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Child well-being and neighbourhood quality: evidence from the Canadian National Longitudinal Survey of Children and Youth

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Abstract

In this paper, we use the Canadian National Longitudinal Survey of Children and Youth data to examine the links between child well-being and neighbourhood 'quality.' This study adds to the literature by (i) investigating the relationship between neighbourhood quality and child health, (ii) by utilizing subjective assessments by individuals familiar with the neighbourhood (i.e., the survey respondent and interviewer), and (iii) by utilizing multiple assessments of neighbourhood quality, and (iv) by investigating several measures of health. Other work has found that controlling for family level characteristics reduces or eliminates the apparent association between neighbourhood quality and health. We find, measuring both child well-being and neighbourhood quality multi-dimensionally, that even after controlling for family level characteristics neighbourhood quality has strong associations with child well-being.

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Introduction and background

Interest in the links between neighbourhood quality and health has burgeoned in the last decade. Studies of this relationship for pre-schoolers, adolescents and adults include Ginther, Haveman, and Wolfe (2000), Ellen and Turner (1997), Mayer (1996) and Jencks and Mayer (1990). Few studies consider children from ages 6 to 10, an exception being McCulloch and Joshi (2001). Ellen and Turner (1997) purport that, neighbourhoods would likely play 'an increasingly important role during elementary school years' but 'virtually no researchers have explored this role' (p. 849). We address this gap

with an analysis of neighbourhood quality and child well-being for children age 4–11 years. Our measures of neighbourhood quality include subjective reports provided by both parents and interviewers.

There are several prominent theories for the association between child outcomes, and the social and geographical neighbourhoods. Two excellent reviews are Ginther et al. (2000) and Ellen and Turner (1997). Important recent papers include Sampson (1991), Sampson, Raudenbush, and Earls (1997), and Brooks-Gunn, Duncan, and Aber (1997). Jencks and Mayer (1990) suggest four models for the relationship between neighbourhood and child outcomes. The 'contagion model' stresses the role of peers especially for children's behavioural outcomes. The 'theory of collective socialization' emphasizes the importance of positive adult role models and monitoring of children's activities. The 'competition model' focuses on the scarcity of opportunities such as employment and the 'relative deprivation

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model' postulates that residents evaluate their circumstances relative to their neighbours' circumstances. Buck (2001) adds the 'network model' to the discussion stressing ties to mainstream groups and social networks which enable social inclusion and employment opportunities. These models differ in emphasis and in qualitative predictions. The competition and relative deprivation models predict that children from low-income households will fare worse in affluent than in poor neighbourhoods whereas the contagion, collective socialization and network models predict the opposite.

Ellen and Turner (1997) identify six mechanisms by which neighbourhood characteristics influence child outcomes: socialization by adults, local social networks, peer influences, quality of local services, exposure to crime and violence, and physical distance and isolation from, in particular, economic opportunities. The first two mechanisms are similar to the 'theory of collective socialization' and the third to 'contagion theory'. The final three mechanisms focus on physical location, safety and economic characteristics of the neighbourhood.

The early empirical literature focussed on the role of objective measures of neighbourhood quality, such as rates of poverty, crime rates, unemployment and single-parenthood in the presence of controls for individual and family characteristics (Ellen & Turner, 1997). Brooks-Gunn, Duncan, Klebanov, and Sealand (1993) found that the cognitive and emotional well-being of children and adolescents was not linked to the percentage of low-income families in a neighbourhood but "powerfully" linked to the percentage of higher-income families. This finding was true of children from both poor and non-poor families consistent with contagion and collective socialization theories. The percentage of neighbourhood residents with high occupational status was associated with fewer behavioural problems in young children and the fraction of female-headed households was linked to higher drop out rates. Neighbourhood characteristics which were not associated with child outcomes, controlling for family characteristics, included the percentage of families on welfare, the percentage of males in the labour force, and the percentage of families who are black.

Several studies have found that high-quality neighbourhood characteristics are related to cognitive child/adolescent outcomes but that low-quality neighbourhood characteristics are not (Chase-Lansdale, Gordon, Brooks-Gunn, & Klebanov, 1997; and several papers in two volumes edited by Brooks-Gunn et al., 1997). Lee and Cubbin (2002) were concerned with health behaviours and found that low neighbourhood socio-economic status (SES) and high neighbourhood social disorganization were associated with poor dietary habits but not physical activity or smoking in youth. Studies which focus on the overall quality of neighbourhoods find that individual and/or family level characteristics

mitigate and sometimes eliminate estimated neighbourhood effects (Duncan, Boisjoly, & Harris, 2001; McCulloch & Joshi, 2001; Ginther et al., 2000; Ellen & Turner, 1997).

Two studies have linked the Canadian National Longitudinal Survey of Children and Youth (NLSCY) with neighbourhood characteristics provided by census enumeration areas data. Boyle and Lipman (2002) and Kohen, Hertzman, and Brooks-Gunn (1998) find that, after controlling for individual and family characteristics, a higher percentage of lone-parent families is associated with worse child outcomes but a higher percentage of low-income families is not. Results for other census-based measures of neighbourhood socioeconomic disadvantage are mixed in both studies.

Recent research efforts have turned from geographic to social definitions of neighbourhood (Ellaway, Macintyre, & Kearns, 2001; Macintyre & Ellaway, 2000) and to respondent reports of neighbourhood quality (Eamon, 2001; Ennett, Flewelling, Lindrooth, & Norton, 1997). Fewer perceived neighbourhood problems and more perceived cohesion have been linked to less adolescent anti-social behaviour (Eamon, 2001) and better adult health and overall neighbourhood quality (Ellaway et al., 2001). In contrast, Ennett et al. (1997) report higher life-time alcohol and cigarette utilization rates in schools located in neighbourhoods perceived to have greater social advantages. Respondent-reported neighbourhood safety and cohesion in the Canadian NLSCY has been positively associated with outcomes for children aged 4 and 5 (Kohen et al., 1998) and aged 2 and 3 years but not for children under 2 (To, Cadarette, & Liu 2000, 2001).

Critics of objective neighbourhood measures point out that, within geographically defined neighbourhoods, parental definitions of a child's effective neighbourhood may vary from family to family as well as depart from administrative boundaries. We use the NLSCY which offers an opportunity to test the association between child well-being and two 'subjective' assessments of neighbourhood quality, one from a resident with children and the other from a trained survey interviewer. Furthermore we focus on children between the ages of 4 and 11, an understudied population and we utilize several measures of health. Ellen and Turner (1997) stress that neighbourhood characteristics may have substantially different effects for children of different ages and for different measures of health. For example, McCulloch and Joshi (2001) found that neighbourhood characteristics were most strongly related to cognitive abilities in preschoolers.

Data

The Canadian NLSCY surveyed the families of a representative sample of 22,831 children, who were aged

0–11 years in 1994. The NLSCY is a prospective longitudinal survey designed to offer representative information on the development, health and well-being of Canadian children. A full description of the data is available elsewhere (Statistics Canada and Human Resources Development Canada, 1995). The weights used in our analysis reflect the complex stratified sampling methodology. We report robust standard errors except in the tobit analysis for which STATA estimators were unavailable. The complex sampling methodology and the large sample size may bias the standard errors downward and, hence, we report significance levels of $p = 0.001$ in the tobit analysis. Furthermore, we report both z -values and p -values so the reader may use their own judgement. There are 14,226 children aged 4–11 in the NLSCY. We restricted the sample to children living in either two-parent or lone-mother families. We excluded 203 children who were living with lone-fathers or with neither parent. We also excluded 21 children where someone other than the parent claimed to be ‘most knowledgeable’ about the child and responded to the survey. The resulting sample was 14,002. Missing information on variables of interest resulted in the exclusion of 2965 observations. Our final sample contained 11,037 children age 4–11, close to 80% of the original sample.

Information on child health and well-being, family SES and neighbourhood characteristics was collected from the ‘Person Most Knowledgeable’ (PMK) about the child, the mother in most (93%) families. Three alternative indices of neighbourhood quality are constructed. The first focusses on aspects of safety, the second on ‘cohesiveness’ (e.g., helpfulness of neighbours), the third on ‘problems’ (e.g., garbage or drugs). The interviewer was also asked to assess problems in the neighbourhood (see Table 6 of Appendix A for the construction of the neighbourhood variables and Table 8 of Appendix A for descriptive statistics on the demographics of the sample). PMK and interviewer assessments can and do differ, and have distinct strengths and weaknesses.

The PMK lives in the neighbourhood and will have more first-hand information concerning, for example, problems at night when interviews are unlikely to occur. (The interviewer, of course, *may live* in the same city and know the neighbourhood directly or by reputation.) The PMK, however, may be less objective than the interviewer and, for example, understate the extent of problems even to herself.

The NLSCY also provides numerous and qualitatively distinct measures of child well-being. We use four indicators for children age 4–11: conduct disorder score; hyperactivity score; emotional disorder score; and the experience of non-sports related injury requiring medical attention. (See the next section and Table 7 of Appendix A for a detailed description.) These indicators range across the spectrum of behavioural, emotional, and physical well-being and differ in degree of subjectivity. The disorder scores are based on the assessments of the PMK. The PMK is also the respondent for the accident/injury variable but a response to the question may, in many cases, incorporate the judgement of a medical care professional.

Different health measures may be related to different aspects of neighbourhood quality. For example, the behavioural and emotional scores may be more closely related to neighbourhood cohesion while accidents/injuries may be more connected to physical safety.

Results

Neighbourhoods and child well-being: a descriptive analysis

Table 1 contains the frequency distribution of each measure of neighbourhood quality. (Table 8 of Appendix A presents means and standard deviations.) The ‘cohesion’ variable in the first row ranges in value from 0 to 15 and higher values indicate ‘greater cohesion’. Most Canadian children live in reasonably cohesive neighbourhoods in that the sample mean is 10.8 and

Table 1
Distribution of neighbourhood scores (% observations)

Score	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Cohesion	0.49	0.15	0.18	0.25	0.83	2.49	2.13	2.9	5.2	11.7	27.4	10.7	7.4	8.1	7.3	12.7
Problem	41.09	27.57	15	6.99	3.38	3.27	1.16	0.6	0.3	0.45	0.14					
Safety	0.65	1.51	5.36	14.1	35.7	18.4	24.2									
Any Problem ^a																
PMK	60.75	39.25														
Interviewer	89.11	10.89														

Total observations = 11,037.

^a Any of the following garbage, groups hanging out or drinking in neighbourhood 1 = yes, 0 = no.

Table 2
Mean child outcome scores by neighbourhood type

Child outcome (scores)	Overall mean	Safety score		Cohesion score		Any Problems PMK		Any Problems interviewer	
		Good	Poor	Good	Poor	No	Yes	No	Yes
Conduct	1.44	1.30	1.68*	1.33	1.66*	1.22	1.61*	1.34	1.69*
Hyperactivity	4.61	4.42	5.01*	4.42	5.32*	4.26	4.99*	4.45	5.35*
Emotional	2.5	2.42	2.97*	2.42	3.24*	2.25	2.99*	2.48	3.03*
Injury ^a	0.09	0.086	0.101**	0.09	0.104**	0.08	0.103*	0.09	0.107**

Total observations = 11,037.

^aNon-sport injury requiring medical treatment (1 = yes, 0 = no).

*Significant with 99% confidence.

**Significant with 95% confidence.

74% of scores are from 10 to 15. Only 1.9% of the scores are under 5.

“Problems” as reported by the PMK are reported in the second row. The problem score can range from 0 to 10 with higher values indicating “more problems”. Most PMKs do not perceive many problems in their neighbourhoods. A majority of children (69%) live in neighbourhoods with scores of 0 or 1. Only 2.7% of children have a problem score greater than 5.

“Safety” scores are reported in the third row and can range in value from 0 to 6 with higher values being “safer”. Nearly one-quarter of children live in neighbourhoods with the maximum safety score of 6 and over three-quarters of children live in neighbourhoods with scores of 4 or higher.

Both the PMK and the interviewer were asked about three specific problems (garbage, groups or gangs hanging out, and drinking—a sub-set of the problems from the PMK neighbourhood ‘problem index’) albeit with questions that differed somewhat in wording (see Table 7 of Appendix A). The fourth row of Table 1 indicates that the PMK responded “no problems” in 61% of cases.¹ The fifth row of Table 1 shows that the interviewer responded “no problems” in 89% of cases. Thus, PMKs report more problems than do interviewers, a finding to which we return in the next subsection. The overall message of Table 1, however, is that most Canadian children generally live in neighbourhoods which both parents and interviewers assess as being cohesive, safe and non-problematic.

Table 2 provides a first look at the correlation between neighbourhood quality and four indicators of child well-being. The mean scores for emotional, conduct and hyperactive disorders in the second column of Table 2 indicate that the average Canadian child is quite healthy by these measures. The fourth outcome measure indicates that 9% of the children in Canada

have experienced a non-sports-related injury or accident that required medical attention in the past year.

The remaining columns of Table 2 provide outcome means in “good neighbourhoods” and “poor neighbourhoods”. We classified neighbourhoods as good or poor by choosing a score (integer value) as close as possible to the “worst” 10th percentile. Safety is ‘poor’ for children with a score of 3 or less (21.6% of observations); cohesion is ‘poor’ for children with a score of 8 or less (14.6% of observations); the problem rating is ‘poor’ if the problem score is 3 or more (16.3% of observations). These dichotomous indicators are used only in this descriptive analysis. For the multivariate analysis discussed later, we use the neighbourhood scores directly. The outcomes are always significantly worse in ‘poor’ quality neighbourhoods regardless of outcome measures or indicator of neighbourhood quality. In all cases the differences are significant at the 99% level except for the likelihood of injury with poor quality neighbourhoods measured by safety score, cohesion score, and any problems reported by interviewer where the level of significance is 95%.

PMK versus interviewer assessments of neighbourhood problems

We are particularly interested in exploiting the fact that we have information about quality of neighbourhood from two respondents. The fourth and fifth rows of Table 1 indicate that PMKs reported a problem with garbage, groups loitering, or drinking in 39% of the observations but this was true of the interviewer in only 11% of the observations. A Pearson Chi-squared test (not shown here) easily rejects the hypothesis that these two distributions are equal. Table 3 explores the extent of agreement. Both respondents indicated a problem in 8.6% of the observations and both reported no problem in 57.8% of the observations. In only 2.8% of the observations did the interviewer, but not the PMK, report a problem. In 30.8% of observations, the PMK noted a problem while the interviewer did not.

¹In row 2, only 41% of PMKs responded “no problem” but this score incorporated responses to question concerning six problems.

Table 4 provides a multivariate examination of which family and individual characteristics are associated with neighbourhood problems as reported by the PMK and the interviewer. Bruin and Cook (1997) and Holady, Swan, and Turner-Henson (1997) helped to inform the choice of independent variables for Table 4. “Low-family income” is defined as income less than the Statistics Canada Low Income Cut-Off (1992 base). This is the most commonly used definition of low income in Canada (Paquet, 2001). A logit conditional probability function is estimated for which the dependent variable is equal to 1 if the PMK (or Interviewer) indicates the presence of any of the three problems (garbage, gangs or alcohol) and equal to zero otherwise.

Table 3
Percentage agreement/disagreement on existence of a neighbourhood problem^a

PMK	Interviewer	
	Yes	No
Yes	8.6	30.8
No	2.8	57.8

Total observations = 11,037.

^aGarbage, groups, drinking in neighbourhood.

Table 4
Determinants of PMKs' and interviewers' views of neighbourhood (*z*-stat) [*p*-value] {comparison group}

Variable	PMK ^a Any Problem	Interviewer ^a Any Problem
	Coeff (<i>z</i> -stat) [<i>p</i> -value]	Coeff (<i>z</i> -stat) [<i>p</i> -value]
Lone Mother {two-parent}	-0.49 (3.59) [0.000]	0.19 (1.01) [0.310]
Low Income Household {non-low-income household}	0.28 (3.33) [0.001]	-0.10 (0.80) [0.424]
Lone Mother*Low Income	0.65 (4.34) [0.000]	0.63 (3.09) [0.002]
PMK Less High School Education {high school grad}	-0.01 (0.18) [0.858]	0.37 (3.75) [0.000]
Some Post High School Education {high school grad}	0.03 (0.50) [0.621]	-0.17 (1.80) [0.073]
University/College Education {high school grad}	0.01 (0.13) [0.897]	-0.46 (4.64) [0.000]
PMK age > 34 yrs {PMK ≤ 34 years}	-0.11 (2.30) [0.021]	-0.15 (1.71) [0.088]
PMK age > 34 yrs*Low Income	-0.25 (2.24) [0.025]	0.48 (2.99) [0.003]
PMK age > 34 yrs*Lone Mother	-0.18 (1.19) [0.236]	-0.48 (2.37) [0.018]
Lived at Address > 10 years {lived < 10 years}	0.69 (3.80) [0.002]	0.14 (0.66) [0.509]
Own Home {rent home}	-0.42 (6.54) [0.000]	-0.72 (7.71) [0.000]
Own Home*Lived at Address > 10 years	-0.59 (3.12) [0.002]	-0.25 (1.04) [0.296]
Residence Subsidized by Government {not subsidized}	0.63 (5.59) [0.000]	0.44 (3.75) [0.000]
Minor Repairs Needed to Home {no repairs needed}	0.26 (4.81) [0.000]	0.73 (9.40) [0.000]
Major Repairs Needed to Home {no repairs needed}	0.55 (7.09) [0.000]	0.96 (9.61) [0.000]
PMK > 34 yr*Low Income*Minor Repairs	-0.51 (2.73) [0.006]	-0.003 (0.01) [0.228]
PMK > 34 yr *Lone Mom*Major Repairs	0.60 (3.11) [0.002]	0.34 (1.21) [0.989]
PMK-Social Support Score	-0.01 (1.96) [0.050]	-0.03 (2.76) [0.006]
PMK-Depression Score	0.03 (8.06) [0.000]	0.02 (4.26) [0.000]
Constant	-0.14 (1.02) [0.309]	-1.34 (6.46) [0.000]
Pseudo R ²	0.045	0.132

Total observations = 11,037.

Province of residence controlled for.

Estimates that are significant at the 0.001 level appear in bold.

^aLogit for any of the following: Garbage, gangs and alcohol. 1 = yes, 0 = no.

Lone-motherhood *per se* is associated with fewer reported problems and low-income is significantly related to more neighbourhood problems in the PMK's reports but not in the interviewer's. There is a strong positive interaction between these variables in both logits. The respondents agree that poor lone-mothers live in problematic neighbourhoods.

PMK's education is not associated with how the PMK reports the neighbourhood but the two extremes are strongly related to neighbourhood characteristics, as reported by the interviewer. The signs and significance levels for the PMK's schooling are more in accord with our expectations (more education is associated with fewer problems) in the interviewer's logit. Perhaps this result reflects mainly the permanent income effect, as opposed to the problem-perception effect, of post secondary schooling.

In both equations, renting, government subsidies and repair-needs are associated with more problems. Length of residence is not significant in the interviewer's equation which suggests that this is not a simple age of neighbourhood-effect in the PMK's equation but rather the association of long-residence with either the knowledge or the subjective interpretation of the PMK.

Interestingly, the PMK's social support and depression scores are significant in both equations. This implies

that the greater neighbourhood problems perceived by depressed PMK's are also perceived by the interviewers. This suggests that isolated/depressed people tend to live in poor neighbourhoods and/or that living in a bad area contributes to such feelings and that poor neighbourhood quality is not just a perception of the depressed/isolated individual.

Multivariate analysis of the relationship between neighbourhood and child well-being

This section presents the multivariate estimates for each of our four child outcomes. We used a tobit regression for the three psychiatric disorders (emotional, conduct and hyperactive). The tobit specification is designed specifically for data with obvious floor (or ceiling) effects which, in our case, is reflected in the high proportion of zeroes observed for the child outcome indices. We use the logit function for the dichotomous non-sports injuries variable. Sample weights were used in each procedure. The tobit coefficients per se are not readily interpretable and we thus provide the marginal effects for each coefficient, i.e., the change in the dependent variable corresponding to a unit change in the independent variable. For the dummies, this reflects a change from not having to having the relevant characteristic. For the continuous independent variables, this reflects a change in value from 0 to 1.

Two specifications are reported for each outcome. Specification 1 includes the three aspects of neighbourhood quality derived from PMK responses—cohesion, safety and problems. These scores do appear to measure different concepts (e.g., an unsafe neighbourhood can nonetheless be cohesive) and the correlations among the PMK's scores are lower than one might expect. The correlation between safety and problems is -0.34 ; between cohesion and problems is -0.27 ; and between safety and cohesion is 0.45 . Specification 2 replaces the dichotomous variable indicating neighbourhood problems as reported by PMK with that reported by the interviewer.

We begin our discussion with the covariates other than the measures of neighbourhood quality. A very common finding from studies with the NLSCY data is that lone-motherhood has a strong, negative relationship with child well-being (Dooley, Curtis, Lipman, & Feeny, 1998). We find the same but stress the need for cautious interpretation. It is possible that lone-motherhood is really a proxy for long-term low-income status (see Curtis, Dooley, Lipman, & Feeny, 2001). Low-income status is generally also negatively related to children's well-being, but this effect is weaker (in terms of coefficient magnitude and statistical significance) and less consistent (it does not hold for conduct disorders or non-sports injuries) than the lone-mother effect.

The lowest level of schooling for the PMK (less than a high school degree) is associated with poorer outcomes except in the case of conduct disorder. Post-secondary school is associated with better outcomes in the case of hyperactivity. We have no ready explanation for why post-secondary education is correlated with worse outcomes in the case of the emotional and conduct disorder scores. One possibility is the impact of schooling on the perception or evaluation of these conditions. It is also true, however, that these anomalous effects weaken or disappear when the neighbourhood variables are dropped (Dooley & Curtis, 1998).

We find, as do most others, that girls generally have more favourable outcomes than do boys in this age range with the exception of emotional disorders. Older children in this age range have more emotional problems and better scores for conduct and hyperactivity. The impact of family size is not consistent. A larger number of children are associated with better scores for emotion and hyperactivity, and with worse scores for conduct. There are few PMKs under age 25 and this coefficient is usually not statistically significant when compared to those 25–34 years of age. A PMK over age 34, however, is quite consistently associated with better outcomes; this may be a result of higher income and/or more mature parenting skills. The coefficients discussed previously for variables other than neighbourhood quality generally do not vary greatly across specifications.

Our focus in this paper is the link between child outcomes and neighbourhood quality. Table 5 confirms that better-quality neighbourhoods are generally associated with higher levels of child well-being, but the dimension of neighbourhood quality also matters. A more cohesive neighbourhood is strongly associated with better child outcomes in all cases except non-sport related injuries. Neighbourhood safety appears to be less important than the other two dimensions which we study. For example, safety is not statistically significant in either case for non-sport related injuries. However, safer neighbourhoods are associated with fewer emotional or conduct disorders and with less hyperactivity.

The PMK's rating of neighbourhood problems is associated with worse child outcomes. However, the interviewer's assessment of problems is not statistically significant for emotional problems or conduct disorder. The p -value for hyperactivity is 0.004 but with our large sample and possible downward bias on standard errors we report the coefficient as insignificant. The PMK's rating of neighbourhood typically has a much larger marginal effect on child outcomes than does the interviewer report. Like most other studies, individual and family characteristics generally have stronger (statistically) associations with child outcomes than do neighbourhood characteristics. Unlike many other

Table 5
Multi-variate regression (*z*-stat) [*p*-value]

	Tobit Emotional score		Tobit Hyperactivity score		Tobit Conduct disorder score		Logit Injuries	
	Spec 1 Coeff {Marg ^a }	Spec 2 Coeff {Marg ^a }	Spec 1 Coeff {Marg ^a }	Spec 2 Coeff {Marg ^a }	Spec 1 Coeff {Marg ^a }	Spec 2 Coeff {Marg ^a }	Spec 1 Coeff	Spec 2 Coeff
Lone Mother	0.84 {0.56} (8.12) [0.000]	0.83{0.59} (8.02) [0.000]	0.74 {0.60} (6.07) [0.000]	0.71 {0.58} (5.82) [0.000]	0.86 {0.49} (8.80) [0.000]	0.85 {0.50} (8.68) [0.000]	0.27 (2.53) [0.011]	0.25 (2.40) [0.017]
Low Income	0.17{0.11} (1.84) [0.065]	0.22 {0.15} (2.38) [0.017]	0.27 {0.21} (2.52) [0.012]	0.29 {0.24} (2.75) [0.006]	-0.10 {-0.06} (1.20) [0.232]	-0.07 {-0.04} (0.86) [0.387]	0.00 (0.00) [1.00]	0.01 (0.10) [0.919]
PMK's Ed Less HS	0.36 {0.23} (3.25) [0.001]	0.35 {0.24} (3.20) [0.001]	0.45 {0.36} (3.55) [0.000]	0.44 {0.35} (3.40) [0.001]	0.18 {0.10} (1.75) [0.080]	0.18 {0.10} (1.72) [0.086]	-0.32 (2.61) [0.009]	-0.33 (2.67) [0.008]
Some Post HS	0.35 {0.22} (3.72) [0.000]	0.35 {0.24} (3.74) [0.000]	0.11 {0.10} (0.99) [0.322]	0.11 {0.10} (1.05)[0.293]	0.26 {0.16} (2.99) [0.003]	0.27 {0.17} (3.02) [0.003]	0.01 (0.12) [0.902]	0.02 (0.17) [0.864]
Univ/College	0.37 {0.22} (4.14) [0.000]	0.37 {0.25} (4.14) [0.000]	-0.22 {-0.17} (2.11) [0.035]	-0.21 {-0.17} (2.00) [0.046]	0.18 {0.10} (2.07) [0.039]	0.18 {0.10} (2.11) [0.035]	0.10 (1.08) [0.284]	0.11 (1.14) [0.255]
Female Child	0.10 {0.06} (1.52) [0.128]	0.09 {0.006} (1.40) [0.164]	-1.48 {-1.12} (20.2) [0.000]	-1.49 {-1.14} (20.2) [0.000]	-0.79 {-0.41} (13.3) [0.000]	-0.80 {-0.42} (13.3) [0.000]	-0.32 (4.69) [0.000]	-0.32 (4.71) [0.000]
Child ≥ 8 years	0.93 {0.63} (14.4) [0.000]	0.94 {0.67} (14.1) [0.000]	-0.23 {-0.18} (3.08) [0.002]	-0.23 {-0.18} (3.02) [0.003]	-0.33 {-0.18} (5.32) [0.000]	-0.32 {-0.18} (5.23) [0.000]	0.05 (0.68) [0.497]	0.05 (0.69) [0.493]
Number Children	-0.21 {-0.13} (5.44) [0.000]	-0.20 {-0.13} (5.25) [0.000]	-0.44 {-0.35} (9.84) [0.000]	-0.44 {-0.34} (9.74) [0.000]	0.38 {0.21} (10.6) [0.000]	0.39 {0.22} (10.6) [0.000]	0.05 (1.27) [0.203]	0.05 (1.32) [0.188]
PMK age 15–24 yrs	-0.31 {-0.19} (1.09) [0.278]	-0.31 {-0.20} (1.08) [0.282]	0.69 {0.58} (2.08) [0.038]	0.68 {0.55} (2.03) [0.042]	0.16 {0.09} (0.60) [0.549]	0.15 {0.09} (0.58) [0.560]	0.01 (0.04) [0.966]	0.003 (0.01) [0.991]
PMK age > 34 yrs	-0.43 {-0.26} (6.39) [0.000]	-0.47 {-0.30} (6.92) [0.000]	-0.29 {-0.22} (3.61) [0.000]	-0.31 {-0.24} (3.88) [0.000]	-0.35 {-0.19} (5.49) [0.000]	-0.37 {-0.20} (5.78) [0.000]	-0.13 (1.75) [0.080]	-0.14 (1.89) [0.059]
Safety Score	-0.08 {-0.05} (2.72) [0.007]	-0.14 {-0.09} (4.99) [0.000]	-0.03 {-0.03} (1.00) [0.316]	-0.07 {-0.05} (2.10) [0.036]	-0.12 {-0.06} (4.47) [0.000]	-0.15 {-0.08} (5.73) [0.000]	-0.03 (0.89) [0.372]	-0.04 (1.41) [0.157]
Cohesion Score	-0.10 {-0.06} (8.23) [0.000]	-0.12 {-0.08} (9.04) [0.000]	-0.12 {-0.09} (7.77) [0.000]	-0.12 {-0.10} (8.16) [0.000]	-0.05 {-0.03} (4.15) [0.000]	-0.06 {-0.03} (4.61) [0.000]	-0.003 (0.25) [0.802]	-0.01 (0.45) [0.652]
Problems PMK	0.76 {0.51} (11.32)[0.000]		0.57 {0.46} (7.18) [0.000]		0.42 {0.23} (6.54) [0.000]		0.26 (3.72) [0.000]	
Problems Interviewer		0.12 {0.08} (1.15) [0.249]		0.36 {0.29} (2.87) [0.004]		0.11 {0.06} (1.06) [0.291]		0.18 (1.73) [0.084]
Constant	2.98 {1.82} (14.9)[0.000]	3.65 {2.01} (18.8) [0.000]	7.36 {5.58} (31.5) [0.000]	7.76 {5.72} (34.3) [0.000]	0.85 {2.76} (4.49) [0.000]	1.20 {2.84} (6.54) [0.000]	-2.26 (10.6) [0.000]	-2.07 (10.1) [0.000]
Pseudo R ²	0.016	0.013	0.016	0.015	0.016	0.015	0.010	0.008

Total observations = 11,037.

Province of residence controlled for.

Estimates that are significant at the 0.001 level appear in bold.

For comparison groups—see Table 4.

^aMarg—marginal results. The effect of changing the value of the variable, holding all other variables constant, from 0 to 1.

Table 6
Questions included in the development of the neighbourhood scores^a

Neighbourhood safety	Neighbourhood cohesion	Neighbourhood problem	Interviewer
Do you strongly agree, agree, disagree, or strongly disagree with this statement about your neighbourhood:	Do you strongly agree, agree, disagree, or strongly disagree with this statement about your neighbourhood:	How much of a problem is the following in this neighbourhood; a big problem, somewhat of a problem, no problem:	Is there garbage, litter, or broken glass in the street or on the sidewalks, or in yards?
It is safe to walk alone in this neighbourhood after dark.	If there is a problem around here, the neighbours get together to deal with it.	Garbage, litter, or broken glass in the street or road, on the sidewalks, or in yards? ^c	<i>Value of the answer</i> ^b
It is safe for children to play outside during the day.	There are adults in the neighbourhood that the children can look up to.	Selling or using drugs?	Almost none = 0 Yes, but not a lot = 1
<i>Value of the answer</i> ^b	People around here are willing to help their neighbours.	Alcoholics and excessive drinking in public?	Yes, quite a bit = 2 Yes, almost everywhere = 3
Strongly agree = 3 Agree = 2	You can count on adults in this neighbourhood to watch out that children are safe and do not get into trouble.	Groups of young people who cause trouble? ^c	Alcoholics and excessive drinking in public?
Disagree = 1 Strongly disagree = 0	When I am away from home, I know that my neighbours will keep their eyes open for possible trouble.	Burglary of homes or apartments?	<i>Value of the answer</i> ^b
Score range: 0–6	<i>Value of the answer</i> ^b	Unrest due to ethnic or religious differences?	No = 0 Yes = 1
	Strongly agree = 3 Agree = 2	<i>Value of the answer</i> ^c	Are any persons arguing, shouting, fighting or otherwise behaving hostile or threatening?
	Disagree = 1 Strongly disagree = 0	A big problem = 2 Somewhat a problem = 1 No problem = 0	<i>Value of the answer</i> ^b
	<i>Score range: 0–15</i>	<i>Score range: 0–12</i>	No, none behaving in hostile or threatening ways = 0 Yes, some observed = 1

^aTo develop the neighbourhood score, each respondent is given the following statements and asked to respond accordingly.

^bEach answer is given a value, to get the score the answer values are summed. For the dichotomous variable ‘Any Problem’ (PMK and Interviewer)—any score > 0 is set equal to 1.0, a score of zero remains zero.

^cOne of three “problems” used to construct dummy variable for “Any Problem” as rated by the PMK which is comparable to the “Any Problems” by the interviewer. The scores of the three questions are summed. Any Problems = 0 if summary score = 0; = 1 if summary score > 0.

Table 7
Hyperactivity, conduct disorder, emotional disorder and non-sports related injuries in the NLSCY

Hyperactivity score	Conduct disorder score	Emotional disorder score
Cannot sit still, is restless or hyperactive	Destroys his/her own things	Seems to be unhappy, sad or depressed
Fidgets	Gets into many fights	Is not as happy as other children
Is distractible, has trouble sticking to any activity	Destroys things belonging to his/her family or other children	Is too fearful or anxious
Cannot concentrate, cannot pay attention for long	When another child accidentally hurts him/her (such as bumping into him/her) he/she assumes the child meant to do it, then reacts with anger and fighting	Is worried
Is impulsive, acts without thinking	Physically attacks people	Cries a lot
Has difficulty awaiting turn in games or groups	Threatens people	Appears miserable, unhappy, tearful or distressed
Cannot settle to anything for more than a few moments	Is cruel, bullies or is mean to others	Is nervous, high-strung or tense
Is inattentive	Kicks, bites, hits other children	Has trouble enjoying him/herself
<i>Score range: 0–16</i>	<i>Score range: 0–16</i>	<i>Score range: 0–16</i>

To calculate the hyperactivity score, conduct disorder score and emotional disorder score the answers to each of the following questions were given an individual score: Never or Not True = 0; Sometimes or Somewhat True = 1; Often or Very True = 2. The scores of the individual questions in each category were summed to obtain a total score. The possible total score is listed at the end of the column for each disorder.

For Non-Sport Related Injury Necessitating Medical Attention—the PMK reports that the child has been involved in an accident or received an injury that required medical attention, that was not sports related, within the last 12 months.

studies, neighbourhood quality is statistically significant after controlling for individual and family characteristics.

Discussion

The basic conclusion of this paper is that lower-quality neighbourhoods are generally associated with poorer outcomes for children. This result was obtained over various outcome measures (emotional, behavioural, and physical), and neighbourhood quality measures (safety, cohesiveness, and problems). We also used information from two respondents and found that parental assessment of neighbourhood quality usually yields stronger results than does interviewer assessment. Our finding that parental-reported neighbourhood quality remains statistically significant after controlling for individual and family characteristics may suggest that aggregate measures of 'geographical' neighbourhoods or reports from individuals observing the neighbourhoods are very different from neighbourhood

measures reported by individuals living in the actual neighbourhoods in which children live. It is interesting that the literature thus far indicates that the further removed from the neighbourhood the reported measure is (i.e. individual within neighbourhood-reported measure vs. interviewer-reported measure vs. aggregate measure using geographic boundaries), the weaker is the association.

The results of this study support other literature that finds a relationship between neighbourhood characteristics and child well-being. The consistent significantly positive relationship between the cohesion score and child outcomes offers support for the collective socialization theory, while the consistent significantly negative association between neighbourhood problems and child well-being coincides with the social isolation model.

We find that lone-mother status is associated with worse outcomes, after controlling for income and neighbourhood status. Family low-income is in general associated with poorer outcomes (other than conduct disorder and non-sports related injuries) after control-

Table 8
Summary statistics for outcomes and independent variables

Variable	Mean	Std. dev	Minimum	Maximum
Emotional Score	2.54	2.59	0	16
Hyperactivity Score	4.55	3.59	0	16
Conduct Disorder Score	1.38	1.86	0	12
Non-Sports Injuries	0.09	0.28	0	1
Neighbourhood Cohesion Score	10.77	2.75	0	15
Neighbourhood Problem Score	1.28	1.63	0	10
Neighbourhood Safety Score	4.35	1.28	0	6
Lone Mother	0.14	0.34	0	1
Low Income	0.21	0.41	0	1
PMK-less HS	0.15	0.36	0	1
Some post HS	0.29	0.45	0	1
University/College	0.37	0.48	0	1
Female Child	0.49	0.5	0	1
Child age 8–11	0.49	0.5	0	1
Number of Children	2.37	0.84	1	4
PMK age 15–24	0.01	0.11	0	1
PMK age > 34	0.58	0.49	0	1
Own Home	0.76	0.43	0	1
Live At Address > 10 years	0.23	0.42	0	1
House Needs Minor Repairs	0.17	0.38	0	1
House Needs Major Repairs	0.08	0.26	0	1
Government Housing subsidy	0.04	0.23	0	1
Social Support Score-PMK	14.6	2.9	0	18
Depression Score-PMK	4.6	5.6	0	35

Total observations = 11,037.

ling for lone-mother status and neighbourhood status. In many studies reported earlier, including both family and neighbourhood characteristics weakened the association between child outcomes and one of these variables or both. In our results, there seems to be independent associations. Like McCulloch and Joshi (2001) we find that family socio-economic status is more strongly related to child well-being than neighbourhood status.

The result that PMKs and interviewers do not rate neighbourhoods identically is unsurprising and there is no obvious accuracy ranking of these two reports. PMKs may be less objective about their neighbourhood than is an outsider, but PMKs live in the neighbourhood and thus may have more and better information on day to day life. As well, it is the PMK who lives with the child and whose beliefs about neighbourhood quality are likely passed on to the child which may be important for child outcomes.

This is a cross-sectional study and as such we have made no mention of causality. Cross-sectional data cannot untangle the pathways of causality, but do allow us to investigate the joint distribution of the variables which are believed to be of relevance in the study of neighbourhood characteristics and child well-being. The study offers micro-level data on neighbourhood char-

acteristics. We believe the responses by the PMK and interviewer (if they are at all familiar with the areas) are much more likely to describe the areas in which children actually live and play than areas aggregated by postal code or enumeration areas however, this is a topic for further study.

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Appendix A

As stated in the text, this appendix details neighbourhood variables (Table 6), provides the four indicators for children aged 4–11 (Table 7) and gives a descriptive statistics (Table 8).

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