 to 3 year-olds due to the greater number of variables included in the index.

Figure 2.2 shows that there is a slight skew toward the positive, with approximately 53 percent of 4 to 5 year-old children scoring 14 or less. The distribution also seems to have a large number of scores grouped between the vulnerability index scores 10 to 22. Overall, however, the item scores, while not normally distributed, do cover a wide range with a definite curve present.

Figure 2.2
Vulnerability Index Scores - 4 to 5 Year-Olds
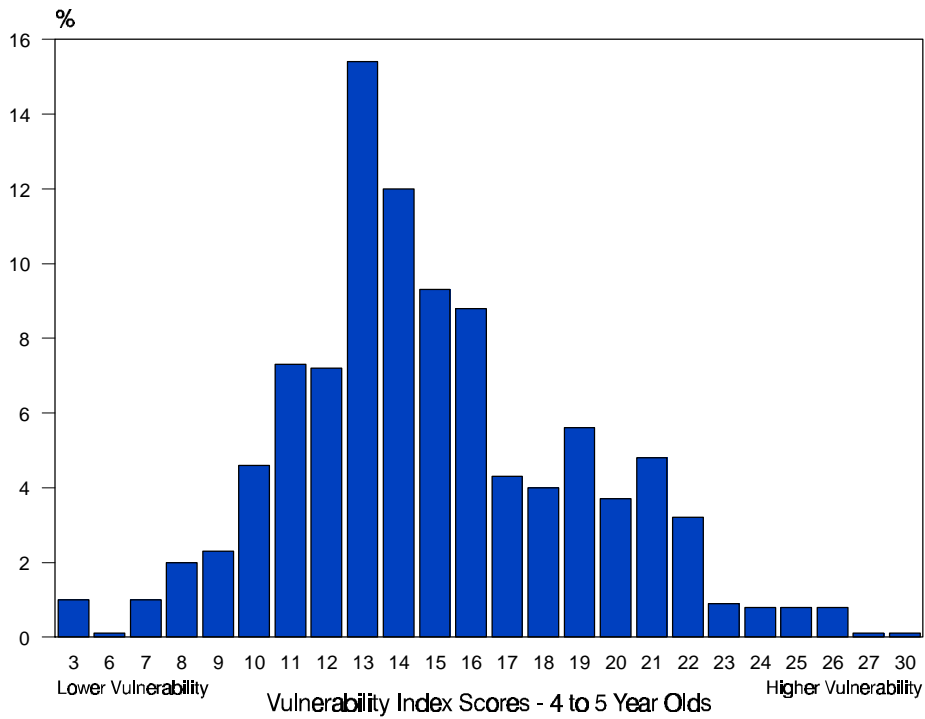
Figure 2.3
Vulnerability Index Scores - 6 to 11 Year-Olds
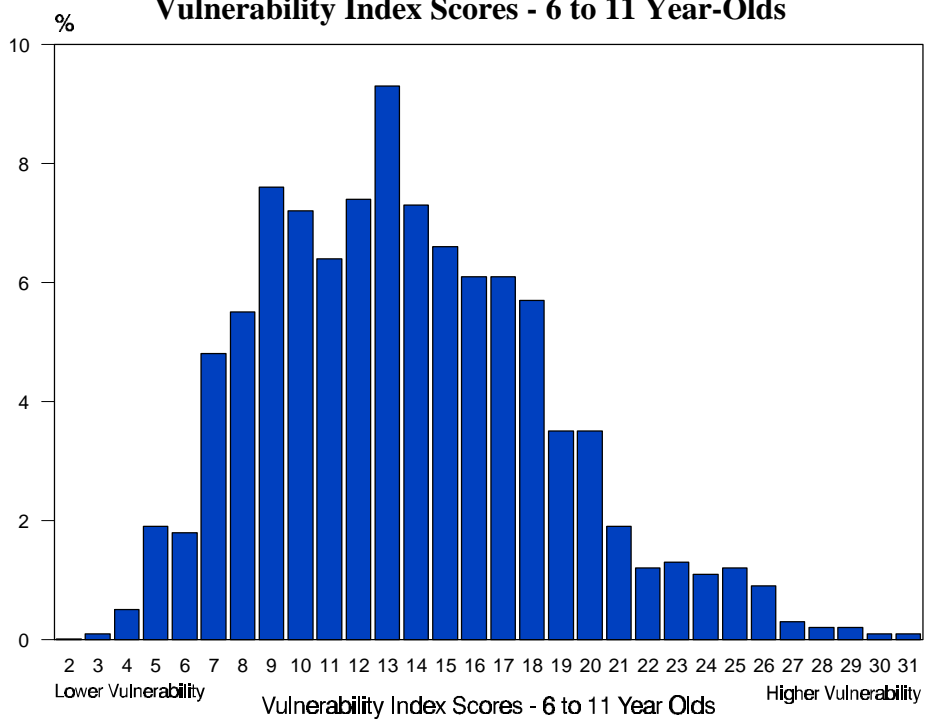
The twenty-one outcome variables used to construct the vulnerability index for 6 to 11 year-olds, have a possible range from 0 to 39 (Figure 2.3). None of the children score below three on the index, or above thirty-one. Just slightly over half (52.6 percent) of these lone-parent children obtained a vulnerability index score of 13 or below. The distribution of the scores is relatively normal, though there is some positive skewness toward the "higher vulnerability" index scores.

Overall, each of these indices reveals that lone-parent children are not equally vulnerable, based on our choice of outcome variables. In fact, given the distributions, we observe a wide variation in outcomes for lone-parent children. Our aim now is to explain exactly what mediating factors may account for why some lone-parent children are in the lower tail of these indices, and why some are in the higher tails, that is, why some lone-parent children are more or less vulnerable.

3.   Research Results

The statistical results are presented in two sections. The first is more descriptive as it presents a bivariate analysis of how selected factors are related to the index scores. The second section describes the results of our regression analysis. A full explanation of the variables used in this analysis can be found in Appendices B and C.

3.1   Bivariate Analysis

This section depicts in a simple way certain associations between the vulnerability index scores of lone-parent children with selected explanatory variables currently available in the NLSCY. To keep the presentation manageable, not all bivariate cross-tabulations between our vulnerability indices and possible factors are included. The selection of cross-tabulations was based on whether they appeared important in our preliminary regression analysis, which were restricted to only those factors within each of the three main resource groups - family financial resources; parental resources; and community resources - and a fourth group labelled family characteristics. This procedure provides an idea as to which factors were important within a resource group before going on to a more comprehensive regression analysis involving all factors [which is performed in the regression analysis]. The cross-tabulations are organized according to the four main factor groups and the three age ranges: 2 to 3, 4 to 5, and 6 to 11 year-olds.

In order to facilitate the presentation in the tables, vulnerability index score cut-offs were chosen in order to cut the populations into three equal sized groups. We have simply labelled these three groups as *higher, moderate and lower*, and there is no other significance to these cut-offs in any clinical sense. They simply represent those children who had the highest and lowest vulnerability index scores. In terms of preferred outcomes, the lower the score, the less vulnerable the child is to a poor development outcome.

3.1.1 Family Economic Resources

There were a number of potential explanatory variables in the NLSCY that could qualify as indicators of a family's economic resources: level of household income; source of income [earnings, investment income, or government transfers]; low-income [poverty] status; and home

ownership. Household income, along with any accumulated wealth, are important family resources since they determine how well a family can provide for its children. Adequacy and stability of income can also be considered measures of a family's economic security, and as indicators of economic pressures and stresses within households. Unfortunately, there are no direct measures of income stability nor of wealth in the survey. However, as the survey matures, fluctuations in income will become available which should allow for the construction of a measure of stability.

Of these four economic variables in the survey, household income level, which typically is low for lone-parents, has proven to be the only important explanatory factor. This was not unexpected since it serves as a close proxy for the other three variables due to the fact that the vast majority of low-income lone-parent households are poor, receive transfer payments, and do not own their homes.

Household income

Information in Table 3.1 indicates how household income level corresponds to different levels of vulnerability. For the two older age groups, the results exhibit an expected inverse association between income and vulnerability. Higher incomes are associated with low vulnerability index scores, and lower incomes are associated with higher vulnerability.

A strong association is evident for 4 to 5 year-olds, where almost three times as many children in households with incomes exceeding $25,000 had the lowest vulnerability index scores compared to those with incomes below $15,000. For 6 to 11 year-olds, the proportion of those most highly vulnerable decreases by one-third as income increases. It is unfortunate that for 2 to 3 year-olds, the statistical reliability of the results is severely limited. A small sample size is coupled with a heavy concentration of incomes at the lower end.

Table 3.1

Percentage Frequency Distribution of Household
Income and Child Vulnerability Index

	Household Income		
Vulnerability Index	**<$15,000**	**$15,000-24,999**	**$25,000+**
Ages 2-3			
Lower Vulnerability	31.6%	26.5% *	---
Moderate Vulnerability	37.7%	33.3% *	---
Higher Vulnerability	30.7%	40.2%	---
Total	100.0%	100.0%	100.0%
Ages 4-5			
Lower Vulnerability	15.5% *	23.8% *	43.5%
Moderate Vulnerability	40.0%	37.0%	30.7%*
Higher Vulnerability	44.5%	39.3%	25.8%
Total	100.0%	100.0%	100.0%
Ages 6-11			
Lower Vulnerability	25.5%	28.9%	32.5%
Moderate Vulnerability	34.9%	34.1%	40.8%
Higher Vulnerability	39.6%	37.0%	26.7%
Total	100.0%	100.0%	100.0%

* Estimates less reliable due to high sampling variability.

--- Sample too small for accurate estimate.

Note: Percentages in table may not add to 100 due to rounding.

3.1.2 Parental Resources

The many parent resource factors of our model were further grouped into three categories:
parental skills; parental health; and parental education. In this section we present what appeared
to be the three most important factors in the parent resources group as revealed by our regression
analysis. Two of the factors emerged from the skills category and one factor from the health
category.

Parental skills

The NLSCY provides information on parenting skills in four areas: do parents interact
positively and encourage their children; does the parenting provide consistent discipline; is
their style hostile and ineffective; and is the style punitive. In our preliminary regression
analysis, all four proved to have associations with vulnerability. But in the interests of brevity,
we present two only, as hostile and punitive tend to track the same behaviour, and positive

and consistent parenting tend to be aligned. Therefore, we present one variable from each of these two somewhat similar styles.

Consistency

There were several questions in the NLSCY which statistically "factored" around the concept of parenting consistency. The individual scores recorded for each question were included in a scale with total scores running from 0 to 20. The higher the score, the more consistent the parenting. For cross-tabulation presentation, we adopted scale cut-offs which divided the population into thirds, and labelled them less consistent, middle, and more consistent. There is no significance to these cut-offs other than the higher the score, the more consistent the style of parenting is likely to be.

The results in Table 3.2 demonstrate a strong inverse association between consistency and vulnerability for all age groups. For example, among 6 to 11 year-olds, only one-quarter the proportion of children raised under higher levels of parenting consistency (25.8 percent) fall into the category of children with the highest vulnerability index scores, compared to approximately one-half of those exposed to the lowest levels of parenting consistency (49.1 percent).

Table 3.2

**Percentage Frequency Distribution of Consistent
Parenting and Child Vulnerability Index**

	Consistent Parenting		
Vulnerability Index	**Less Consistent**	**Middle**	**More Consistent**
Ages 2-3			
Lower Vulnerability	---	38.6%	35.7%
Moderate Vulnerability	34.1%	33.2% *	36.4%
Higher Vulnerability	45.7%	28.1%	28.0% *
Total	100.0%	100.0%	100.0%
Ages 4-5			
Lower Vulnerability	---	18.1% *	38.1%
Moderate Vulnerability	27.6% *	44.3%	38.3%
Higher Vulnerability	54.8%	37.6%	23.6% *
Total	100.0%	100.0%	100.0%
Ages 6-11			
Lower Vulnerability	19.5%	29.7%	34.9%
Moderate Vulnerability	31.4%	38.4%	39.3%
Higher Vulnerability	49.1%	32.0%	25.8%
Total	100.0%	100.0%	100.0%

* Estimates less reliable due to high sampling variability.

--- Sample too small for accurate estimate.

Note: Percentages in table may not add to 100 due to rounding.

Hostile and ineffective parenting

A parenting style categorized as hostile and ineffective was based on a series of separate survey questions. As with parenting consistency, the scores of the individual questions were gathered into a scale that ranged from 0 to 25, and once again, cut-offs were adopted that divided the population into thirds.

Table 3.3 shows that for all age groups, hostile parenting is strongly associated with higher vulnerability index scores. For example, 6 to 11 year-old children with higher vulnerability index scores are proportionately over four times more likely to be residing in households where the parenting style ranks highest in terms of hostility and ineffectiveness than children from lower hostile parenting environments.

Table 3.3

**Percentage Frequency Distribution of Hostile-Ineffective
Parenting and Child Vulnerability Index**

Vulnerability Index	Hostile- Ineffective Parenting		
	Less Hostile	Middle	More Hostile
Ages 2-3			
Lower Vulnerability	53.4%	30.8% *	---
Moderate Vulnerability	22.5% *	53.4%	29.1% *
Higher Vulnerability	---	15.7% *	59.1%
Total	100.0%	100.0%	100.0%
Ages 4-5			
Lower Vulnerability	42.5%	23.1% *	---
Moderate Vulnerability	47.3%	46.4%	18.9% *
Higher Vulnerability	---	30.5% *	69.8%
Total	100.0%	100.0%	100.0%
Ages 6-11			
Lower Vulnerability	49.1%	25.8%	13.5% *
Moderate Vulnerability	37.5%	43.1%	31.1%
Higher Vulnerability	13.4% *	31.1%	55.4%
Total	100.0%	100.0%	100.0%

* Estimates less reliable due to high sampling variability.

--- Sample too small for accurate estimate.

Note: Percentages in table may not add to 100 due to rounding.

Parental health

Information on three aspects of parental health is provided by the NLSCY: parental
depression; conditions that lead to the restriction of activity; and any chronic health
conditions. Our preliminary regression analysis involving this restricted group of factors
revealed that depression had the most important association with our vulnerability index.

Depression

A scale score for adult depression was based on a series of separate survey questions. As
with the two parenting styles discussed above, scores from individual questions were
gathered into a scale that ranged from 0 to 35. Cut-offs were adopted that divided the
population into thirds, with higher scores corresponding to a greater tendency towards
depression.

Table 3.4 reveals a strong association between a higher score on both the depression scale and vulnerability index for all age groups. Three times the proportion of children 6 to 11 years exhibiting the highest level of vulnerability are living with an adult with the highest scores on the depression scale compared to those living with an adult with lower scores.

Table 3.4

**Percentage Frequency Distribution of Adult Depression
Scale and Child Vulnerability Index**

	Adult Depression Scale		
Vulnerability Scores	**Lower Depression**	**Middle**	**Higher Depression**
Ages 2-3			
Lower Vulnerability	40.6% *	28.4% *	27.5% *
Moderate Vulnerability	43.6% *	33.3% *	30.4%
Higher Vulnerability	---	38.3%	42.1%
Total	100.0%	100.0%	100.0%
Ages 4-5			
Lower Vulnerability	35.3%	22.1% *	18.1% *
Moderate Vulnerability	44.3%	35.3%	29.7% *
Higher Vulnerability	20.5% *	42.6%	52.2%
Total	100.0%	100.0%	100.0%
Ages 6-11			
Lower Vulnerability	48.6%	22.6%	17.5% *
Moderate Vulnerability	35.3%	41.0%	34.3%
Higher Vulnerability	16.1% *	36.3%	48.2%
Total	100.0%	100.0%	100.0%

* Estimates less reliable due to high sampling variability.

--- Sample too small for accurate estimate.

Note: Percentages in table may not add to 100 due to rounding.

3.1.3 Community Resources

The NLSCY provides information on two important areas relating to the availability and quality of community resources: neighbourhood characteristics, and level of social support.

Neighbourhood characteristics

Information collected by the NLSCY permits an assessment of certain neighbourhood qualities such as safe streets and parks; neighbourly concern and help; and the presence of problems such as drugs, public drinking, burglary, and racism. Our regression analysis revealed that neighbourhood problems was the most important characteristic in this category.

Neighbourhood problems

The scores and cut-offs for this factor were derived using similar processes described for the preceding three variables. Neighbourhood problems encompasses a number of different issues that may be found in the locale the family lives in, such as litter, the selling of drugs, crime or people who cause trouble. A higher score on the scale corresponds to a larger number of neighbourhood problems. Information in Table 3.5 reveals a strong correspondence across all age groups between neighbourhoods with the greatest number of problems and higher vulnerability index scores. For all age groups, there is almost twice the proportion of higher vulnerability children living in neighbourhoods exhibiting the largest number of problems.

Table 3.5

Percentage Frequency Distribution of Neighbourhood
Problems and Child Vulnerability Index

	Neighbourhood Problems		
Vulnerability Index	**Fewer Problems**	**Middle**	**More Problems**
Ages 2-3			
Lower Vulnerability	36.5%	33.2%	---
Moderate Vulnerability	37.4%	37.9%	---
Higher Vulnerability	26.0% *	28.9% *	48.9%
Total	100.0%	100.0%	100.0%
Ages 4-5			
Lower Vulnerability	37.3%	20.8%	---
Moderate Vulnerability	35.5%	38.9%	---
Higher Vulnerability	27.3%	40.3%	50.2%
Total	100.0%	100.0%	100.0%
Ages 6-11			
Lower Vulnerability	33.5%	34.6%	14.6% *
Moderate Vulnerability	39.2%	36.5%	34.4%
Higher Vulnerability	27.4%	28.9%	51.1%
Total	100.0%	100.0%	100.0%

* Estimates less reliable due to high sampling variability.

--- Sample too small for accurate estimate.

Note: Percentages in table may not add to 100 due to rounding.

Social supports

Community social support is based on responses to a series of questions which were then incorporated into a scale. Cut-offs were selected that divided the population in thirds, with higher scores corresponding to higher levels of social support. Table 3.6 reveals a strong association for all age groups between lower levels of social support for lone-parents and higher vulnerability index scores. Among 6 to 11 year-olds, twice the proportion of more highly vulnerable children are associated with lower support levels compared to those living in communities with higher support levels.

Table 3.6

Percentage Frequency Distribution of Social
Support and Child Vulnerability Index

	Social Support		
Vulnerability Scores	**Less Support**	**Middle**	**More Support**
Ages 2-3			
Lower Vulnerability	27.1%	34.1% *	35.5% *
Moderate Vulnerability	31.4%	39.9%	35.1% *
Higher Vulnerability	41.4%	25.9% *	---
Total	100.0%	100.0%	100.0%
Ages 4-5			
Lower Vulnerability	17.0% *	27.6% *	34.7%
Moderate Vulnerability	33.3%	42.4%	34.3%
Higher Vulnerability	49.7%	29.9%	30.9% *
Total	100.0%	100.0%	100.0%
Ages 6-11			
Lower Vulnerability	24.8%	29.6%	37.4%
Moderate Vulnerability	33.3%	37.1%	42.2%
Higher Vulnerability	41.9%	33.2%	20.4%
Total	100.0%	100.0%	100.0%

* Estimates less reliable due to high sampling variability.
--- Sample too small for accurate estimate.
Note: Percentages in table may not add to 100 due to rounding.

3.1.4 Family Characteristics

Unlike the above three categories of variables - economic, parental and community resources - family characteristics do not necessarily represent resources available to families. Nonetheless, characteristics such as number of siblings; family functioning; parental expectations of children; domestic conflict; mobility and school change; and community and religious participation are

important defining features of families that may have important influences on child outcomes. Preliminary regression analysis revealed that family functioning and number of siblings had the strongest associations with our vulnerability index.

Family functioning

A measure of family functioning [or dysfunction] is used that is based on a series of questions in the NLSCY. The results to a number of individual questions were combined into a scale with scores running from 0 to 35. Our cut-offs were selected so that the population was divided into thirds. Table 3.7 shows that for all age groups a strong pattern emerges whereby the proportion of lone-parent children in the poorest functioning families strongly corresponds with higher vulnerability index scores. For example, among 6 to 11 year-olds, over one-half [54.6 percent] of the children in the poorest functioning lone-parent families exhibited the highest vulnerability index scores, this compared to only 21 percent of those children from lone-parent families who functioned at higher levels.

Table 3.7
Percentage Frequency Distribution of Family
Functioning and Child Vulnerability Index

Vulnerability Index	Family Functioning		
	Worse Functioning	Middle	Better Functioning
Ages 2-3			
Lower Vulnerability	---	21.2% *	51.9%
Moderate Vulnerability	24.9% *	48.8%	30.8% *
Higher Vulnerability	50.3%	30.0%* *	17.3%
Total	100.0%	100.0%	100.0%
Ages 4-5			
Lower Vulnerability	---	25.2% *	32.7%
Moderate Vulnerability	34.1%	40.5%	34.6%
Higher Vulnerability	49.9%	34.4%	32.7%
Total	100.0%	100.0%	100.0%
Ages 6-11			
Lower Vulnerability	15.5% *	29.8%	38.8%
Moderate Vulnerability	29.8%	38.7%	40.2%
Higher Vulnerability	54.6%	31.4%	21.0%
Total	100.0%	100.0%	100.0%

* Estimates less reliable due to high sampling variability.

--- Sample too small for accurate estimate.

Note: Percentages in table may not add to 100 due to rounding.

Number of siblings

There appears to be an association between number of siblings and vulnerability index scores for each age group. Information in Table 3.8 presents results based on the actual number of siblings in each household: none, one, and two and more. Proportionately, children with the highest vulnerability index scores were approximately one and one-half to two times higher if they had two or more siblings as compared to those children with no siblings. This relationship occurred for all age groups. But of interest also is that for 6-11 year-olds [the age group for which highly reliable sample information exists] there appears little association between the lowest vulnerability index scores and number of siblings.

Table 3.8

Percentage Frequency Distribution of Number of
Siblings and Child Vulnerability Index

	Number of Siblings		
Vulnerability Scores	**None**	**One**	**Two or more**
Ages 2-3			
Lower Vulnerability	38.5%	25.8% *	---
Moderate Vulnerability	40.0%	30.9% *	---
Higher Vulnerability	21.6% *	43.3%	43.1% *
Total	100.0%	100.0%	100.0%
Ages 4-5			
Lower Vulnerability	29.1% *	23.6% *	---
Moderate Vulnerability	46.0%	29.5%	34.7% *
Higher Vulnerability	24.8% *	46.9%	42.4%
Total	100.0%	100.0%	100.0%
Ages 6-11			
Lower Vulnerability	29.1%	30.5%	28.1%
Moderate Vulnerability	45.5%	35.8%	32.6%
Higher Vulnerability	25.4%	33.6%	39.4%
Total	100.0%	100.0%	100.0%

* Estimates less reliable due to high sampling variability.

--- Sample too small for accurate estimate.

Note: Percentages in table may not add to 100 due to rounding.

3.2 Multivariate Regression Analysis

Simple bivariate analysis can yield important insights into the relationship between certain dependent variables and a variety of independent factors. The results are also easily understandable compared to more sophisticated statistical techniques. Nonetheless, to investigate the complexity of the mediating factors which affect child development outcomes, a multivariate approach is required. A multivariate analysis controls for the effects of a variety of independent variables, while isolating the direct effects on our vulnerability indices. This cannot be achieved using cross tabulations. The small sample size for each of the lone-parent vulnerability indices makes it impractical to use cross tabulations to investigate anything more complex than direct bivariate effects. Instead, the analysis in this section will rely upon a multiple regression approach, which favours statistically controlling for the influences of our independent variables on the vulnerability indices.

Our analysis of the input variables affecting vulnerability employs standard multiple regression techniques to investigate the complex relationships among our dependent variables and a large number of independent variables. The benefit of multiple regression is its ability to isolate the direct effect of a single variable while controlling for the influence of each of the other variables. This allows us to determine and isolate those variables which have the largest effect on the dependent variable, and those which do not.

The model we utilize to examine the factors affecting the outcomes for lone-parent children divides the resource inputs into four general areas: economic, parental, community, and family characteristics.[12] As demonstrated in Table 3.1 through Table 3.8, a number of the input variables seem to be associated with our vulnerability index. We begin the regression analysis with an investigation of the relationship between each resource area's variables only and the vulnerability index, and then move on to examine the combined effect of all inputs with the use of a single regression model.

---

[12]   Although not really a resource group, the variables in this general category are called such for our purposes here since we believe they do contribute to the overall well-being of children.

3.2.1 Analysis of Four Resource Areas Separately — Regression Results

Economic Resources

This resource input area has been reduced to only one variable, household income. Other economic resource variables, such as low-income cut-offs, source of income, and ownership of dwelling were dropped since they exhibited too high a correlation with household income. Their inclusion would simply tend to obscure any possible income gradient effects.

Another problem occurred with the nature of the income distribution for lone-parent families. Our analysis of the distribution of household income for lone-parents shows it to be highly skewed (Figure 3.1). A comparison to two-parent family household incomes is provided for illustrative purposes only in Figure 3.1, since it demonstrates the high skew associated with lone-parent incomes.

Given this extreme skewness of the lone-parent incomes, and the problems this would create for our regression, it was decided to transform household income. A simple logarithmic (base 10) transformation was performed to overcome the skewness in the lone-parent household income. Household income, therefore, is measured in the regression analyses using logged units rather than in units of dollars.

Examining Table 3.9 for all three groups, we observe that household income is negatively related with the corresponding vulnerability index. Lone-parent children from relatively higher income households are less likely to exhibit vulnerable outcomes (as measured by our index), than children from households with lower incomes.

Figure 3.1

Household Income Distribution
Lone-Parent and Two-Parent Families (NLSCY)

Table 3.9

Regression Analysis Predicting Vulnerability Index Scores
(2-3 year-olds, 4-5 year-olds, 6-11 year-olds)
With Economic Resource Area Variables,
National Longitudinal Survey of Children and Youth
1994-1995

	2 to 3 year-olds		4 to 5 year-olds		6 to 11 year-olds	
	b	Beta	b	Beta	b	Beta
constant	10.396*		31.803*		29.136*	
Household Income (log10)	-0.750	-0.059	-3.967*	-0.219*	-3.564*	-0.186*
R² (adjusted)		0.001		0.046		0.034
Sig. R²		0.215		0.000		0.000
N		440		469		1570

* $p < 0.05$

However, this relationship varies for each of the three age groups. It is strongest for 4 to 5 year-old lone-parent children, where a change of one unit of household income is associated with an approximate four unit (-3.967) decrease in the vulnerability index. The regression co-efficient value for 6 to 11 year-old children is slightly smaller, a one unit change in income is associated with a decrease in the vulnerability index of approximately three and one-half units (-3.564). In comparison, 2 and 3 year-old children experience only a modest decrease in their vulnerability index scores, associated with an increase in household income. A one unit increase in income results in a decrease in our vulnerability index of approximately three-quarters of a unit (-0.750).

The relationships for 4 to 5 and 6 to 11 years are significant at the 5 percent level, but the proportion of the variation[13] in vulnerability [see the R^2 adjusted] accounted for by household income is extremely small, 4.6 percent for 4 and 5 year-olds, and 3.4 percent for 6 to 11 year-olds. The modest negative relationship experienced by 2 to 3 year-old children is not statistically significant.

Parental resources

Eight variables are used to represent parental resources in our regression model. It was first necessary to convert the parental education variable (education of the parent most knowledgeable of the child - PMK) into a four category dummy variable: 'less than high school education,' 'high school graduate,' 'some post-secondary education,' and 'post-secondary graduate.' Our base response category for the regression is the category 'less than high school education.'

The regression results (Table 3.10) indicate that parental resources are an extremely important factor associated with the vulnerability of lone-parent children for all three age groups. Each of the three age-specific regressions account for a significant and considerable proportion of the total variation in our vulnerability indices. Looking at the R^2 values, the parental resources regression equation explains: approximately 28 percent of the total variation in child vulnerability for 2 to 3 year-olds; just over 36 percent of total variation for 4 to 5 year-olds;

---

[13]   Explained variation is accounted for using the adjusted R^2 value for all tables.

and slightly over 34 percent of the total variation in 6 to 11 year-old lone-parent child vulnerability.
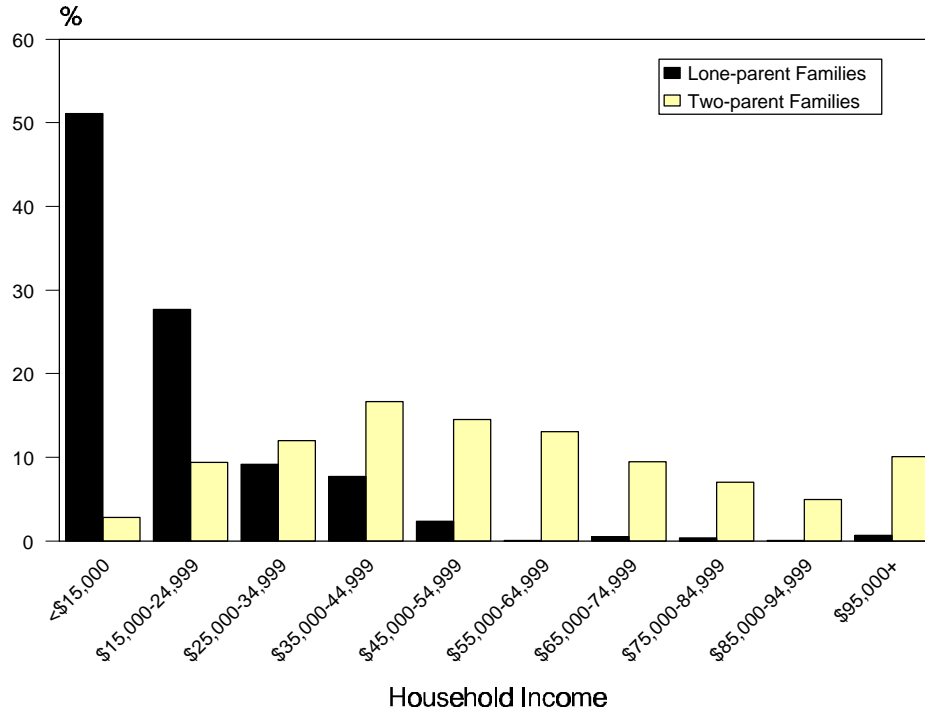
Table 3.10

Regression Analysis Predicting Vulnerability Index Scores
(2-3 year-olds, 4-5 year-olds, 6-11 year-olds)
With Parental Resource Area Variables,
National Longitudinal Survey of Children and Youth
1994-1995

	2 to 3 year-olds		4 to 5 year-olds		6 to 11 year-olds	
	b	**Beta**	**b**	**Beta**	**b**	**Beta**
constant	**5.989***		**11.633***		**9.294***	
Activity Restriction	0.253	0.027	1.274*	0.108*	0.556	0.044
Chronic Health Problem (PMK)	0.114	0.019	-0.066	-0.008	0.053	0.005
Depression (PMK)	0.038*	0.089*	0.021	0.034	0.110*	0.167*
Education PMK (Less than High school=0)						
- High School Graduate	-0.107	-0.013	0.101	0.009	-1.468*	-0.110*
- Some post-secondary	-0.003	0.000	-0.148	-0.018	-1.515*	-0.144*
- Post-secondary Graduate	-0.182	-0.022	-0.676	-0.073	-2.538*	-0.226*
Positive Interaction - Parenting	-0.109*	-0.102*	-0.058	-0.039	-0.103*	-0.065*
Hostile-Ineffective - Parenting	0.211*	0.282*	0.476*	0.449*	0.445*	0.353*
Consistency - Parenting	-0.147*	-0.188*	-0.177*	-0.157*	-0.062*	-0.047*
Punitive (Aversive) - Parenting	0.271*	0.209*	0.211*	0.112*	0.318*	0.136*
R² (adj)		0.276		0.361		0.341
Sig. R²		0.000		0.000		0.000
N		437		463		1531

* p<0.05

Nonetheless, not all of the parental resource variables are important in accounting for vulnerability. In families where the lone-parent experiences an activity limitation, children aged 2 to 3 years, or 6 to 11 years, are neither more or less likely to be vulnerable than children whose parent is without an activity limitation. However, children aged 4 to 5 years seem significantly more prone if their parent experiences an activity limitation. Concerning the presence of a chronic condition in the lone-parent, it is not significantly associated with the vulnerability index for any age group.

Adult depression is significantly associated with vulnerability for 2 to 3 year-olds, and 6 to 11 year-olds. This relationship is much stronger among lone-parent 6 to 11 year-olds (0.110) than it is for the lone-parent children ages 2 to 3 year-olds (0.04). A one unit change in the depression scale for the parents of older lone-parent children, is associated with larger changes to the vulnerability index, in comparison to the changes experienced by younger lone-parent (2 to 3 year-olds) children. Adult depression does not appear to be significantly related to the vulnerability index for lone-parent children ages 4 to 5 years old.

The educational background of the parent (our dummy variable), which ordinarily is a good proxy for socio-economic position of the parent, is not significantly related with our vulnerability index for lone-parent children ages 2 to 3 years, and 4 to 5 years. But for children aged 6 to 11 years, the degree of education attained by their parent is significantly associated with the vulnerability index. Observing the regression co-efficients for each of the dummy variables we can see a definite trend, increasing levels of parental education are associated with lower vulnerability index scores for the children. Lone-parent children 6 to 11 years old, are significantly less likely to experience poor outcomes, as measured by our index, if their parent is more highly educated. A possible explanation for the age differences is that the parent's education plays a larger role when the children themselves are beginning to attend formal schooling, and thus is more likely to be related for older rather than younger children. Nevertheless, this would run somewhat contrary to the prevailing social scientific evidence that suggests the formative years as being prior to the age of 4. As well, a number of children attend pre-school, daycare, and junior kindergarten programs across the country (children

younger than 6 years-old). Socio-economic factors such as parental education would be expected to have an influence here as well. Our evidence does not indicate this.

The final four variables in Table 3.10 we refer to as parenting "styles", and they seem to have significant associations with vulnerability for all three age groups. All four of the parenting scales are significant, except for the 'positive interaction' parenting style which is not significant for 4 to 5 year-olds. The parenting scales 'hostile-ineffective' and 'punitive (aversive)' are positively associated with our vulnerability indices for each age group [as they go up, index scores increase]. On the other hand, the parenting scales 'positive interaction' and 'consistency' are negatively associated with the vulnerability index [as they go up, index scores decrease]. Parenting styles which tap into more negative or detrimental forms of behaviour are associated with higher vulnerability index scores. Thus, those parenting styles which tap into more encouraging parenting traits are associated with lower vulnerability index scores, for all age groups.

As a group, the parental resource area is associated with variations in our vulnerability index for each age group, although the effect of particular variables vary with age. Thus, the presence of hostile-ineffective, punitive-aversive, and consistency in parenting, are strongly associated with our index for 2 to 3 year-olds and 4 to 5 year-olds. While the effect of these variables (except for consistency in parenting) remain relatively strong for 6 to 11 year-olds, other variables such as parental depression and parental education increase in importance.

Community resources

This family resource area considers variables designed to measure the local environment in which the lone-parent child is being raised. It considers the effect that variables such as surroundings and social support have on the vulnerability of the children. The evidence from our regression suggests that the level of neighbourhood problems and social support are significantly associated with the vulnerability index scores of lone-parent children for the two older age groups, and that communal neighbours are important for 6 to 11 year-olds (Table 3.11). However, while these variables are statistically significant, they have limited explanatory value overall, as evidenced by the small amount of explained variation for which they can account: just 2.6 percent for 2 to 3 year-olds; 10.1 percent for 4 to 5 year-olds; and

9.7 percent for 6 to 11 year-olds. These are relatively small, particularly in comparison to the results from Table 3.10.

Table 3.11

Regression Analysis Predicting Vulnerability Index Scores
(2-3 year-olds, 4-5 year-olds, 6-11 year-olds)
With Community Resource Area Variables,
National Longitudinal Survey of Children and Youth
1994-1995

	2 to 3 year-olds		4 to 5 year-olds		6 to 11 year-olds	
	b	**Beta**	**b**	**Beta**	**b**	**Beta**
constant	**8.504***		**19.921***		**18.718***	
Neighbourhood Safety	-0.007	-0.003	-0.274	-0.094	-0.185	-0.052
Communal Neighbours	-0.116	-0.114	-0.004	-0.003	-0.214*	-0.132*
Neighbourhood Problems	0.130	0.095	0.343*	0.174*	0.303*	0.128*
Social Support	-0.034	-0.034	-0.313*	-0.230*	-0.193*	-0.123*
R² (adj)		0.026		0.101		0.097
Sig. R²		0.007		0.000		0.000
N		393		421		1371

* $p<0.05$

Family characteristics

Several variables are used here in order to measure the family context in which the child is being raised. Important factors which can affect the vulnerability index scores of lone-parent children of all ages include: the manner of family interactions, the size of the family, whether they witness domestic conflict, whether they participate in religion, or if they have a parent who volunteers. Some factors in this group may only affect 6 to 11 year-olds, such as how often the child has moved schools, and the expectations parent's have for how far in school their child will go. Given the categorical nature of the school expectation variable, it was transformed into a dummy variable with the base category 'less than high school,' and the other variables 'to college or trade school' and 'to university.'

The overall regression results for all three age groups are significantly associated with our vulnerability index (Table 3.12). However, we observe that only two variables are significant across all three age groups: family functioning and witnessing domestic conflict.

Table 3.12

**Regression Analysis Predicting Vulnerability Index Scores
(2-3 year-olds, 4-5 year-olds, 6-11 year-olds)
With Family Characteristics Resource Area Variables,
National Longitudinal Survey of Children and Youth
1994-1995**

	2 to 3 year-olds		4 to 5 year-olds		6 to 11 year-olds	
	b	**Beta**	**b**	**Beta**	**b**	**Beta**
constant	**4.996***		**12.603***		**11.903***	
Community Volunteer	0.467	0.063	0.483	0.051	0.748*	0.070*
Child Attends Religious Services	0.411	0.066	0.476	0.058	0.842*	0.084*
Family Functioning	0.080*	0.153*	0.094*	0.135*	0.231*	0.244*
Number of Siblings	0.621*	0.198*	0.658*	0.140*	-0.208	-0.039
Child Witness Domestic Conflict	0.824*	0.094*	1.521*	0.133*	1.525*	0.106*
How far in school child will go: (To High School or less=0) - To College or Trade School					-0.576	-0.049
- To University					-2.301*	-0.217*
Number of times moved school					0.533*	0.145*
R² (adj)		0.075		0.070		0.180
Sig. R²		0.000		0.000		0.000
N		433		463		1508

* $p<0.05$

Lone-parent children aged 2 to 11 years, from poorly functioning families are relatively more likely to be associated with higher vulnerability index scores than children from well-functioning families. This effect is observed to be strongest for those lone-parent children aged 6 to 11 year-olds. Similarly, lone-parent children from all three age groups (ages 2 to 11 years), who witness domestic conflict, are relatively more likely to obtain higher vulnerability index scores than children who don't witness such conflict. This relationship is strongest for older children aged 4 to 5 years, and 6 to 11 years. Number of siblings is another important

variable associated with our vulnerability index, but only for children aged 2 to 3 years, and 4 to 5 years. Increased number of siblings in lone-parent families is associated with higher vulnerability index scores.

The four remaining variables in this resource area are statistically significant only for 6 to 11 year-olds. Those lone-parent children who have moved school frequently are associated with relatively higher vulnerability index scores than those who move less frequently. Children whose parents expect them to progress as far as university, appear less vulnerable than those whose parents do not expect them to. Lastly, there are two somewhat unexpected results. Parent volunteering is associated with higher vulnerability index scores; and children who participate in religious activities at least once every year are more likely to be associated with a higher vulnerability index score than children who never participate in religious activities.

Our results suggest that family characteristics contribute to determining the vulnerability index scores of lone-parent children. The overall variation explained by this group of factors is 7.5 percent for 2 to 3 year-olds, 7 percent for 4 to 5 year-olds, and 18 percent for 6 to 11 year-olds.

3.2.2 Analysis of All Resource Areas — Full Regression Model

The analysis of each individual resource area leads to the general conclusion that each of the areas, though not all of the variables in each area, is significantly associated with our vulnerability index. However, these results only control for the influence of the variables *within* any one resource area. We must now use a procedure that controls for the effect of every resource variable upon each other. This will allow us to isolate and assess the direct impact of each variable on the vulnerability index for each of our age groups.

Up to this point we have employed only the unstandardized regression co-efficient, labelled "b" in our tables, to judge a variable's significance. However, in order to compare the magnitude effect that independent variables have upon a dependent variable within an entire regression model, researchers use the standardized regression co-efficient (Beta). Beta measures each variable in terms of standard units of change, thus controlling for the influence of different units of

measurement used to measure the dependent and independent variables. By employing Beta co-efficient values it becomes possible to compare the effects of the independent variables in the same metric, and thus determine which independent variables produce larger amounts of standardized change in the dependent variable. In our analysis, independent variables with the largest effect on our dependent vulnerability index will be those with the largest Beta values.

As well, it was determined during the course of our analysis, that the four parenting variables were important predictors of vulnerability index scores. We were interested in discovering just how much of the total variation in the vulnerability index scores was accounted for by these variables. Therefore, we performed our regression analysis of the full model using all of the variables, noting the relevant regression measurements. Then, we removed the four parenting variables to determine the effect this would have on the model. By comparing the proportion of variation explained (R^2) before and after the removal of the parenting variables we can see how large the impact was of removing these four variables.

Overall, the sum of all the regression variables listed in Table 3.13 is able to account for a relatively good proportion of the variability in the vulnerability indexes [see the R^2 s]. For 2 to 3 year-olds, the regressions explain slightly over 33 percent of the total variation in vulnerability; for 4 to 5 year-olds, 42 percent; and for 6 to 11 year-olds, 40 percent of the variation in vulnerability. These results suggest that our four resource areas in combination are able to account for a substantively significant proportion of the variation in our lone-parent child vulnerability index. This broad conclusion, however, masks the details of which variables are most significantly associated with vulnerability. If we observe the outcomes in Table 3.13, only a few of the variables are significantly related to our vulnerability indices.

Table 3.13

**Regression Analysis Predicting Vulnerability Index Scores
(2-3 year-olds, 4-5 year-olds, 6-11 year-olds)
With All Resource Area Variables,
National Longitudinal Survey of Children and Youth
1994-1995**

	2 to 3 year-olds		4 to 5 year-olds		6 to 11 year-olds	
	b	**Beta**	**b**	**Beta**	**b**	**Beta**
constant	**11.066***		**20.890***		**11.754***	
Household Income (log10)	-1.291*	-0.098*	-2.161*	-0.119*	-0.852	-0.045
Activity Restriction	0.531	0.059	1.400*	0.113*	0.504	0.041
Chronic Health Problem (PMK)	0.027	0.004	-0.041	-0.005	0.220	0.023
Depression (PMK)	0.006	0.013	-0.014	-0.022	0.075*	0.118*
Parental Education	0.193	0.025	0.825	0.073	-0.286	-0.022
- Some post-secondary	0.269	0.041	0.199	0.023	-0.395	-0.038
- Post-secondary Graduate	1.020*	0.122*	-0.237	-0.025	-1.127*	-0.102*
Positive Interaction - Parenting	-0.023	-0.021	-0.07	-0.047	-0.023	-0.014
Hostile-Ineffective - Parenting	0.232*	0.301*	0.512*	0.469*	0.441*	0.351*
Consistency - Parenting	-0.184*	-0.235*	-0.096*	-0.086*	-0.045	-0.034
Punitive (Aversive) - Parenting	0.258*	0.200*	0.155	0.083	0.261*	0.111*
Neighbourhood Safety	-0.042	-0.018	-0.068	-0.023	0.096	0.027
Communal Neighbours	-0.145*	-0.139*	0.001	0.001	-0.119*	-0.073*
Neighbourhood Problems	0.001	0.001	0.292*	0.148*	0.104	0.044
Social Support	0.021	0.021	-0.131	-0.096	-0.011	-0.007
Community Volunteer	0.134	0.019	0.569	0.060	0.764*	0.073*
Child Attended Religious Services	-0.470	-0.075	0.011	0.001	0.545*	0.055*
Family Functioning	0.021	0.041	0.020	0.027	0.068*	0.074*
Number of Siblings	0.475*	0.145*	0.073	0.016	-0.265*	-0.049*
Child Witnessed Domestic Conflict	-0.188	-0.022	0.050	0.004	0.492	0.035
How far in school child will go:					-0.085	-0.007
- To University					-1.266*	-0.120*
Number of times moved School					0.334*	0.088*
R² (adj)		0.331		0.419		0.403
Sig. R²		0.000		0.000		0.000
R² (adj) Without Parenting variables		0.088		0.162		0.252
Sig. R²		0.000		0.000		0.000
N		388		414		1311

* $p < 0.05$

For 2 to 3 year-old lone-parent children, household income, parental education, three parenting variables, communal neighbours and number of siblings are significantly associated with the vulnerability index. Of these seven factors, the three parenting variables are the most important variables directly associated with our vulnerability index: hostile-ineffective (beta 0.301), consistent parenting (beta -0.235), and punitive (beta 0.200). The other four variables are important, but have less influence than any of the three parenting factors. For this age group, we can see by comparing the R^2 values with and without the inclusion of the parenting variables (positive interaction, hostile/ineffective, consistency, and punitive-aversive), that all of the non-parenting variables explain approximately 9 percent of the total variation, while the parenting variables alone explain about 24 percent of the variation.

The results for lone-parent children aged 4 to 5 years old, reveal that household income, parental activity restriction, two parenting variables, and neighbourhood problems are significantly associated with our vulnerability index. Hostile-ineffective parenting is by far the most important (beta 0.469). For this age group, we can see by comparing the R^2 values with and without the inclusion of the parenting variables (positive interaction, hostile/ineffective, consistency, and punitive-aversive), that the four parenting variables alone explain about 26 percent of the variation, with another 16 percent being added by the non-parenting variables.

The 6 to 11 year age group of lone-parent children has the largest number of significant explanatory variables associated with their vulnerability index - eleven. To some extent this is explained by the larger sample size available for this age group.[14] It is also due to a larger number of outcome variables originally included in constructing the vulnerability index for this age group, which provides more variation to be explained.

For 6 to 11 year-olds, household income is relatively unimportant an explanatory variable, but new variables take on significance for the first time such as: adult depression, volunteering, religious service participation, family functioning, educational expectations, and number of times moved school. While there is less reliance on parenting variables overall for this age group,

---

[14]   The sample sizes for the 2 to 3 year-olds and 4 to 5 year-olds are substantially smaller than for the 6 to 11 year-olds. This is a function in large part, of the wider age range.

hostile-ineffective parenting is still by far the most important (beta 0.351), followed by four factors with about the same influence: expectations (beta -0.120); depression (beta 0.118); punitive parenting (beta 0.111); and parental education (beta -0.102).

The reduction in the impact of the four parenting variables (positive interaction, hostile/ineffective, consistency, and punitive-aversive) can be witnessed in the amount of explained variation. Without the four parenting variables included in the regression, the remaining variables measure approximately 25 percent of the total variation. By including the four parenting variables we increase this amount by another 15 percentage points. This figure is somewhat less than the amounts by which R^2 changed for the younger age groups (2 to 3 years, and 4 to 5 years). Our other variables now explain a greater proportion of the variation in vulnerability outcomes for 6 to 11 year-olds.

4. Summary and Qualification of Findings

4.1 Summary of Findings

Our regression analysis leads to several specific conclusions concerning what factors mediate or contribute to good outcomes in lone-parent families. To start with, our original resource area model provided a useful analytic tool, since our preliminary regression analyses demonstrated that all four resource areas contribute to explaining variations in the vulnerability of lone-parent children (i.e. mediating factors were highlighted). Economic resources were important for children aged 4 to 5 years old, and 6 to 11 years old, but not as important for the 2 to 3 year-olds. This was somewhat surprising given that much social research indicates that income and socio-economic circumstances of a family are generally associated with the well-being of young children.[15] Our suspicions regarding this outcome are explained in detail below.

Parental resources are an extremely important factor for all groups. Our preliminary regression determined that the group of factors we have labelled *parenting resources* emerges as the most influential group in terms of explaining variation in lone-parent child vulnerability measured by our index. Of these variables, the parenting scale style referred to as "hostile-ineffective" is by far the most influential. Moreover, it is the only variable in any of our four resource groups to cut across and dominate all age groups.

Community resources were less important for younger children (2 to 3 years old) but played a greater part (as measured by R^2) in explaining the vulnerability of 4 to 5, and 6 to 11 year-olds from lone-parent families. We suspect that this may be an age related resource area since it measures the general neighbourhood, social support and community of the child's family. It therefore seems reasonable to assume that younger children may be less likely to be as exposed to this environment as compared to slightly older children, who would be more likely to play or be active (walking to school, for example) than the younger children. Nevertheless, it is difficult to account for why social support is quite important for older children but not for those 2 to 3 years

---

[15] Duncan, G. *et al*. 1994. See also Keating, Daniel P. *et al*. 1993; Bertrand, Jane. 1998; and Ross, David P. *et al*. 1996.

old. Younger children would demand as much, if not more, from a single parent as children 4 years of age or older.

Our outcomes from the family characteristics section suggest that these variables are important for determining the vulnerability of children in lone-parent families. The variables 'Family Functioning,' 'Witnessing Domestic Conflict,' and 'Number of Siblings' are particularly vital when observing the outcomes of younger lone-parent children (ages 5 and under). These variables are positively related to increased vulnerability index scores and indicate that familial dynamics can affect these young lone-parent children.

These results, however, do not control for the influence of all the variables. Our full regression model yielded results that differed for the most part, across the three age groups of lone-parent children. Parental resource variables, however, are observed to be the most or among the most, influential variables in our full regression model. The most influential variable in all three age groups is still the parenting scale style referred to as "hostile-ineffective." We are not fully satisfied with this particular result, our reasoning is explained in more detail below.

Lastly, in analysing what factors mediate good outcomes for children in lone-parent families, it is important to observe the different influences the various environmental factors have within the different age groups. What appears as a strong mediating or contributing factor for one age group is not necessarily so for another. Different factors seem to be more effective in producing superior outcomes at different ages. Unfortunately, the small sample sizes for the 2 to 3 year-old and 4 to 5 year-old age groups, permits only limited confidence in the results.

4.2   Qualifications to the Findings

Because we regard this analysis using NLSCY data to be exploratory, we feel it necessary to list some serious problems and limitations we encountered using the survey data. These lead us to place some serious qualifications on our regression results.

1. We expected parenting to be an important influence on our vulnerability indices, but not as dominant as it appears, especially for the younger age groups. Upon further investigation, we have concluded that there may be problems in the construction of certain parenting scales used

in the survey which may result in them not being good measures of the independent effect of parenting as an input in a regression analysis. Does a certain style of parenting determine child outcomes, or do certain child outcomes and behaviours determine parenting styles? Which comes first? Parenting styles may produce an independent effect on child outcomes, but equally they may be a reflection of parental responses to the behaviour of their children. Thus, parental scales may in reality be better measures of child outcomes than inputs. What we may have done is unintentionally created regression equations with outcome variables on both sides, in which case this inter-dependence guarantees good regression results.

What is the basis for our belief that certain parenting factors are not independent of child outcomes? When "hostile and ineffective" parenting repeatedly dominated the regressions we went back to look at the seven individual questions that formed the basis of the scale. When we did this we discovered two things.

First, anyone who has parented will not find it unusual that parents adjust - within bounds - their parenting styles and techniques to fit the child. Children with behavioural problems and difficult dispositions are more likely to elicit what may be considered harsher or more restrictive styles than children who are easy to get along with. Yet, our regression analysis is interpreting the style as being independent of a child's behaviour; that style determines child behaviour, and not vice versa. One must examine the seven component questions to realize they are as much a response, as a parenting style associated only with the parent independently of the child's behaviour:

- How often do you get annoyed with child for saying or doing something child is not supposed to say or do?

- Of all the times that you talk to child about their behaviour, what proportion is praise?

- Of all the times that you talk to your child about their behaviour, what proportion is disapproval?

- How often do you get angry when you punish child?

- How often do you think that the kind of punishment you give child depends on your mood?

- How often do you feel you are having problems managing child in general?

- How often do you have to discipline child repeatedly for the same thing?

Second, these seven questions "factored" around something, but why was the term "hostile and ineffective" chosen? This is a very emotive term which evokes strong imagery, which in itself lends weight to its importance as an independent variable, strongly reinforcing the idea that it is a definite parenting style unassociated with child behaviour. We believe other people in assessing these seven questions might just as easily conclude that they factor around something labelled "parental response", in which case it would be seen just as much a measure of child behaviour, as a parenting style determining it.

2. Why is income not more important, when many other studies, and analyses of two-parent families shows it to be very important? We conclude that the level of household income has limited explanatory capabilities, since there is an extremely heavy concentration of incomes in the narrow income band between $5,000 and $25,000 [it includes 79% of lone-parent families with 2 and 3 year-olds]. Figure 3.1 shows just how concentrated incomes are for lone-parents compared to two-parent households. While the income distribution for two-parent households traces a more familiar "normal curve", peaking in the $45,000-$50,000 range, that for lone-parents is markedly skewed at the lower end with the highest concentrations occurring at less than $25,000.

This income concentration, coupled with the small sample sizes in the NLSCY for lone-parents [further reduced because of the use of three age groups], makes it difficult to perform a reliable statistical analysis of the influence of household income on the vulnerability index. If there is a relationship between income and vulnerability, we need more observations in the income ranges beyond $25,000. It is quite likely that the small differences in income in the under $25,000 range do not seriously affect outcomes - they are still all poverty incomes.

A bivariate analysis we have completed for two parent families, and forthcoming elsewhere, suggests that large differences in outcomes do exist when incomes move beyond the lower range. We are currently supplementing this bivariate analysis with regression analysis on two-

parent families using the vulnerability index, to check the results when substantial income variability exists.

On the other hand, when all lone-parent families are poor, it is not surprising that parenting comes out so strongly. In households with severely limited resources, the only important variable available to parents is their parenting skills. In effect, by choosing to study one-parent families, we have effectively and unwittingly controlled for income.

3. Scale values, whether for inputs or outcomes are not equal interval scales. Whereas on an income scale, $30,000 is twice as large as $15,000, on a parenting scale, a score of 30 is not necessarily twice as large as 15. In terms of the underlying behaviour measured, these two numbers could be differentiating between either virtually identical or wildly different behaviours. And different scales will provide different interval values in terms of the differences being recorded in the underlying behaviours. All scale scores tell us is that a higher order number is larger than any other number below it. Unfortunately, the regression procedure treats scale values as equal distances, so that 30 is twice the size of 15. Thus, it is searching to relate these distances to similar outcome differences that may not exist. In effect, scales can give the impression of extensive underlying behavioural differences that do not really exist, they artificially construct differences that confuse the unknowing regression software.

4. Unfortunately, the small sample sizes especially for the 2 to 3 year-old and 4 to 5 year-old age groups, permit only limited confidence in the results. In choosing to perform a detailed regression analysis on only lone-parent families in the NLSCY, we immediately reduced our sample size. Only 17 percent of children in the survey are living with lone-parents.

5. The unavailability of results from the custody section of the survey placed constraints on our analysis. Information on factors such as child's age at time of separation, cause of lone-parenthood, duration of lone-parenthood, custody arrangements, conflict between separated parents, and time spent with non-custodial parent can be expected to have a significant influence on child outcomes, and hence on our regression analysis.

6. One of the qualifications to our findings may be the result of our own doing. The vulnerability index we constructed may be imposing limitations. We chose not to regress against individual outcomes, but rather construct a scale that combined many outcomes, since we were trying to look for children with multiple poor outcomes and identify particularly vulnerable children. Our index may be too much of a mongrel; that is, when composing the original index for our research the many individual outcomes were not weighted by importance before including them in the scale.

    For example, one child may have a high vulnerability index score because they are hyperactive, anti-social and aggressive. Whereas another child may have a similarly high score because they have bronchitis, and did not participate in organized sports or art classes. But do identical scores make them equally vulnerable to a poor development outcome in real life? Probably not, and one should not therefore be searching statistically for connections to similar inputs/environmental factors that produced these high scores.

    As our example demonstrates, vulnerability index scores depend on the values assigned to the constituent individual outcomes, and it would be coincidence that similar scores described similar types of children in real life. Consequently, the regression analysis may be searching for inputs/environments that produce what appear to be similar children, when in fact they are only similar by their scale scores. In real life their environments have produced quite different children, if one observed them, and no amount of investigation, not even by the brightest software, is going to make them similar. So this may have confounded our regression analysis.

5. Broad Policy Implications

The findings of this exploratory study, keeping in mind certain critical qualifications, lead to a few broad policy implications. The majority of children in lone-parent families do not appear particularly vulnerable to poor developmental prospects when looking at a broad range of outcomes. However, as already reported in the first stage of our research ["Variations in Child Development Outcomes Among Children Living in Lone-Parent Families"] in the case of many outcomes, there are proportionately more lone-parent children in the lower ends of the frequency distributions of outcomes than children from all types of families. From a policy perspective, lone-parent families warrant more attention, but since most lone-parent children are not faring poorly, policy initiatives can be relatively selective.

Our research suggests some of the factors that appear to mediate better outcomes for lone-parent children. These mediating factors could be bolstered by providing greater support in certain broad policy areas. Both our separate resource sector analysis and our full regression analysis suggest that the parenting resource group contains the most important factors explaining the variation in vulnerability scores, followed by certain family characteristics, community resources, and economic resources.

However, in looking for policy interventions in these four resource areas it should be noted that the influence of parenting factors seems to diminish considerably as children age. The analysis suggests that policies to support improved parenting will have the biggest impact on 2 to 3 year-olds, somewhat less so for children aged 4 to 5, and considerably less so for 6 to 11 year-olds. In fact, for this older age group, parenting factors, while important, no longer explain more than one-half of the variation in vulnerability scores. Consequently, a shift in focus on policies to support the other three resource areas takes on increased importance as children age.

For the 2 to 3 year-old children, policies that support parenting skills [at work, home and in the community] appear extremely important, but support for other factors such as income, parental education, and communal neighbourhoods also appear particularly effective in mediating good outcomes.

For 4 to 5 year-olds, in addition to the importance of supporting parenting skills, other important factors requiring support are income, assistance for parents with activity restrictions, and fostering neighbourhoods with fewer problems such as drugs, public drinking, and racism.

For the 6 to 11 year group, while still important, support for parenting skills diminishes in importance. Policy supports that focus on alleviating parental depression, enhancing parental educational attainment, and assisting families to function more harmoniously acquire increased importance.

Finally, it is important to note that the NLSCY factors used in our statistical analysis "explain" or account for approximately 40 percent of the variation in vulnerability scores [which by statistical standards is high], but much variation still remains "unexplained." Obviously, there are other factors, not included or dealt with adequately in the NLSCY such as genetic make-up that influence the scores as well. Consequently, this "knowledge gap" should be kept in mind when formulating policy responses.

Appendix A

Missing and Excluded Variables

Missing Variables

Due to the delayed release of NLSCY data on child custody, a number of variables dealing with separation and divorce which are thought to be important influences on child development, are not included in our analysis. However, the following variables will soon be available for analysis:

- child's age at time of separation
- route of lone-parenthood
- presence of step/half siblings
- timing and duration of lone-parenthood
- custody arrangements
- remarriage
- conflict between separated parents
- time spent with father/mother (non-custodial parent)

Excluded Variables

For different reasons, the data gathered from the teacher and principal questionnaires are too incomplete to be used reliably. But in later cycles, if this problem is overcome, there are a list of variables thought important to child development outcomes:

- parental involvement in schooling
- school quality [resources]
- perceptions of school
- discipline climate
- teacher's expectations of students
- social supports available through the school

Appendix B

Variables Composing the Vulnerability Indices

2 to 3 Year-Old Vulnerability Index Variables

For the 2 to 3 year-olds there were eleven relevant variables (three dichotomous, six scale and two categorical) resulting in an index which has a lowest possible score of zero and a high of nineteen, based on the following NLSCY variable questions:

- "Does child attend nursery school?"

- "Would you say child's health is. . ."

- "How often has child been in good health? - past 6 months"

- Chronic conditions (a new dichotomous variable constructed using the following NLSCY variables):
  - ➢ "does child have allergies?"
  - ➢ "does child have bronchitis?"
  - ➢ "does child have heart condition?"
  - ➢ "does child have epilepsy?"
  - ➢ "does child have cerebral palsy?"
  - ➢ "does child have kidney disease?"
  - ➢ "does child have mental handicap?"
  - ➢ "does child have other condition?"

- "Is child limited in normal activity?"

- Hyperactivity-inattention scale

- Prosocial Behaviour scale

- Emotional disorder-anxiety scale

- Physical aggression-opposition scale

- Separation anxiety scale

- Standardized Score for Motor and Social Development scale

Appendix B (Continued)

4 to 5 Year-Old Vulnerability Index Variables

For the 4 to 5 year-olds there were eighteen relevant variables (two dichotomous, seven scales and nine categorical) resulting in an index which has a lowest possible score of zero and a high score of thirty-four, based on the following NLSCY variables:

- "Would you say child's health is . . ."
- "How often has child been in good health? - past 6 months"
- Chronic conditions (a new dichotomous variable constructed using the following NLSCY variables):
  - ➢ "does child have allergies?"
  - ➢ "does child have bronchitis?"
  - ➢ "does child have heart condition?"
  - ➢ "does child have epilepsy?"
  - ➢ "does child have cerebral palsy?"
  - ➢ "does child have kidney disease?"
  - ➢ "does child have mental handicap?"
  - ➢ "does child have other condition?"
- "Is child limited in normal activity?"
- Hyperactivity-inattention scale
- Prosocial Behaviour scale
- Emotional disorder-anxiety scale
- Aggression scale score
- Indirect aggression scale score
- Property offences scale score
- Participated in organized sports?
- Participated in unorganized sports?
- How often has child taken art lessons?
- Participated in clubs/community groups?
- How often did child play video games?
- Child got along with other kids?
- Child got along with parent?
- Standard Score for PPVT-R

Appendix B (Continued)

6 to 11 Year-Old Vulnerability Index Variables

For the 6 to 11 year-olds there were twenty-one relevant variables (three dichotomous, six scales and twelve categorical variables) resulting in an index which has a lowest possible score of zero and a high score of thirty-nine, based on the following NLSCY variables:

- "Would you say child's health is . . ."

- "How often has child been in good health? - past 6 months"

- Chronic conditions (a new dichotomous variable constructed using the following NLSCY variables):
  - ➢ "does child have allergies?"
  - ➢ "does child have bronchitis?"
  - ➢ "does child have heart condition?"
  - ➢ "does child have epilepsy?"
  - ➢ "does child have cerebral palsy?"
  - ➢ "does child have kidney disease?"
  - ➢ "does child have mental handicap?"
  - ➢ "does child have learning disability?"
  - ➢ "does child have emotional, psychological or nervous difficulties?"
  - ➢ "does child have other condition?"

- "Is child limited in normal activity?"

- Hyperactivity-inattention scale

- Prosocial Behaviour scale

- Emotional disorder-anxiety scale

- Aggression scale score

- Indirect aggression scale score

- Property offences scale score

- Participated in organized sports?

- Participated in unorganized sports?

- How often has child taken art lessons?

- Participated in clubs/community groups?

Appendix B (Continued)

- How often did child play video games?

- Child got along with other kids?

- Child got along with teachers?

- Child got along with parent?

- Literacy "How often does child read on their own?"

- Child repeated a grade at school?

- Has parent been contacted this year about [child's] behaviour (at school)?

Appendix C

Independent Variables for Regression Analysis

The number of variables in the full model differs by age group: 2-3 year-olds and 4-5 year-olds have 18 independent variables, while the regression for 6-11 year-olds consists of 20 independent variables. The vulnerability indexes we created are the dependent variables for each regression.

1) Household Income (transformed using logarithm base 10) (LOGINC using ainhq03)

2) Presence of Activity Restriction PMK (arspd01)

   - a Statistics Canada derived variable on the presence or absence of an activity restriction (Yes/No).

3) Presence of Chronic condition PMK (achpd01)

   - a Statistics Canada derived variable on the presence or absence of a chronic condition (Yes/No).

4) Depression - Adult Health Depression Score (adpps01)

   - Statistics Canada scale from 0-36 derived from a Statistics Canada factor analysis of 12 questions, high score is poor health or high depression. Alpha for the scale of 0.82. Response categories for each question:

      ➢ rarely or none of the time (less than 1 day);
      ➢ some or a little of the time (1-2 days);
      ➢ occasionally or a moderate amount of the time (3-4 days);
      ➢ most or all of the time (5-7 days).

   - High scores indicate high levels of depression.

5) Highest level of schooling obtained by PMK (aedpd02)

   - A derived variable. A dummy variable was constructed using the original four categories: Less than secondary (LSTHANHS); Secondary school graduation (HSGRAD); Some post-secondary (SOMEPSE); post-secondary graduate (PSEGRAD) "Less than secondary" as the base or reference dummy variable (not entered into equation).

Appendix C (Continued)

6)   Neighbourhood safety score (asfhs5) (alpha 0.681)

- Statistics Canada Scale 0-6 derived from two questions with response categories: strongly agree, Agree, disagree, strongly disagree.

  ➢ (asfhq05a) Do you (response categories) with this statement about your neighbourhood: "It is safe to walk alone in this neighbourhood after dark"?
  ➢ (asfhq05b) Do you (response categories) with this statement about your neighbourhood: "It is safe for children to play outside during the day"?

- High scores indicate a high degree of perceived neighbourhood safety.

7)   Neighbours Score (asfhs6) (alpha 0.863)

- Statistics Canada Scale 0-15 derived from five questions with response categories: strongly agree, agree, disagree, strongly disagree.

  ➢ (asfhq06a) Do you (response categories) with this statement when thinking about your neighbours: "If there is a problem around here, the neighbours get together to deal with it"?
  ➢ (asfhq06b) Do you (response categories) with this statement when thinking about your neighbours: "There are adults in the neighbourhood that children can look up to"?
  ➢ (asfhq06c) Do you (response categories) with this statement when thinking about your neighbours: "People around here are willing to help their neighbours"?
  ➢ Do you (response categories) with this statement when thinking about your neighbours: "You can count on adults in this neighbourhood to watch out that children are safe and don't get in trouble"?
  ➢ (asfhq06e) Do you (response categories) with this statement when thinking about your neighbours: "When I'm away from home, I know that my neighbours will keep their eyes open for possible trouble"?

- High scores indicate a high degree of neighbour cohesiveness.

8)   Neighbourhood Problems Score (asfhs7) (alpha 0.704)

- Statistics Canada Scale 0-10 derived from five questions with response categories: a big problem, somewhat of a problem, no problem.

  ➢ (asfhq07a) How much of a problem is the following in this neighbourhood: Garbage, litter, or broken glass in the street or road, on the sidewalks, or in yards?

Appendix C (Continued)

> ➢ (asfhq07b) How much of a problem is the following in this neighbourhood: Selling or using drugs?
> ➢ (asfhq07c) How much of a problem is the following in this neighbourhood: Alcoholics and excessive drinking in public?
> ➢ (asfhq07d) How much of a problem is the following in this neighbourhood: Groups of young people who cause trouble?
> ➢ (asfhq07e) How much of a problem is the following in this neighbourhood: Burglary of homes or apartments?

- High scores indicate a high degree of prevalence of neighbourhood problems (bad neighbourhoods).

9)   Social Support (asphs01) (alpha 0.82)

- Statistics Canada scale 0-18 derived from six questions with response categories: strongly agree, agree, disagree, strongly disagree.

> ➢ (afnhq01a) Planning family activities is difficult because we misunderstand each other.
> ➢ (afnhq01b) In times of crisis we can turn to each other for support.
> ➢ (afnhq01c) We cannot talk to each other about sadness we feel.
> ➢ (afnhq01d) Individuals (in the family) are accepted for what they are.
> ➢ (afnhq01e) We avoid discussing our fears or concerns.
> ➢ (afnhq01f) We express feelings to each other.

10)   Volunteering by PMK (asfhq03)

- This variable asks of the PMK: Are you involved in any local voluntary organizations such as school groups, church groups, community or ethnic associations? (Yes/No)

11)   Child attends religious services past year (combined asdcq8 and asdcq9)

- Children without a religion in asdcq8 were coded as not applicable in asdc9. These children were re-coded as "Not at all" for asdcq9 (i.e. they do not attend any religious services during the year).

- Question asdcq9 was then recoded to a dichotomous variable (none / at least once a year or more).

Appendix C (Continued)

- Full questions:
  - ➢ asdcq8 "What, if any is child's religion?" (No religion, R.C., etc.)
  - ➢ asdcq9 "Other than on special occasions (such as weddings, funerals or baptisms), how often did child attend religious services or meetings in the past 12 months?"

- response categories: at least once a week / at least once a month / at least 3 or 4 times a year / at least once a year / not at all.

12) Family Functioning Score (afnhs01 - alpha 0.88)

- Scale 0 to 36 formed from twelve questions, with response categories: strongly agree, agree, disagree, strongly disagree. The twelve items are:
  - ➢ afnhq01a- Planning family activities is difficult because we misunderstand each other.
  - ➢ afnhq01b- In times of crisis we can turn to each other for support.
  - ➢ afnhq01c- We cannot talk to each other about sadness we feel.
  - ➢ afnhq01d- Individuals (in the family) are accepted for what they are.
  - ➢ afnhq01e- We avoid discussing our fears or concerns.
  - ➢ afnhq01f- We express feelings to each other.
  - ➢ afnhq01g- There are lots of bad feelings in our family.
  - ➢ afnhq01h- We feel accepted for what we are.
  - ➢ afnhq01i- Making decisions is a problem for our family.
  - ➢ afnhq01j- We are able to make decisions about how to solve problems.
  - ➢ afnhq01k- We don't get along well together.
  - ➢ afnhq01l- We confide in each other.

- High scores indicating family dysfunction (poor family function).

13) Number of siblings in household (admcd08)

- This variable asks: Total number of siblings (of the child) living in the household (including full, half, step, adopted and foster siblings and excluding the child him/herself). This includes siblings of all ages.

Appendix C (Continued)

14) Witnessed conflict in home - child (aprcq28)

- Question recoded to dichotomous variable (never / seldom or more)

- Full question: "How often does child see adults or teenagers in your house physically fighting, hitting or otherwise trying to hurt others?

- response categories: (often / sometimes / seldom / never).

15) How far do you think child will go in school? (aecdq18b) (6 to 11 year-olds)

- response categories: primary school / secondary or high school / go to community college, technical college or CEGEP / go to university / learn a trade / other.

- question recoded into three dummy variables:

  ➢ **TOHS** - child will go as far as high school - categories: primary school and secondary or high school (Reference category for regression equation).
  ➢ **TOCOLLG** - child will go as far as college or learn a trade - categories: community college, technical college or CEGEP or learn a trade.
  ➢ **TOUNIV** - child will go as far as university - categories: university.

16) Number of times child has changed schools (SCHOOLMV) (6 to 11 year-olds)

- this is a derived variable from merging the two variables aedcq09a (Other than natural progression through the school system in your area, has child ever changed schools? Yes/No) and aedcq09b (How many times has child changed schools? Number of times from 1 up).

- Children answering "No" on aedcq09a are coded as zero on SCHOOLMV. Those children who have moved schools one or more times are given their numerical equivalent from aedcq09b.

17) Positive Interaction (aprcs03, alpha 0.808)

- Statistics Canada Scale 0-20 formed from five questions, original age range 2 to 11 year-olds. Five questions, with possible response categories (Never/ about once a week or less / A few times a week / one or more times a day/ many times each day):

  ➢ (aprcq01) How often do you praise child by saying something like "Good for you!" or "What a nice thing you did!" or "That's good going!"?
  ➢ (aprcq02) How often do you and child talk or play with each other, focusing attention on each other for five minutes or more, just for fun?

Appendix C (Continued)

> ➢ (aprcq03) How often do you and child laugh together?
> ➢ (aprcq06) How often do you do something with child that they enjoy?
> ➢ (aprcq07) [2 yrs old] How often do you play games with child? / [3+ yrs olds] How often do you play sports, hobbies or games with child?
> ➢ High scores indicate good/high positive interaction.

18) Hostile Ineffective Parenting (aprcs04, alpha 0.706)

- Statistics Canada Scale 0-25 formed from seven questions, original age range 2 to 11 year-olds. Seven questions, with possible response categories (Never/ about once a week or less / A few times a week / one or more times a day/ many times each day):

> ➢ (aprcq04) How often do you get annoyed with child for saying or doing something child is not supposed to?
> ➢ (aprcq08) Of all the times that you talk to child about their behaviour, what proportion is praise?
> ➢ (aprcq09) Of all times that you talk to child about their behaviour, what proportion is disapproval?
> ➢ (aprcq13) How often do you get angry when you punish child?
> ➢ (aprcq14) How often do you think that the kind of punishment you give child depends on your mood?
> ➢ (aprcq15) How often do you feel you are having problems managing child in general?
> ➢ (aprcq18) How often do you have to discipline child repeatedly for the same thing?

- High scores indicate bad/high hostile-ineffective parenting.

19) Consistency (aprcs05, alpha 0.660)

- Statistics Canada Scale 0-20 formed from five questions, original age range 2 to 11 year-olds. Five questions, with possible response categories (Never/ about once a week or less / A few times a week / one or more times a day/ many times each day):

> ➢ (aprcq10) When you give child command or order to do something, what proportion of the time do you make sure that they do it?
> ➢ (aprcq11) If you tell child they will get punished if they don't stop doing something, and they keep doing it, how often will you punish them?
> ➢ (aprcq12) How often does child get away with things that you feel should have been punished?

Appendix C (Continued)

> ➢ (aprcq16) How often is child able to get out of a punishment when they really set their mind to it?
> ➢ (aprcq17) How often when you discipline child, do they ignore the punishment?

- High scores indicate bad/high consistency in parenting.

20) Punitive (Aversive) (aprcs06, alpha 0.569)

- Statistics Canada scale 0-19, original age range 2 to 11, four questions with possible response categories (always, often, sometimes, rarely, never):

> ➢ (aprcq21) (When child breaks the rules or does things that they are not supposed to, how often do you) - Raise your voice, scold or yell at them?
> ➢ (aprcq22) (When child breaks the rules or does things that they are not supposed to, how often do you) - Calmly discuss the problem?
> ➢ (aprcq23) (When child breaks the rules or does things that they are not supposed to, how often do you) - Use physical punishment?
> ➢ (aprcq24) (When child breaks the rules or does things that they are not supposed to, how often do you) - Describe alternative ways of behaving that are acceptable?

Bibliography

Amato, P. and B. Keith. 1991. "Separation from a parent during childhood and adult socioeconomic attainment." *Social Forces*, Vol. 70, pp. 187-206.

Bertrand, Jane. 1998."Enriching the Preschool Experiences of Children." In *Determinants of Health: Children and Youth - Vol. 1 Canada Health Action: Building on the Legacy, Papers Commissioned by the National Forum on Health*, Éditions MultiMonde, Sainte-Foy, Québec, Canada.

Blum, Munroe H., M.H. Boyle and D.R. Offord. 1988. "Single-parent families: child psychiatric disorder and school performance." *Journal of the American Academy of Child and Adolescent Psychiatry*, Vol. 27, No. 2, pp. 214-219.

Duncan, G., Brooks-Gunn, J. and Kato Klebanov, P. 1994. "Economic Deprivation and Early Childhood Development," *Child Development*, Vol. 65, pp. 296-318.

Haveman, Robert and Barbara Wolfe. 1994. Succeeding Generations: On the Effects of Investments in Children. Russell Sage Foundation, New York, USA.

Keating, Daniel P. and J. Fraser Mustard. 1993. "Social Economic Factors and Human Development." In *Family Security in Insecure Times, Vol. 1*, National Forum on Family Security, Canadian Council on Social Development, Ottawa, 1993.

Lipman, E., D. Offord and M. Dooley. 1996. "What do we know about children from single-mother families? Questions and answers from the National Longitudinal Survey of Children and Youth." In *Growing up in Canada.* Ottawa: Human Resources Development Canada and Statistics Canada.

McLanahan, S. and G. Sandefur. 1994. *Growing up with a Single Parent: What hurts, what helps*. Cambridge: Harvard University Press.

Ross, David P., Paul Roberts and Katherine Scott. 1998. "Variations in Child Development Outcomes Among Children Living in Lone-Parent Families: An Analysis Using the National Longitudinal Survey of Children and Youth (NLSCY)." Research Paper. Ottawa: Human Resources Development Canada.

Ross, David P., Katherine Scott and Mark Kelly. 1996. *Child Poverty: What are the Consequences?*, Centre for International Statistics, Canadian Council on Social Development, Ottawa.

Statistics Canada. 1996. "Canadian Families: Diversity and Change," *General Social Survey*, Catalogue 12F0061XPE.

Vanier Institute of the Family. 1994. *Profiling Canada's Families*, Ottawa, Canada.

Wadsworth, J., I. Burnell, B. Taylor and T. Butler. 1985. "The Influence of Family Type on Children's Behaviour and Development at Five Years," *Journal of Child Psychology and Psychiatry*, Vol. 26, pp. 245-254.