

DEPARTMENT OF ECONOMICS

WORKING PAPER SERIES

2005-07



McMASTER UNIVERSITY

Department of Economics
Kenneth Taylor Hall 426
1280 Main Street West
Hamilton, Ontario, Canada
L8S 4M4

<http://www.mcmaster.ca/economics/>

FAMILY INCOME, PARENTING STYLES AND CHILD BEHAVIOURAL-EMOTIONAL OUTCOMES

MARTIN DOOLEY^a and JENNIFER STEWART^{b,*}

^aDepartment of Economics, McMaster University, Canada

^bSchool of Public Policy and Administration, Carleton University, Canada

SUMMARY

A positive relationship between income and child outcomes has been observed in data from numerous countries. A key question concerns the extent to which this association represents a causal relationship as opposed to unobserved heterogeneity. We use data from the National Longitudinal Survey of Children and Youth to implement a series of empirical strategies for estimating the existence and size of the effect of income on behavioural-emotional outcomes. We also examine the role of parenting style. Our results indicate that there is little evidence of an effect of income on behavioural-emotional scores. The exclusion of parenting style from the models was found to not bias the estimated income effect, but parenting style was found to have a consistent impact on child outcomes. Copyright © 2006 John Wiley & Sons, Ltd.

Received 21 December 2004; Accepted 4 May 2006

JEL classification: I10

KEY WORDS: child development; income

INTRODUCTION

A positive correlation between income and child outcomes has been observed in data from numerous countries and surveys. Canadian data also indicate that children from lower income families have worse behavioural, emotional and cognitive outcomes than do children from higher income families (Dooley *et al.*, 1998; Phipps, 1999). Governments have used this observation as one of the motivations for income transfers to families with children. For income transfers to be effective, this empirical link must represent a causal relationship. Specifically, can governments expect to improve child behavioural and emotional outcomes substantially by increasing cash transfers to low income families? Or should the government focus on the provision of services, such as early childhood education or parenting training?

It is difficult to conclude that a causal relationship exists between household income and child outcomes using survey data. Unmeasured variables, such as parental health and skill may be correlated with both child outcomes and income. Estimated effects of income on child outcomes will be biased if methods are not employed to account for these unobserved variables. One solution for heterogeneity is to use instrumental variables, but this approach is not commonly encountered in the child outcome literature due to the scarcity of good instruments in most surveys. We believe there does not exist one clearly superior and feasible solution for heterogeneity given the available data. In this paper, we first provide estimates of a conventional model of the effects of income and other socio-economic variables

*Correspondence to: School of Public Policy and Administration, Carleton University, 1125 Colonel By Drive, Ottawa, ON K1S 5B6, Canada. E-mail: jennifer_stewart@carleton.ca

on the behavioural and emotional well being of children and then take a series of steps to assess the validity of those estimates.

Our first step in assessing the effect of income is to use measures of child behavioural-emotional outcomes provided by three different respondents. Most surveys, such as the (US) National Longitudinal Survey of Youth's (NLSY) Mother and Child Supplement, provide only parental reports of child well being. An important and unique feature of our data source, the Canadian National Longitudinal Survey of Child and Youth (NLSCY) is that an identical and large set of questions concerning our outcomes of interest were asked of a teacher, a parent and the older children themselves. The use of responses from three different respondents provides one means for assessing the robustness of our estimates.

Our second step is to incorporate four different measures of parenting style into the conventional model. These measures capture different aspects of parenting (positiveness, hostility, consistency, and punitiveness) that may be correlated with socio-economic status and, therefore, give rise to bias in the estimated effects of income and other variables on child outcomes. The impact of parenting style on child outcomes is also of strong interest in its own right. Some early studies with the NLSCY have concluded that parenting style is at least as important for child development as is socio-economic status (Miller *et al.*, 2002). Such studies, however, relied on data from only the first cycle of the NLSCY and have used only measures of child outcomes provided by the parent, that is, the same person who answered questions concerning parenting styles. In this study, we use data from the first three cycles of the NLSCY and measures of child well being from three different respondents in order to reassess this early conclusion.

Our third step is to estimate the effect of income and parenting style on child behavioural and emotional outcomes using four different approaches apart from our conventional model. The four approaches attempt to account for unobserved heterogeneity and to assess the robustness of our OLS estimates.

Next we review the previous research on the determinants of child outcomes. Then we describe our data and present some preliminary statistics. Further we present our multivariate estimates using OLS and the four alternative estimation techniques to control for unobserved heterogeneity. Finally, we provide a summary and conclusion.

REVIEW OF THE LITERATURE

Equation (1) is representative of the reduced-form model used for empirical studies in this literature

$$CO_{it} = P_{it}\beta_1 + C_{it}\beta_2 + I_{it}\alpha + \varepsilon_{it} \quad (1)$$

where CO_{it} is the i th child's outcome in year t , P is a matrix of observable parental characteristics, C is a matrix of child characteristics, I is household income and ε is an error term. I is typically a measure of average income over a period of years. Estimates of the coefficients in Equation (1) using OLS will be biased if ε includes unobserved variables correlated with I and CO .

The most commonly used US data source for the study of childhood outcomes has been the NLSY Mother and Child Supplement. The Behavior Problem Index (BPI) in the NLSY is based on the mother's answers to a set of questions about the child's behaviour and is similar to our outcome measure. Using a variety of estimation approaches, Blau (1999) concludes that the income effects are sufficiently small that income transfers to poor families are likely to have very little impact on child development. Mayer (1997) also uses a variety of estimation strategies with the NLSY and generally agrees with Blau's assessment but also cautions that a series of small effects on individual outcomes may possibly have a substantial cumulative impact. Korenman *et al.* (1995) also use the NLSY and characterize their income elasticities as 'modest to large' but our reading is that their coefficients are

similar in magnitude to those of Blau and Mayer. Our own work builds closely on this past research to control for unobserved heterogeneity and our results are often similar to theirs. Hence, we postpone a discussion of their specific estimates until the presentation of our own in ‘Multivariate results’.

Most research to date with the NLSCY has concluded that children from low-income families generally experience worse outcomes than other children, but there have been few efforts to control for unobserved heterogeneity (Roberts *et al.*, 2001). Other research has controlled for unobserved heterogeneity in models estimating the effect of income on the cognitive scores of children and conclude that unobserved heterogeneity plays a substantial role in the estimated effect of income, but that income nonetheless has a positive effect on cognitive scores (Dooley and Stewart, 2004).

Parenting style is one source of heterogeneity that may induce bias. Early work with the NLSCY reported that parenting style is quite relevant for child outcomes but is not strongly correlated with socio-economic status and, hence, is not a source of bias when omitted from models used to estimate income effects (Miller *et al.*, 2002; Chao and Willms, 2002). These early studies, however, used only data from the first cycle of the NLSCY and only parental reports of child well being. Using data from three cycles and three reports of child well being, we include four measures of parenting style in order to assess the impact on the estimated income effects but also because of our interest in the effect of this variable in its own right. It is very unlikely that the problem of heterogeneity is fully or even substantially resolved by the addition of the parenting measures. Indeed, estimating the effect of parenting style on child outcomes is arguably plagued by the same heterogeneity problem as income. We, therefore, apply the same alternative (to OLS) strategies to estimating the effect of parenting style as we do to estimating the effect of income.

One source of estimation bias, aside from heterogeneity, is simultaneity between the child outcomes and income. The parenting needs of severely sick children may lead to a reduction in hours of paid work and income. In developed countries, however, children have relatively few serious physical health problems and account for a very small proportion of family income. Hence, our assumption is that simultaneity is much less of a problem in our data than in studies of adult health and income. Some studies of the relationship between child outcomes and maternal labour supply find that they cannot reject the hypothesis that maternal labour supply is exogenous (Anderson *et al.*, 2003; Baum, 2003; Gagne, 2002). Previous research indicates that choices concerning the mother’s labour supply and mode of child care do not have direct influences on child outcomes (Dooley and Stewart, 2004; Dooley *et al.*, 2005; Lefebvre and Merrigan, 2002). Burton *et al.* (2002) hypothesized that simultaneity may also characterize the relationship between child behaviour and parenting style. They present a game theoretic model of the interaction between parents and child and report that parenting style has a larger impact on child outcomes than OLS results would indicate when they account for the bi-directional nature of the relationship. Their empirical support, however, comes entirely from the first cycle of the NLSCY and, more importantly, relies on means of identification with which one can raise legitimate concerns, such as the assumption that a change in schools is exogenous with respect to the incidence of child behavioural problems. Our judgement is that the NLSCY, or other available data sets, do not contain appropriate instruments to deal with either heterogeneity or simultaneity, and, hence, our focus is on a series of alternate estimation strategies for attempting to assess the impact of both income and parenting style on child outcomes.

DATA AND MEASUREMENT

The NLSCY is designed to measure child development and well being over time. The first cycle in 1994–1995 provided information on 22 831 children who were newborn to eleven years of age. Cycles 2 and 3 were collected in 1996–1997 and 1998–1999. The sample excluded children who lived in institutions for more than six months and Aboriginal children living on-reserve. In Cycle 2, a sample of

Table I. Summary statistics for income and other control variables

	Total	Two-parent	Lone mother
Log average income	10.83	10.93	9.94
% Lone mother families	0.10	0.00	1.00
% Two parent families	0.90	1.00	0.00
% Children age <4	0.32	0.33	0.27
% Children age 4-5	0.17	0.17	0.17
% Children age 6-8	0.24	0.24	0.28
% Children age 9-11	0.27	0.27	0.28
Average number of children	2.26	2.30	1.92
% Parent with <high school	0.14	0.13	0.22
% Parent with high school	0.19	0.19	0.16
% Parent with some post high school	0.50	0.50	0.53
% Parent with university degree	0.17	0.18	0.09
% Parent age >34	0.49	0.50	0.48
% Problem drinker	0.06	0.06	0.01
Average positive parenting score	12.61	12.62	12.46
Average hostile parenting score	8.95	8.90	9.44
Average consistency score	15.17	15.22	14.69
Average punitive parenting score	8.84	8.83	8.96

Sample size = 11 474 children in 7609 families

families that had been originally randomly drawn from the National Population Health Survey was dropped and the maximum number of children per family was reduced from four to two. The rate of sample attrition otherwise has been about 10% at each cycle. Research has found that this attrition appears not to be a source of serious bias for the variables which they studied and which we are using in this paper (Hoddinott *et al.*, 2002).

Our sample of children was restricted in the following manner. Our outcome measures are available only for children age 4 and above. Average income over the three cycles is the best available measure of permanent income and we include only families for whom this information is available. We recognize that our measure of 'permanent income' is limited in that it is an average of three reports of annual income spanning only a five-year period. One of our more interesting findings is how similar our estimated income elasticities are to those obtained with longer panels from the (US) NLSY. Finally, changes in marital status are a major source of variation in income but such difficult transitions in family composition may also have non-financial impacts on child well being. Our desire is to focus on the impact of income changes. Hence, we select only children who lived with either the same two parents in all three cycles or the same lone mother¹ in all three cycles. Ninety-four percent of the children who otherwise qualify for our sample also live in one of these two family types which means that there are relatively few marital transitions in our data even if we wished to include this phenomena in our model of child well being explicitly.

Table I presents the summary statistics for the independent variables in our basic sample. The primary respondent for our variables is a parent of the child who is usually the mother. The values for log of average income in the first row correspond to average incomes of \$50 513 for two-parent families and \$19 700 for lone mother families in 1998 dollars. Only 10% of the children in our sample are from lone-mother families, which is less than the 13–15% of children who are from such families in any given year. This difference reflects the fact that lone-mother families are more likely than two-parent families to change marital status and, hence, be excluded from our sample. The children in our sample are

¹We believe that the term 'lone' mother best describes our sample of 'mothers not currently living with a partner'. Statistics Canada restricts the term 'single' mother to refer to 'never married' and the term 'unmarried' could, by some definitions, include those living in common law.

distributed evenly by age and couples have 0.4 more children on average. The parents in two-parent families are slightly more educated and older than lone mothers. The problem drinking variable is equal to one if either parent drinks at least 2–3 times a week AND on more than 12 occasions in the last 12 months has had more than 5 drinks, and equal to zero otherwise. Such a drinking problem was reported in 6% of two-parent families and 1% of lone mother families. This measure is similar to those that we have found in the relevant literature (Bradley *et al.*, 2003). Failure to include a problem drinking measure might lead to biased estimates of the coefficients for income and parenting (Snow Jones *et al.*, 1999).

Summary statistics for the four measures of parenting styles are in Table I. The component questions for each measure are presented in Appendix A. These questions are answered by the parent for children 11 years old and under. Higher scores for positive parenting and consistent parenting indicate more effective interaction between the parent and child, and should be associated with better behavioural-emotional outcomes. Higher scores for hostile parenting and punitive parenting indicate less effective parenting practices, which we expect will reduce behavioural-emotional outcomes. The questions used in the construction of the behavioural-emotional scores are presented in Appendix A. The aggregate score is the sum of the scores for four problem areas each of which represents the sum of scores received on the answers to five to eight questions. The four problem areas are hyperactivity disorder, conduct disorder, emotional disorder, and property offence. A higher score on a question means that the event occurs more often and, therefore, a higher aggregate score indicates more behavioural-emotional problems. We expect a negative relationship between family income and a child's behavioural-emotional score. The same set of questions were asked of teachers for all children age 4 and over, of the parent for children age 4–11, and of the children age 10 years and older. We estimate our models on all three measures. Children age 12 and older were asked about parenting, but we do not use this information because the parenting questions asked of the older children differed markedly from those asked of the parent for children age 11 and under. Teachers were not asked about parenting style. Our outcome measures have a long history of development and use in Canadian studies of child well-being and are very similar to measures which have been used in other surveys and countries in particular the (US) National Longitudinal Survey of Youth (Cadman *et al.*, 1986; Boyle *et al.*, 1987; Baydar, 1995).

Table II contains the summary statistics for measures of child behavioural and emotional well being as provided by three respondents in the NLSCY. For all respondents, we see that low average income is related to higher behavioural-emotional scores, being in a lone parent family is related to higher scores and these differences are statistically significant (p -values < 0.05).

The bottom panel of Table II presents kappa scores, which indicate the degree of agreement on a score between two different respondents. The simplest kappa score is

$$(Observed \text{ Agreement} - Expected \text{ Agreement}) / (1 - Expected \text{ Agreement})$$

Observed agreement is the percentage of instances in which the parent and the teacher assign the same score to a given child. Expected agreement is the percentage of instances in which a random draw from the sample of parent scores and a random draw from the sample of teacher scores would be expected to have the same value.

We report a weighted kappa score that gives more weight to scores that are closer together. All of our kappa scores are statistically different from zero indicating that we can reject the null hypothesis that the scores are a random draw. A rating scale for the strength of agreement represented by kappa scores has been constructed (Landis and Koch, 1977). They rate scores between 0 and 0.20 as having only slight agreement. All of our scores are in this range with only two exceptions indicating that there is only slight agreement between our respondents. This low level of agreement does not necessarily mean, however, that the estimated relationship between the behavioural-emotional score and income (or other family characteristics) will vary by respondent, as we shall show in the next section.

Table II. Behavioural-emotional scores – ranges, means, standard deviations (parentheses) and kappa scores

	Teacher	Parent	Self
Range	0–56	0–56	0–56
Total	7.19 (7.59)	8.85 (6.83)	11.74 (7.25)
Below average income	10.00 (9.83)	10.87 (8.11)	12.46 (7.61)
Above average income	6.76 (7.09)	8.55 (6.56)	11.64 (7.19)
Lone mother	10.93 (9.94)	11.99 (8.61)	13.12 (7.57)
Two parents	6.82 (7.21)	8.55 (6.55)	11.58 (7.19)
Sample size	9852	9852	7476
Kappa scores			
Comparing teacher and parent reports			
	Agreement	Expected agreement	Kappa
Total w/IA	86.96	84.03	0.1837
Total	87.31	84.16	0.1990
Property offense	93.51	92.43	0.0528
Indirect aggression	84.22	82.16	0.1157
Emotion	84.57	82.52	0.1176
Conduct	88.00	85.66	0.1637
Hyperactivity	79.49	72.52	0.2536
Comparing teacher and self reports			
	Agreement	Expected agreement	Kappa
Total w/IA	77.44	74.79	0.1052
Total	76.82	74.25	0.0996
Property offense	72.36	71.43	0.0326
Indirect aggression	79.69	77.66	0.0907
Emotion	78.15	75.61	0.1040
Conduct	87.41	84.61	0.1818
Hyperactivity	79.14	74.37	0.1863
Comparing parent and self reports			
	Agreement	Expected agreement	Kappa
Total w/IA	84.78	81.76	0.1653
Total	84.70	81.58	0.1696
Property offense	80.46	79.75	0.0348
Indirect aggression	83.69	81.45	0.1211
Emotion	83.14	80.33	0.1432
Conduct	88.77	86.48	0.1693
Hyperactivity	82.71	77.33	0.2373

MULTIVARIATE RESULTS

OLS estimates of the income effect

Our starting point is the ordinary least squares model.² These estimates were obtained by stacking the data from all three cycles and are reported in Table III. The unit of observation is the reported score and, therefore, there may be up to three observations for one child and up to six observations for a

²The frequencies for our dependent variables are concentrated at low values though there is not major lumping at a value of zero. The proportion of observations with a value of zero is 7% for the parental score, 15% for the teacher score, and 4% for the self-report. As an alternative to least squares, we did estimate a Tobit model which yielded inferences very similar to those in Table III.

CHILD BEHAVIOURAL-EMOTIONAL OUTCOMES

Table III. OLS estimates of income effect

	Teacher	Parent	Self	Teacher with parenting	Parent with parenting
Log income	-0.15 (0.04)	-0.15 (0.04)	-0.06 (0.05)	-0.16 (0.04)	-0.14 (0.04)
Lone mother	0.31 (0.10)	0.35 (0.10)	0.16 (0.07)	0.25 (0.08)	0.24 (0.07)
Number of children	-0.04 (0.02)	0.03 (0.03)	0.05 (0.03)	-0.06 (0.02)	-0.02 (0.02)
Child age 6–8	0.05 (0.04)	-0.03 (0.04)		0.07 (0.04)	0.02 (0.04)
Child age 9–11	-0.04 (0.04)	-0.12 (0.05)		-0.01 (0.04)	-0.07 (0.05)
Child age 12–13			0.00 (0.03)		
Child age 14–15			0.02 (0.05)		
Parent HS dropout	0.28 (0.08)	0.25 (0.09)	0.01 (0.07)	0.27 (0.07)	0.20 (0.06)
Parent some	0.08 (0.04)	0.12 (0.05)	-0.03 (0.05)	0.06 (0.04)	0.07 (0.04)
Post-secondary					
Parent university	-0.05 (0.05)	0.01 (0.06)	-0.06 (0.07)	-0.05 (0.05)	0.03 (0.05)
Parent >34	-0.08 (0.04)	-0.09 (0.05)	-0.10 (0.05)	-0.06 (0.04)	-0.05 (0.04)
Problem drinker	0.00 (0.06)	0.23 (0.07)	0.18 (0.07)	-0.04 (0.06)	0.09 (0.06)
Child female	-0.46 (0.03)	-0.20 (0.04)	-0.11 (0.04)	-0.43 (0.03)	-0.15 (0.03)
Positive parenting				0.01 (0.02)	-0.04 (0.02)
Hostile parenting				0.15 (0.03)	0.44 (0.03)
Consistency				0.02 (0.02)	-0.06 (0.02)
Punitive parenting				0.01 (0.02)	0.03 (0.02)
Lone mother*				0.19 (0.09)	0.21 (0.10)
Hostile parenting					
Constant	0.25 (0.07)	-0.02 (0.09)	-0.01 (0.09)	0.26 (0.07)	0.06 (0.07)
R-squared	0.11	0.06	0.02	0.15	0.33
Sample size	9452	9452	7350	9398	9398

Sample is children observed in all three years with constant family type (two-parent or lone mother). Income is average income over 3 cycles. Standard errors in parentheses.

household. In order to facilitate the interpretation of our coefficients, we used normalized versions of both the behavioural-emotional scores and the parenting style scores in our regressions, that is, the units are standard deviations. The standard errors were corrected for multiple observations from a family. By design, our measures of income and family structure do not vary over the three cycles and other variables, such as parental education, change little over time. The intercept refers to a boy from a two-parent family whose parent is more than 34 years old and has a high school diploma.

The sample of observations for which we have behavioural-emotional scores reported by the teacher and scores reported by the parent differs. The parent scores are limited to children age 4–11 whereas the teacher scores cover ages 4–15. We report estimates obtained with those observations for which we have behavioural-emotional scores from both the teacher and the parent and as a result, the sample is limited to children age 4–11. The estimates in Table III for the self-reported scores are based on a sample of all

available observations. The self-report scores are only available for children age 11–15 and, hence, there is relatively little overlap with the samples of observations with teacher and parent scores.

The first three columns of Table III omit the parenting style variables. Overall, the estimated effect of income is quite similar for all three scores. Higher income is related to lower (better) behavioural-emotional scores. An approximate doubling of income (increase of 0.7 of a log) reduces the score by approximately one-tenth of a SD. In their conventional models, Mayer and Blau report income effects of a similar size despite having substantially longer income panels. These income effects are reduced by roughly 15% when they add a measure of the mother's score on a cognitive test (AFQT or Armed Forces Qualification Test). An AFQT score or its equivalent is not available in the NLSCY. As also found by most other researchers (Blau, 1999; Mayer, 1997; Dooley and Stewart, 2004), the use of current income (not shown here) yields coefficients that are one-half the size of those obtained with 'permanent income.'

The coefficient for lone mother is statistically significant in all our models. A child in a lone mother family has a behavioural-emotional score which is about one-third of a SD higher than an observationally equivalent child in a two parent family for the teacher and parent scores and around one-tenth of SD higher for the self-reported scores. We hasten to add, however, that the interpretation of the 'lone mother effect' is far from obvious given the available data. The higher behavioural-emotional scores for the children of lone mothers could reflect a number of factors including the lack of resources (time, social support, etc.) in such families (Lipman *et al.*, 1994, 2002) or the lagged effect of paternal abuse in a former two-parent family (Macmillan *et al.*, 2001). In an alternate specification, we also interacted the lone mother dummy with income. The estimated coefficients were invariably small and statistically non-significant and, hence, are not shown here.

The children of the least schooled (less than HS diploma) parents have scores that are about one-quarter of a SD higher (worse) than those of other children. We have no ready interpretation for the positive and statistically significant (though small in magnitude) coefficient for the parents with some post secondary schooling. The coefficient for a university degree is not significantly different from zero. Parent's education level is not statistically significant for the self-reported scores and this is true when family income is removed from the regression.

Girls have scores that are one-tenth (self-reported) to one-half (teacher) of a SD lower than the score for boys. The children of older parents have slightly lower (one-tenth of a SD) scores. The number of children has a significantly negative coefficient in the case of the teacher score but not for the parent or self-reported scores. The age of the child has a significantly negative coefficient in the case of the parent scores but not for the teacher scores. If one includes older children in the sample with teacher scores, then the children age 12–13 and 14–15 have statistically significant coefficients equal to -0.10 and -0.16, respectively, but there are no substantial changes in the other coefficients. Older children have statistically significant worse self-reported scores. Problem drinking is associated with significantly worse parental and self-report scores.

The final two columns in Table III provide the OLS estimates for the teacher and parent scores with the parenting style variables included in the model (which leads to a slight loss in sample size due to missing values). We estimated models with interactions between each parenting measure and the lone mother dummy variable. The only instance in which we found consistently significant effects is the interaction with hostile parenting and it is the specification with this interaction term that is reported in Table III. The inclusion of the parenting style variables has little effect on most other coefficients, in particular those for income, which implies that the absence of these measures was not a source of bias in the estimated income coefficient. One exception is that problem drinking no longer has a significant effect impact on the parental score when parenting measures are included.

In the case of teacher scores only the coefficient for hostile parenting is statistically significant and a one SD increase in this score leads to an increase of 0.17 of a SD in the teacher score. The parenting style variables have significant impacts of the expected sign in the case of the parent

scores. Of particular note is hostile parenting, an increase of one SD in which is associated with an increase of 0.44 of a SD in the parent score for couples and an increase of 0.65 of a SD for lone mothers. The *R*-squared values increase from 0.11 to 0.14 for the teacher scores and from only 0.07 to 0.32 for the parent scores. This much greater impact of parenting styles on the parent scores is also true of each individual score (conduct, emotions, hyperactivity and property offences) and may reflect true differences in children's behaviour and emotions, i.e. children may behave and appear quite differently at school and in the home. This same difference, however, may also indicate different perceptions and ratings of the same behaviour and emotions by the teacher and the parent. The greater impact on parent scores, in particular, may reflect the fact that the same person (the parent) is rating the parent's and the child's behaviour. There may be a tendency for parents to view their own parenting in the same light (good or bad) as they see the behaviour and emotional well being of their children.

Parenting style is of interest in its own right and estimates of this variable may be plagued by the same heterogeneity problem as income. Hence, we include the parenting style variables in all of the following analyses, which test the robustness of the OLS estimates. We also continue to include variables other than income and parenting style, such as parental age and education, in the model. The coefficient estimates for these variables, however, change little in other estimation strategies and, for the sake of brevity are not presented in subsequent tables.

In results not shown here, we estimated our models using a single dummy variable for being in low income,³ linear income, income categories, separate family types and for individual components of the aggregate emotional and behavioural scores, all of which yielded similar inferences. In such multivariate models, for example, children in families with low income have teacher (parent) scores which are 0.26 (0.21) of a SD higher than children in families without low income. The other coefficient estimates are very similar to those in Table III. One final sensitivity test was to estimate the effect of low income and being from a lone mother family using propensity score matching methods. The estimated effect of low income was similar to coefficients estimated with weight least squares. Low income was related to higher teacher and parent scores, but not self-reported scores. The estimated effect of being from a lone mother family was smaller than the estimates of Table III in the case of teacher scores (0.24) and parent scores (0.31), and larger than the estimates of Table III in the case of self-reported scores (0.21). A common support was imposed on the matching process, which resulted in 22 observations being dropped from the low income group when matching and 15 observations from the lone mother group (Leuven and Sianesi, 2003).

Fixed effects models

The first of our alternative estimation strategies is the fixed effects model. This strategy assumes that the unobserved heterogeneity is constant over time (or within families). Referring back to Equation (1), this model assumes that $\varepsilon_{it} = v_i + \omega_{it}$, that is, that there is a part of the error that is constant for each child (or family) over time. Taking differences between time periods (or siblings) will eliminate the constant unobserved heterogeneity as a source of bias in the estimated income effects. Differencing also increases the variance of estimators and may induce bias as the relative importance of error in the measurement of control variables increases. Family income in the NLSCY does change over time but the availability of only three cycles limits the amount of variation. In addition, the source of the unobserved heterogeneity may not be constant over time or between siblings. For example, changes in income may be correlated with changes in the unobserved determinants of child outcomes such as parental health and family functioning.

³Our measure of low income is based on the Statistics Canada Low Income Cutoff (Pacquet, 2002). Low income is defined as the income level at which the expected expenditure on food, clothing, and shelter is 20 percentage points higher than the average expenditure.

We estimate both a child-specific fixed effects model and a family-specific fixed effects model. The estimates of the child-specific fixed effects model, which must be based on current income, are in the first three columns of Table IV. The sample sizes are smaller than in Table III because of the restriction that we have more than one report for the child. The penultimate row shows the mean differences in outcome scores over time.

The income coefficients are not statistically significant in the fixed effect models with one exception. The child-specific model indicates that an increase in income is related to an improvement of one-third of a SD in the self-reported score. One interpretation of this result is that the OLS estimates of the income effect for the teacher and parent scores are due mainly to unobserved heterogeneity, but our caveats regarding fixed effects estimation may also be the explanation. The parenting style variables have the expected results in the majority of cases in the child-specific model in Table IV. In this model, the coefficients for positive parenting are significantly negative for both scores and substantially larger for the teacher score than in Table III. Hostile parenting still has the largest effect of the parenting variables but the coefficients are markedly smaller in the child-specific model than in the OLS model. In the family-specific model, the only significant coefficients are punitive parenting for the teacher score and hostile parenting for the parent score.

In summary, the fixed effects models do not provide evidence that income can improve behavioural-emotional scores, but do provide some support for the effect of parenting style, particularly hostile parenting. The very weak income estimates may reflect the availability of only three NLSCY cycles but we note the similarity to fixed effects estimates obtained by other researchers with the longer panel of NLSY data. Blau estimates three fixed effects models: difference over time between observations for the same child, between siblings, and between cousins. In each case, he finds small and imprecisely estimated income effects. Blau uses linear income and our results are similar to his when we use linear income. Of course, both Blau's results and ours may reflect the shortcomings of the fixed effects approach described above. For this reason, we turn to other strategies for evaluating the conventionally estimated income effects.

Income before and after an outcome

This strategy assumes that past income has a bigger effect on child outcomes than does future income. Parents may have better information about past income than about future income or there may be

Table IV. Fixed effect models

	Child-specific			Family-specific		
	Teacher	Parent	Self	Teacher	Parent	Self
Log income	-0.01 (0.04)	0.05 (0.04)	-0.34 (0.05)	-0.06 (0.21)	0.14 (0.19)	0.01 (0.24)
Positive parenting	-0.06 (0.02)	-0.11 (0.02)		0.04 (0.04)	-0.03 (0.04)	
Hostile parenting	0.06 (0.02)	0.29 (0.02)		0.02 (0.05)	0.48 (0.04)	
Consistency	0.01 (0.02)	-0.06 (0.02)		0.05 (0.05)	-0.04 (0.04)	
Punitive parenting	0.00 (0.02)	0.02 (0.02)		0.14 (0.05)	0.00 (0.05)	
Adjusted R-squared	0.54	0.67	0.31	0.23	0.49	0.27
Average raw difference	0.33	0.13	0.01	0.32	-0.14	4.17
Sample size	4833	4833	5646	1250	1252	1046

Standard errors in parenthesis. For child-specific models current income is used. For family-specific models income is log of average of year of test and prior year.

capital market imperfections. It is also assumed that parenting style in the past has a stronger impact on child outcomes than does future parenting style.⁴ A final assumption of this approach is that those unobserved determinants of child outcomes that are correlated with income and parenting style are also fixed over time. Under these assumptions, a finding of no difference in the estimated effects of past and future income (or parenting style) is consistent with the hypothesis that the income or parenting style coefficients mainly reflect heterogeneity. One problem with this approach is that we are forced to rely on measures of income and parenting style based on only one year of data. As indicated, the literature and our own work have shown that such estimates can be quite imprecise.

We analyse the relationship of Cycle 2 outcomes with both Cycle 1 ('past') and Cycle 3 ('future') income and parenting styles, and test for the equality of the Cycle 1 and Cycle 3 coefficients. The sample size is considerably smaller than in Table III because we are using only Cycle 2 outcomes. For all three scores, none of the income coefficients are significantly different from zero and the *F*-tests at the bottom of Table V cannot reject the hypothesis of equality between the Cycle 1 and Cycle 3 coefficients. These results do not support the hypothesis that income has a causal effect on behavioural-emotional outcomes. They may also reflect the fact that we are using measures of only one year of income that can be quite noisy. In previous research (Dooley and Stewart, 2004), we did find that Cycle 1 income effects were often stronger than Cycle 3 incomes in the case of two cognitive outcomes. Using a longer panel of income data from the NLSY, Mayer found that future income had a substantially smaller estimated effect on child outcomes (cognitive and behavioural) than did past income, however, the difference between past and future income coefficients was not always large in an economic sense (Mayer, 1997).

Hostile parenting in Cycle 3 is statistically significant in the case of the teacher scores, which is unexpected. For parent scores, positive parenting has a significant effect of the expected sign only in Cycle 3. Hostile parenting has positive impacts in both cycles, however, the Cycle 3 coefficient is larger than the Cycle 1 coefficient. Hence we have no instances in which the Cycle 1 coefficient is larger than the Cycle 3 coefficient and several instances in which the reverse is true. Stronger Cycle 3 effects may reflect simultaneity, i.e. the influence of past child behaviour on future parenting style. Unlike in Table III, none of the interaction coefficients between lone mother and hostile parenting is significant. Our general reading of Table V is that this sample has yielded estimates that are too imprecise to draw any firm conclusions.

Income, consumption activities and child outcomes

Our final two estimation strategies apply only to the income effect. This strategy is based on the assumption that consumption expenditures, especially child-related expenditures, are one pathway by which income might influence child outcomes. We first construct two indicators of family consumption levels and then introduce these measures into the child outcome regressions in order to assess how much of the income effect might be accounted for by the consumption pathway. Failure of the income coefficient to change when consumption is inserted into Equation (1) is consistent with the hypothesis that all or most of the estimated income effect is due to unobserved heterogeneity. A change in the income coefficient could, however, result from one or both of the following: (i) income influences consumption which, in turn, truly affects child outcomes and (ii) an unobserved variable is correlated with all three of consumption, income and child outcomes. Hence, a finding that the inclusion of consumption measures does reduce the income coefficient does not constitute definitive proof of an effect of income.

We define two sets of consumption indicators in the NLSCY: child activities and housing. Data for child activities come from questions asked of the parent concerning the child's participation 'outside of

⁴It is possible, however, that child outcomes have an effect on future parenting style. See the discussion of simultaneity in 'Review of the Literature' and the comment below.

Table V. Income and parenting scores before and after an outcome

Cycle 2 outcomes	Parent	Teacher	Self
Cycle 1 Log income	-0.08 (0.08)	-0.09 (0.07)	-0.02 (0.07)
Cycle 3 Log income	-0.02 (0.09)	-0.13 (0.07)	-0.04 (0.05)
Cycle 1 Positive parenting	0.08 (0.05)	0.02 (0.03)	
Cycle 1 Hostile parenting	0.16 (0.04)	0.06 (0.04)	
Cycle 1 Consistency	-0.05 (0.04)	0.00 (0.03)	
Cycle 1 Punitive parenting	0.01 (0.03)	0.03 (0.04)	
Cycle 3 Positive parenting	-0.08 (0.05)	0.05 (0.04)	
Cycle 3 Hostile parenting	0.21 (0.04)	0.09 (0.04)	
Cycle 3 Consistency	0.01 (0.04)	0.02 (0.03)	
Cycle 3 Punitive parenting	0.04 (0.04)	0.01 (0.03)	
Lone mother *	-0.07	-0.10	
Cycle 1 Hostile parenting	(0.14)	(0.28)	
Lone mother *	0.14	0.10	
Cycle 3 Hostile parenting	(0.13)	(0.23)	
R-squared	0.2311	0.1411	0.0157
Sample size	2389	2389	2424
<i>F</i> -test for the equality of coefficients:			
Income	0.18	0.05	0.02
Positive parenting	3.53	0.33	
Hostile parenting	0.59	0.47	
Consistency	0.92	0.16	
Punitive parenting	0.24	0.12	
Hostile parenting*lone mother	1.36	0.24	
Degrees of freedom	(1, 2143)	(1, 2143)	(1, 2169)

Sample selection same as Table III with only cycle 2 outcomes. Standard errors in parentheses. *F*-test reports the *F*-statistic for tests of the equality of the cycle 1 and cycle 3 coefficients.

school hours' in supervised sports, unsupervised sports, the arts, clubs, day camp and night camp. Data for housing come from questions asked of the parent and interviewer concerning the type of housing and the need for repairs. Appendix B describes these questions and possible responses. We construct an index for each set of consumption indicators as follows. In two separate regressions, the log of family income is regressed on a series of dummy variables for all possible responses to the activity and housing questions, respectively. The predicted value of log income from each regression and for each child serves as the index of activity participation and housing quality; the regression coefficients providing the index weights. Mayer used this same method of index construction so as to obtain indices which would be most likely to reject the null hypothesis, i.e. lower the absolute value of the income coefficient when introduced into a child outcome regression (Mayer, 1997).

We normalize the values of each index (child activity and housing) by subtracting the sample means and dividing by the sample standard deviations. The normalized values of the indices for child activity and housing are then included in child outcome regressions, which are otherwise the same as those in Table III. The first two rows of Table VI contain the coefficients for the housing and activity indices which indicate that greater consumption is associated with better outcomes. The coefficients indicate that a change of one SD in the index is associated with a decrease of 0.06–0.07 of a SD in the outcomes.

Table VI. Consumption activities and child outcomes

	Teacher	Parent	Self
Housing index	-0.07 (0.03)	-0.06 (0.02)	-0.04 (0.04)
Activity index	-0.06 (0.02)	-0.08 (0.02)	-0.08 (0.02)
Change in coefficients with addition of indices:			
Log income	-0.07	-0.08	-0.04
R-squared	0.15	0.33	0.08

Sample is same as Table III with a few observations not included due to missing information in indices. Standard errors in parentheses.

The second panel indicates the changes in the income effect brought about by including the consumption indices in the regressions. This change provides one measure of how much of the conventionally estimated income effect in Table III might be operating via consumption expenditures. The inclusion of indices reduces the income coefficients by approximately 50 per cent for each score. Evidence from the NLSY is similar to ours with respect to both the effect of consumption indexes on child outcomes and the reduction in the income coefficient in the outcome regressions when the consumption indexes are included (Mayer, 1997). Hence, both our results and those from US data imply that at least some of the conventionally estimated effect of income on child outcomes is not due solely to heterogeneity and may indeed reflect a causal effect operating via consumption expenditures. However, the size of the implied income-via-consumption effect is definitely smaller than the conventional estimates in Table III.

Welfare income

This strategy examines the link between child outcomes and variation in the level of welfare benefits, which we assume to not be correlated with heterogeneity given that the provincial governments set the benefits. Our hypothesis is that higher benefits will narrow the outcome gap between children in two-parent families and those in lone mother families. Only 5%–8% of two-parent families in the NLSCY reports any annual income from welfare as opposed to 50%–60% of lone mother families. Provinces differ in ways other than welfare benefits. Hence, the regressions in this section include the provincial unemployment rate to control for labour market conditions and a set of provincial dummies to control for other policy differences that might influence child outcomes, such as educational and health expenditures.

One potential problem with this strategy is that an increase in welfare benefits may not just increase the income of those families already on welfare. It may also lengthen welfare spells and induce some families to start a spell. Time spent on welfare, in turn, may have a direct impact on child outcomes due to a stigma effect, for example, in addition to the indirect effect of lowering family income. Previous research reports only a small difference between the cognitive scores of the children of the welfare poor and the children of the non-welfare poor in the first cycle of the NLSCY (Kornberger *et al.*, 2001). Hence, our assumption is that the primary effect of welfare benefits on child outcomes is via the effect on income.

The estimates in Table VII are obtained with the same sample and estimation method as those in Table III. We include the log of the lagged average of welfare income in the regressions. We do not, however, include family income because a control for individual family income might well underestimate the effect of welfare benefits on child outcomes in lone mother families given their heavy reliance on this source of income. We estimate this model with both the total sample and, as a

Table VII. Welfare benefits

	Teacher		Parent		Self	
	All education levels	Low education	All education levels	Low education	All education levels	Low education
Log welfare benefits	-0.19 (0.61)	1.56 (1.33)	-0.32 (0.63)	-1.28 (1.08)	-0.17 (0.94)	-0.05 (1.70)
Lone mother	0.37 (0.07)	0.20 (0.10)	0.35 (0.06)	0.19 (0.09)	0.30 (0.07)	0.15 (0.14)
Interaction term	0.47 (0.64)	0.91 (0.90)	0.24 (0.51)	1.89 (0.66)	0.34 (0.53)	1.83 (1.25)
R-squared	0.14	0.19	0.33	0.38	0.08	0.10
Sample size	9398	2893	9398	2893	3492	1194

Sample is same as Table III. Standard errors in parentheses.

sensitivity test, with only those parents with no post-secondary education, a sub-sample more likely than others to be influenced by a change in welfare benefits.

The first row of Table VII indicates that in four out of six regressions higher welfare income is associated with lower behavioural-emotional scores, but the coefficients are not statistically significant. The lone mother coefficient is positive and usually significant. For our purposes, the key coefficient is the interaction term between welfare income and lone-mother family. The interaction term is statistically significant in only one case and the sign is usually positive which indicates that higher benefits are associated with a widening of the gap between two parent and lone mother families; a finding that does not provide support for a causal impact of income on behavioural-emotional scores.

The single largest change in welfare benefits over the course of our sample period is the 22% decrease in benefits, which was enacted in October of 1995 by a newly elected government in Ontario. Welfare benefits in Ontario had been about one-third higher than in the rest of the country since the late 1980s but this gap fell to only 10% (except for the disabled) in late 1995. The income period for Cycle 1 clearly precedes and the income period for Cycle 3 clearly follows this policy change. Controlling for demographic factors (age and schooling of parent, age and sex of child, number of children in family, but not family income), we examined the change in the outcome gap between the children in lone mother and two parent families in Ontario versus the rest of Canada. The results of this difference in difference analysis were consistent with our above results. The change in welfare benefits had no impact on the gap in behavioural-emotional scores between two parent and lone mother families, a result that also fails to confirm a true income effect on child outcomes.

SUMMARY

We have investigated the important question of why poor children have worse behavioural and emotional outcomes than other children. To what extent is there a causal effect of income or parenting style on child outcomes and to what extent are these empirical links the result of unobserved heterogeneity? We use data from the National Longitudinal Survey of Children and Youth to implement a series of empirical strategies for estimating the existence and size of a causal effect of income and parenting style. Each strategy has flaws but they utilize different assumptions concerning the unobserved determinants of child outcomes to determine whether or not a consistent answer to our main question is found. The measures of behavioural-emotional well being are scores that summarize the responses to a large and identical set of questions that were asked of a parent, a teacher and the older children themselves.

Our answers concerning income effects are similar to what has been found with survey data from other countries. Our estimates of the conventional model indicate that a unit increase in the log of income was associated with a decrease of about 0.15–0.10 of a SD in the scores. Support for an income effect was provided by the similar coefficients for the scores and by the fact that these income elasticities were not affected by the addition of parenting style variables to the model. Only one of the four alternative estimation strategies, however, provided support for the claim that increases in income are an effective way to improve these outcomes.

Our findings are very similar to those of other researchers (Blau, 1999; Mayer, 1997), who have sounded a cautionary note about using enhanced cash transfers as a principal mechanism for improving outcomes among low income children. Alternative strategies such as early childhood education programs directed toward populations at high risk of developmental disadvantage may provide a better use of public funds. Currie (2001) summarized the best research on such programs in the US and concludes it provides a compelling endorsement but there is a need for more studies of long term outcomes using large samples and randomization.

We commonly found strong empirical links between the four NLSCY measures of parenting style and child outcomes but the results did sound several cautionary notes. Most importantly, the impact of parenting style, as reported by the parent, is substantially more strongly related to parental reports of child behavioural-emotional well being than to teacher reports. This result may reflect reporting bias on the part of the parent and a need for caution concerning the magnitude of the effect. We did find, however, that the fixed effects model provides estimates which are consistent qualitatively with the estimates from the OLS model, a result which is almost invariably not found in the literature on income and child outcomes.

Several qualifications to this conclusion are in order. Although our general results are consistent with those of longer panels, the NLSCY is still a young survey and data from additional future cycles should yield firmer conclusions. We also echo a cautionary note (Mayer, 1997) that little is still known about how childhood outcomes influence individual functioning and health in adolescence and young adulthood. It may be, for example, that a series of individually small improvements in childhood functioning can translate into a substantial improvement in adolescence such as in the likelihood of completing secondary school. Further research on this topic and on the effectiveness of policy initiatives other than enriched cash transfers are certainly warranted.

ACKNOWLEDGEMENTS

The authors gratefully acknowledge the skilled research assistance of Emmanuelle Pierard, the financial support of Human Resources Development Canada, the Canadian Institutes of Health Research, and the Social Science and Humanities Research Council.

APPENDIX A: CONSTRUCTION OF PARENTING AND BEHAVIOURAL-EMOTIONAL SCORES

Positive Parenting	1. How often does parent praise child?
Score Range: 0-20	2. How often does parent focus on child for more than 5 minutes?
(Higher score indicates more positive interactions)	3. How often do they laugh together?
	4. How often does parent do something special with child?
	5. How often does parent praise child?

Ineffective Parenting	1. How often does parent get annoyed with child?
-----------------------	--

Appendix A. (*Continued*)

Score Range: 0-25 (Higher score indicates more ineffective parenting)	2. What proportion of talk is praise? (reversed) 3. What proportion of talk is disapproval? 4. How often does parent get angry when punishing child? 5. Does punishment depend on parent's mood? 6. Having problems with child in general? 7. How often repeatedly punish for same thing?
Consistency Score Range: 0-20 (Higher score indicates more consistency)	1. What proportion of tasks does parent ensure are completed? 2. Does parent follow through with threatened punishment? 3. How often does child get away with behaviour that should be punished? (reversed) 4. How often does child avoid punishment? (reversed) 5. How often does child ignore punishment? (reversed)
Punitive Parenting Score Range: 4-20 (Higher score indicates more punitive parenting)	1. Raise voice? (reversed) 2. Calmly discuss problem? 3. Use physical punishment? (reversed) 4. Describe alternate, acceptable behaviours.
Hyperactivity Disorder Score Range: 0-16	1. Can't sit still, is restless of hyperactive 2. Fidgets 3. Is distractible, has trouble sticking to any activity 4. Can't concentrate, can't pay attention for long 5. Is impulsive, acts without thinking 6. Has difficulty awaiting turn in games or groups 7. Can't settle to anything for more than a few minutes 8. Inattentive
Conduct Disorder Score Range: 0-12	1. Gets into many fights 2. When another child accidentally hurts him/her reacts with anger 3. Physically attacks people 4. Threatens people 5. Is cruel, bullies or is mean to others 6. Kicks, bites, hits other children
Emotional Disorder Score Range: 0-16	1. Seems to be unhappy, sad or depressed 2. Is not as happy as other children 3. Is too fearful or anxious 4. Is worried 5. Cries a lot 6. Appears miserable, unhappy, tearful or distressed 7. Is nervous, high-strung or tense 8. Has trouble enjoying him/herself

Appendix A. (Continued)

Property Offence Score Range: 0-12	1. Destroys his/her own things 2. Steals at home (not asked of teacher) 3. Destroys things of his/her family or other children 4. Tells lies or cheats 5. Vandalizes 6. Steals outside the home
---------------------------------------	--

Each outcome is an index. Each individual response is scored 0 = Never, 1 = Sometimes, 2 = Often. The sum of the scores in the index value. The wording of the actual question is more extensive than indicated above.

APPENDIX B: CONSTRUCTION OF NLSCY CONSUMPTION INDICATORS

Activities

Either the PMK (age4-9) or the child (age 10 and over) was asked “In the last 12 months, outside of school hours, how often has your child (PMK) or you (self-report) taken part in the following activities.”

Possible responses for the PMK for children age 9 were; most days; a few times a week; about once a week; about once a month; and almost never. Possible responses for children age 10 and over were; 4 or more times a week, 1-3 times a week; less than once a week; and never.

Supervised Sports	Sports which involved coaching or instruction.
Unsupervised Sports	Unorganized sports or physical activities.
Arts	Lessons or instruction in music, dance, art or other non-sport activities.
Clubs	Clubs, groups, church groups or community programs with leadership (Brownies, Guides, etc. depending on age group).
Day Camp	“Last summer did the child attend a day camp or recreational or skill building activity that ran for half-days or full days (e.g. music program, reading program, athletic program?)” and “If so, for how many days.”
Night Camp	“Last summer did the child attend an over-night camp?” and “If so, for how many days.”

Housing

Ownership	Does the family own its home?
Subsidy	Does the family live in subsidized housing?
Repairs	Is the dwelling in need of minor or major repairs? Interviewer assessment.
Type of dwelling	Is the dwelling a single detached home? Semi-detached? Townhouse? Apartment?
Bedrooms	How many bedrooms are there in the dwelling?

REFERENCES

- Anderson PM, Butcher KF, Levine PB. 2003. Maternal employment and overweight children. *Journal of Health Economics* 22: 477–504.
 Baum CL. 2003. Does maternal employment harm child development? An analysis of the potential benefits of leave taking. *Journal of Labour Economics* 21(2): 409–448.

- Baydar N. 1995. Reliability and validity of temperament scales of the NLSY child assessments. *Journal of Applied Developmental Psychology* **16**(3): 339–370.
- Blau DM. 1999. The effects of income on child health development. *Review of Economic and Statistics* **81**: 261–276.
- Boyle MH, Offord DR, Hoffman HF et al. 1987. Ontario Child Health Study: I. Methodology. *Archives of General Psychiatry* **44**: 826–831.
- Bradley KA, Bush KR, Epler AJ et al. 2003. Two brief alcohol-screening tests from the Alcohol Use Disorders Identification Test (AUDIT): validation in a female Veterans Affairs patient population. *Archives of Internal Medicine* **163**(7): 821–829.
- Burton P, Phipps S, Curtis L. 2002. All in the family: a simultaneous model of parenting style and child conduct. *American Economic Association Papers and Proceedings* **92**(2): 368–372.
- Cadman D, Boyle M, Offord D et al. 1986. Chronic illness and functional limitation in Ontario children: findings of the Ontario Child Health Study. *Canadian Medical Association Journal* **135**: 762–767.
- Chao R, Willms JD. 2002. Special demands of single parenting. In *Vulnerable Children*, Willms JD (ed.). The University of Alberta Press: Edmonton, 149–166.
- Currie J. 2001. Early childhood education programs. *Journal of Economics Perspectives* **15**(2): 213–238.
- Dooley M, Lipman E, Stewart J. 2005. Exploring the good mother hypothesis: do child outcomes vary with the mother's share of income? *Canadian Public Policy* **31**: 123–144.
- Dooley M, Stewart J. 2004. Family income and child outcomes in Canada. *Canadian Journal of Economics* **37**(4): 898–917.
- Dooley MD, Curtis L, Lipman E, Feeny D. 1998. Child behaviour problems, poor school performance and social problems: the roles of family structure and low income in cycle one of the National Longitudinal Survey of Children and Youth. In *Labour Markets, Social Institutions, and the Future of Canada's Children*, Corak M (ed.). Statistics Canada, Ottawa, Canada.
- Gagne L. 2002. Parental work, child-care use and young children's cognitive outcomes. *Working Paper*, University of Victoria.
- Hoddinott J, Lethbridge L, Phipps SA. 2002. Is history destiny? Resources, transitions and child education attainments in Canada. *Working Paper*, Dalhousie University.
- Korenman S, Miller JE, Sjaastad JE. 1995. Long-term poverty and child development in the United States: results from the NLSY. *Children and Youth Services Review* **17**: 127–155.
- Kornberger R, Fast J, Williamson D. 2001. Welfare or work: which is better for Canadian children? *Canadian Public Policy* **27**: 407–422.
- Landis JR, Koch GG. 1977. The measurement of observer agreement for categorical data. *Biometrics* **33**: 159–174.
- Lefebvre P, Merrigan P. 2002. The effect of childcare and early education arrangements on developmental outcomes of young children. *Canadian Public Policy* **28**: 187–202.
- Leuven E, Sianesi B. 2003. PSMATCH2: stata module to perform full Mahalanobis and propensity score matching, common support graphing, and covariate imbalance testing. Statistical software components S432001, Boston College Department of Economics.
- Lipman EL, Offord DR, Boyle MH. 1994. Economic disadvantage and child psycho-social morbidity. *Canadian Medical Association Journal* **151**: 431–437.
- Lipman EL, Secord M, Boyle MH. 2002. Moving from the clinic to the community: the Lone Mothers Together Program. *Canadian Child Psychiatry Review* **11**: 5–8.
- MacMillan HL, Fleming JE, Streiner DL et al. 2001. Childhood abuse and lifetime psychopathology in a community sample. *American Journal of Psychiatry* **158**: 1878–1883.
- Mayer S. 1997. *What Money Can't Buy*. Harvard University Press: Cambridge.
- Miller F, Jenkins J, Keating D. 2002. Parenting and children's behaviour problems. In *Vulnerable Children*, Willms JD (ed.). The University of Alberta Press: Edmonton, 167–181.
- Pacquet B. 2002. Low income cut-offs from 1992–2001 and low income measures 1991–2000. *Statistics Canada Research Paper* **75F0002MIE2002005**. Ministry of Industry: Ottawa.
- Phipps SA. 1999. An International comparison of policies and outcomes for young children. *Canadian Policy Research Network Study No. F-05*.
- Roberts P, Smith P, Nason H. 2001. Children and familial economic welfare: the effect of income on child development. *Applied Research Branch Working Paper No. W-01-1-11E*, Human Resources Development Canada.
- Snow Jones A, Miller DJ, Salkever DS. 1999. Parental use of alcohol and children's behavioural health: a household production analysis. *Health Economics* **8**(8): 661–683.