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Neighbourhood Influences on Children's School Readiness

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by
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Executive Summary

Children are influenced by a variety of contexts in which they live. A majority of the research examining effects on healthy child development has focused on the influence of the family and the peer group, and only recently have broader influences such as the effects of neighbourhoods and communities begun to be examined for young children. This study examines the influences of neighbourhood and family socio-economic characteristics on children's competencies associated with school readiness. Three areas of competence are explored. For toddlers, the focus is on motor and social development; for preschoolers, the major area of study is receptive verbal abilities; and for both groups, maternal reports of behaviour problems are examined.

Results indicate that neighbourhood characteristics, particularly neighbourhood affluence and cohesion are associated with competencies for children of both age groups. Family characteristics such as higher levels of household income and higher levels of maternal education are also associated with children's competencies. Neighbourhood characteristics have an impact on children's readiness to learn. As would be expected for both toddlers and preschoolers, family characteristics are also important; they mediate neighbourhood effects for the youngest children. However, these effects remain significant over and above family characteristics for the older group of children (i.e., preschoolers).

These findings highlight the important impact that conditions of neighbourhoods, particularly neighbourhood affluence, can have on young children's competencies both directly and indirectly. Neighbourhoods must be safe and free of violence with additional benefits accruing to neighbourhoods that have shared values and expectations. Efforts to improve conditions that maximize child development and well-being will have a positive impact on all children, especially those living in the poorest socio-economic conditions. If we wish to ensure children's healthy development, they must have equal access to nurturing, stimulating, supportive, caring, and safe environments. Furthermore, primary prevention initiatives to ensure the health and well-being of children are important because investments in child development have been shown to be more cost-effective than dealing with long-term consequences such as delinquency or criminal involvement.

Sommaire

Les enfants sont influencés par toutes sortes de contextes dans lesquels ils évoluent. La plupart des études de facteurs influant sur le développement sain de l'enfant sont axées sur la famille et le groupe de pairs, et ce n'est que depuis peu qu'on examine les effets, sur les jeunes enfants, de facteurs d'influence plus étendus tels que le quartier et la collectivité. La présente étude porte sur les incidences des caractéristiques socioéconomiques du quartier et de la famille sur les compétences des enfants associées à la maturité scolaire. Trois secteurs de compétence sont à l'étude : le développement moteur et social chez les tout-petits, les aptitudes verbales dans leur versant réceptif chez les enfants d'âge préscolaire et, pour les deux groupes, les problèmes comportementaux signalés par la mère.

Les résultats indiquent que les caractéristiques du quartier, en particulier l'aisance et la cohésion, sont associées à des compétences chez les enfants des deux groupes d'âge. Les caractéristiques familiales telles que des niveaux accrus de revenu du ménage et de scolarisation maternelle sont également associées aux compétences chez les enfants. Les caractéristiques du quartier ont une incidence sur la maturité scolaire des enfants. Comme l'on s'y attendrait dans le cas des tout-petits et des enfants d'âge préscolaire, les caractéristiques familiales sont également importantes et agissent comme médiateur sur les effets du quartier chez les enfants les plus jeunes. Cependant, ces effets demeurent significatifs indépendamment des caractéristiques familiales chez les enfants plus âgés (c.-à-d. ceux d'âge préscolaire).

Ces constatations font ressortir les répercussions importantes que les conditions du quartier, en particulier le niveau d'aisance, peuvent avoir sur les compétences des jeunes enfants, aussi bien directement qu'indirectement. Les quartiers doivent être sécuritaires et libres de violence, et ceux où les résidents ont des valeurs et des attentes communes s'en portent d'autant mieux. Les initiatives destinées à rendre les conditions les plus propices au développement et au bien-être des enfants auront des incidences positives sur tous les enfants, surtout ceux qui vivent dans les conditions socioéconomiques les plus défavorables. Si nous voulons assurer le développement sain des enfants, ils doivent tous bénéficier d'un accès égal à des environnements sécuritaires et stimulants qui leur offrent les soins, le soutien et l'attention dont ils ont besoin. De plus, les initiatives de prévention primaire destinées à assurer la santé et le bien-être des enfants sont importantes, car il est reconnu qu'il vaut mieux investir dans le développement de l'enfant que faire face aux conséquences à long terme comme la délinquance ou l'activité criminelle.

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1. Introduction

1.1 Neighbourhood Theories

Neighbourhood characteristics are part of an ecological model that influences development (Bronfenbrenner, 1979). Individuals are influenced by a variety of contexts in which they live including the family, peers, and the neighbourhood as well as institutions such as school and the work place. A majority of the research examining effects on healthy child development has focused on the most proximal influences such as the family and the peer group (Maccoby & Martin, 1983), and only recently have the more distal influences such as the effects of neighbourhoods and communities begun to be examined for young children.

Although the associations between neighbourhoods and health have been studied for adults, less is known about the impact of different neighbourhood characteristics for children. Several theories about neighbourhood effects on children's well-being have been reviewed by Jencks and Mayer (1990). Theories that have been described include contagion theories, theories of collective socialization, competition theories, and theories of relative deprivation. Contagion theories are based on the power of peer behaviours, including imitation and pressure, to influence other children to exhibit problem behaviours. Theories of collective socialization suggest that adult members of the community act as role models, monitoring and influencing children who are not their own. Community members may monitor children's actions and exercise social control by helping youngsters internalize social norms and learn the boundaries of acceptable behaviours. These theories would predict that living among affluent neighbours would encourage child competence, achievement in school, and avoidance of problem behaviours.

Competition theories are based on a concept of limited resources in which neighbours, peers, and/or classmates compete for scarce resources, suggesting that a large proportion of affluent neighbours may be a disadvantage. When there is competition for scarce resources, such as grades in school or jobs in the workforce, affluent neighbours can be seen as increasing competition. Theories of relative deprivation are based on the assumption that young people judge their success and failure by a comparison process to others around them such as neighbours, peers, or classmates. If young people respond to failure or limited opportunities in school or in the job market by becoming less motivated and reducing their effort, having affluent

neighbours may decrease their chances of success. Competition and relative deprivation theories predict that the presence of affluent neighbours would be disadvantageous (Mayer & Jencks, 1989).

Wilson (1987) has suggested that living in impoverished neighbourhoods where families have few economic resources, high rates of unemployment, and high rates of single parenthood is associated with "social isolation," which may have damaging psychological and behavioural effects on children and families. Families living in these circumstances may not emphasize socialization practices and family routines that reinforce behaviours and lifestyles associated with competencies that are rewarded in present day society. In contrast, families living in affluent neighbourhoods are more likely to be associated with more positive role models and increased access to jobs that may reinforce behaviours conducive to future success.

The organization of a community is linked to social and cultural processes that are important for forming social networks and kinship ties. Robert Sampson's theory of "collective efficacy" is based on informal social control found in the neighbourhoods where members trust each other and express a willingness to intervene for the common good (Sampson, 1991; Sampson, Raudenbush & Earls, 1997). An organized community has shared norms that may be directed towards social problems that support the communities' common values (Sampson, 1991). A community whose members rely on and trust each other may receive more support from within their community or may be more likely to exhibit "collective socialization" by monitoring and serving as role models for children who are not their own.

1.2 Family Characteristics as Mediators of Children's Environmental Experiences

Families provide ongoing learning environments for young children. Generally, parents control their children's access to contexts outside the home such as interaction with peers, child care, and pre-school experiences. Parents interact with their children, provide learning materials in the home, talk to and play with their children and offer access to activities outside the home. The way parents do these things constitute the educational environment of the young child (Brooks-Gunn, Denner, & Klebanov, 1995; Brooks-Gunn & Duncan, 1997) and are influenced by the child characteristics as well as the socio-economic resources available to the family. Child characteristics such as age may determine parental control as well as independence to choose

friends and activities. Family socio-economic characteristics such as parental education, household income, and single family headship are also important influences especially in the early years of life (Alexander & Entwisle, 1988; Duncan & Brooks-Gunn, 1997; McGauhey & Starfield, 1993). These influences largely determine children's educational experiences and outcomes throughout childhood, adolescence, and young adulthood (Hertzman, 1992).

1.3 Children's Competencies and School Readiness

Readiness to learn includes physical well-being and motor development, social and emotional development, approaches toward learning, literacy and language development, and cognition and general knowledge (Doherty, 1997; Kagan, 1995). Children who are not prepared for formal education are likely to experience problems such as low achievement and grade failure in the early years (Guo, Brooks-Gunn & Harris, 1996). In the adolescent years poor school achievement is associated with lowered educational attainment, lowered literacy skills, and risky health behaviours such as smoking, the early onset of sexual behaviour, and juvenile delinquency (Darlington, Royce, Snipper, Murray, & Lazar, 1980).

In this study we use the National Longitudinal Survey of Children and Youth (NLSCY) to focus on specific areas of competency associated with children's school readiness, in two age groups of children. For the youngest group of children, toddlers aged 2-3, reports of motor and social development as well as reports of behaviour problems were collected from the person most knowledgeable about the child (PMK[1]). For preschoolers, aged 4-5, receptive verbal abilities, a proxy measure for cognitive competence were assessed by interviewers and mothers reported on behaviour problems. We examine the influences of various neighbourhood and family characteristics on the competencies associated with school readiness. We also include measures of unsafe neighbourhood as rated by survey interviewers as well as lack of social cohesion within the neighbourhood as perceived by the PMK, constructs that are not usually available in studies examining school readiness that have used census linked data (Chase-Lansdale et al., 1997; Sampson, Raudenbush & Earls, 1997).

[1] For most of the children (89.9%) the PMK was the mother, 88.5% were the biological mother and 1.4% were the step, adoptive, or foster mother. For 9.5% of the children, the PMK was the father. For 0.5% of the children, the PMK was not a parent.

1.4 Research Objectives and Hypotheses

- How are neighbourhood characteristics associated with the competencies of toddlers (aged 2-3) and preschoolers (aged 4-5)?
- How are family socio-economic characteristics associated with children's competencies?
- Do neighbourhood characteristics affect children's competencies over and above family characteristics?
- Do neighbourhood effects differ by child age group?

Based on previous studies we expect both family and neighbourhood characteristics to affect children's competencies even prior to the commencement of formal education. For young children, the effects of neighbourhood characteristics may operate indirectly via effects on parents. Throughout the pre-school period, parents exert control over the child's environment including extra familial contacts and activities. Parents control young children's experiences within the neighbourhood such as trips to the park or to libraries, interactions with other children, and participation in child care and community programs. For young children, the effects of neighbourhood characteristics may operate via parental decisions regarding children's exposure to the environment. Based on two studies examining these effects in samples of American children, neighbourhood affluence rather than neighbourhood poverty is hypothesized as being a determinant of early competencies (Chase-Lansdale et al., 1997; Brooks-Gunn, Duncan, Klebanov & Sealand, 1993; Duncan, Brooks-Gunn & Klebanov, 1994). We expect the importance of neighbourhood characteristics to increase as children get older due to the more numerous interactions with the community and institutions such as day cares, community centres, and schools. Neighbourhood effects are expected to be stronger for preschoolers than toddlers, and although not tested here, effects for school aged children would be expected to be larger than those for preschoolers. As children get older, their independence increases, parental monitoring decreases, and peer contacts within the community become more frequent.

- Neighbourhood characteristics, particularly neighbourhood affluence is expected to have a positive effect on preschoolers competencies (Chase-Lansdale et al., 1997; Brooks-Gunn, Duncan, Klebanov & Sealand, 1993; Duncan, Brooks-Gunn & Klebanov, 1994). We expect to find indirect neighbourhood effects on children as young as 2-3 years of age with direct effects getting larger as children get older.

- Family socio-economic characteristics are expected to be large determinants on all areas of children's competence. Higher levels of household income, higher levels of maternal education, and two-parent families are expected to be associated with child competence (Kohen, Hertzman & Brooks-Gunn, in preparation).
- Neighbourhood effects are expected to exist over and above family socio-economic characteristics for preschoolers. However, for the youngest children the importance of neighbourhoods is secondary to the importance of the family.

2. Methods

The NLSCY is a national prospective longitudinal study designed to measure child development and well-being. The first cycle was conducted by Statistics Canada on behalf of Human Resources and Development Canada from November 1994 to June 1995. A cross sectional sample of 22,831 children aged 0-11 were initially surveyed in the first cycle and are going to be followed into adulthood with reassessments every two years.

The NLSCY is a clustered probability sample of Canadian residential households with children aged 0-11. Excluded households included those situated in remote areas, those on First Nations Peoples' reserves, and institutional settings. Sampling frames for the first cycle of the NLSCY included a main component based on households participating in Statistics Canada's Monthly Labour Force Survey (excluding the Territories for which data was collected separately) and an integrated component based on households participating in the 1994 National Population and Health Survey. In total, 15,579 households were selected to participate, 12, 879 for the main component and 2,700 for the integrated component. Responses were obtained from 13,439 participants, resulting in an overall response rate of 86.3 percent. An analysis of responding versus non-responding households revealed a slight under representation of households in Census Metropolitan Areas, households with parents aged 40 and over, and households with a parent with 8 years or less of education. Sample weights were applied to the data to take sampling features into account including unequal probabilities of selection, non-response (person and household level), and an adjustment making the age and sex distributions of the sample correspond to the age and sex distributions of the Canadian population.

In each eligible household, one child aged 0-11 was randomly selected. Information was obtained from the person most knowledgeable about that child (PMK). Other children were then selected at random, to a maximum of four per household. The PMK was asked to complete a general questionnaire, a parent questionnaire and a child questionnaire. The PMK provided basic demographic information about all household members, socio-economic information about herself and her spouse, and extensive information about the selected child. For this study, child measures included toddlers' motor and social development as well as behaviour problems based

on maternal reports. Receptive verbal abilities were collected by interviewers for preschoolers together with maternal reports of behaviour problems.

Researchers must often use units such as census tracts or block groups to approximate the concept of local communities. Although imperfect as estimates of an individual's perceived community, they are closely linked to the causal processes assumed to underlie the outcomes of interest. Census data linkages to the NLSCY were performed by Statistics Canada using group clusters and corresponding enumeration areas. Census information was linked based on the enumeration area or an average was taken if the unit corresponded to more than one enumeration area.

2.1 Subjects

The present study focuses on the families and neighbourhoods of toddlers and preschool aged children. Since the outcomes assessed varied based on the child's age, different subsamples of children were selected based on the competencies assessed.

2.1.1 Toddlers

Of the total sample of children aged 2-3 (unweighted n=3,669) 95% (unweighted n=3,868) had census information linked to NLSCY data. These children came from a total of 3,512 households of which 157 households contained two children between the ages of 2-3. From the 157 households that had multiple children aged 2-3, one child was randomly selected, yielding a sample of n=3,512 children (weighted n=3,701). Final analyses were conducted on two subsamples of toddlers. The first consisted of children who had complete data for the motor and social development scale n=1,755 (weighted n=1,951) and the second consisted of children who had complete data for the behaviour problem score index n=3,446 (weighted n=3,623). All analyses are based on the weighted samples. The descriptive characteristics of the sample of toddlers are presented in Table 1.

Table 1: Descriptive Characteristics of the Toddler Sample,Aged 2-3 (n=3,701)

Family Variables

	Percentage
Female	49
Additional Household Members	
0	27
1	44
2	19
3+	10
PMK Age at Birth (%teen)	5
PMK Education	
< high school	16
high school grad	16
> high school	68
Female-Headship	16

PMK Age (M=31.72, SD=5.38) (range 16-69)

	Income Categories	Percentage
1	<$10,000	2
2	10-19,999	15
3	20-29,999	12
4	30-39,999	13
5	40,000+	58

Neighbourhood Variables	Mean (SD)	Range
% families with household incomes < $20,000	13.50 (10.37)	0-78%
% families with household incomes $20-49,999	18.72 (7.60)	0-50%
% families with household incomes > $50,000	40.65 (20.70)	0-94%
% female headed families	10.92 (7.43)	0-70%
Unemployment Rate	15.79 (12.96)	0-100%
% below 1994 national average	45	
Unsafe Neighbourhoods (Interviewer observation)	4.14 (1.31)	1-10
Log scores	1.37 (0.30)	0-2.3
PMK Rating of Low Cohesion	9.15 (2.71)	1-15

Coding of Variables in Regressions

Province (9 dummy variables; B.C. omitted)
Female (1=female, 0=male)
Number of other people in the household (continuous; higher number represents more people)
Immigrant (1=immigrant; 0=non-immigrant)
PMK age at birth of child (1=non-teen, 0=teen)
Household income (categorical 1<$10,000; 2=10-19,999; 3=20-29,999; 4=30-39,999;5=$40,000+)
PMK level of education (1 < high school, 2 high school grad, 3 > high school)
Single female headship (1=single, 0=two parent family)

Table 2: Descriptive Characteristics of the Preschool Sample Aged 4-5 (n=3,350)

Family Variables				
	Percentage			
Female	49	**PMK Age** (M=33.40, SD=5.34) (range 19-68)		
Additional Household Members			**Income Categories**	**Percentage**
0	14	1	<$10,000	1
1	50	2	10-19,999	14
2	24	3	20-29,999	12
3+	12	4	30-39,999	14
		5	40,000+	59
PMK Age at Birth (%teen)	5			
PMK Education				
< high school	14			
high school grad	19			
> high school	67			
Female-Headship	14			

Neighbourhood Variables	**Mean (SD)**	**Range**
% families with household incomes < $20,000	13.71 (10.04)	0-68 %
% families with household incomes $20-49,999	18.54 (7.55)	0-50%
% families with household incomes > $50,000	41.96 (20.80)	0-95%
% single female headship	10.44 (6.64)	0-70%
Unemployment Rate	10.17 (6.78)	0-77%
% below 1994 national average	45	
Unsafe Neighbourhoods		
(Interviewer observation)	3.32 (1.42)	0-10
Log scores	1.12(.40)	0-2.3
PMK Rating of Low Cohesion	9.06 (2.55)	1-15

Coding of Variables in Regressions
Province (9 dummy variables; B.C. omitted)
Female (1=female, 0=male)
Number of other people in the household (continuous; higher number represents more people)
Immigrant (1=immigrant; 0=non-immigrant)
PMK age at birth of child (1=non-teen, 0=teen)
Household income (categorical 1<$10,000; 2=10-19,999; 3=20-29,999; 4=30-39,999;5=$40,000+)
PMK level of education (1 < high school, 2 high school grad, 3 > high school)
Single female headship (1=single, 0=two parent family)

2.1.2 Preschoolers

Of the total sample of PMK's with 4 and 5 year old children (unweighted n=3,728) 94% had census information linked to NLSCY data (unweighted n=3,499). These children came from a total of 3,564 households of which 160 households contained two children between the ages of 4-5 and two households contained three children aged 4-5. From the 162 households that had multiple children aged 4-5, one child was randomly selected, yielding an unweighted sample of n=3,564 children. In addition two children were dropped due to invalid census neighbourhood data (the percentage of people in the neighbourhood who reported incomes greater than $50,000 was greater than 100%). The two final subsamples consisted of children who had complete PPVT-R data n=2,993 (weighted n=3,350) and children who had complete data for the behaviour problem scale n=2,986 (weighted n=3,340). All analyses are based on the weighted sample. The descriptive characteristics of the sample of preschoolers are presented in Table 2.

2.2 Family Characteristics

The characteristics entered as covariates in the regression analyses were province (9 dummy codes with the tenth province, B.C., selected as the omitted province) and child sex (female=1, male=0). Other family characteristics included the number of people in the household (continuous), and PMK age at the birth of the child (1=non-teen, 0=teen). In addition, the following variables assessed family socio-economic characteristics: household income (5 categories; < $10,000; $10-19,999; $20-29,999; $30-39,999; $40,000+), PMK level of education (1 < high school grad, 2=high school, 3 > high school grad), and single female headship (1=single, 0=not single).

2.3 Neighbourhood Characteristics[2]

2.3.1 Neighbourhood Poverty and Affluence

Neighbourhood poverty and affluence were based on a continuous variable from census information indicating the percentage of families in the neighbourhood with household incomes less than $20,000 ("poverty") and the percentage of families in the neighbourhood with household incomes of $50,000 or more ("affluent"). The percentage of families who earned

[2] Since the NLSCY used a clustered sampling technique many children were located within the same neighbourhood. Effects are likely to be biased since the sample was not randomly selected. Therefore the sample of neighbourhoods in this study is not nationally representative of all Canadian neighbourhoods.

$20,000-$49,999 served as the comparison or omitted group in our analyses. Different categorizations of this variable were not possible as data was predefined by Statistics Canada.

2.3.2 Neighbourhood Family Structure

Neighbourhood family structure was based on a continuous census variable indicating the percentage of single female headed families in the neighbourhood.

2.3.3 Neighbourhood Unemployment

Neighbourhood unemployment was based on a census variable indicating the unemployment rate for individuals in the neighbourhood aged 15-24. A dichotomous variable was created, comparing each neighbourhood's unemployment rate to the national average rate in 1994 (1=above the national average; 0=below the national average).

2.3.4 Neighbourhood Safety

Ratings of unsafe neighbourhoods were based on NLSCY interviewers' ratings of the safety and general condition of the neighbourhood. The scale consisted of a sum of the following 6 items: a) the volume of traffic b) presence of garbage, litter, or broken glass c) any people loitering, congregating, or hanging out d) any persons arguing, shouting, fighting or behaving in a hostile or threatening manner e) are drunken or otherwise intoxicated persons visible f) rating of the general condition of most of the buildings on the block. Scales were collapsed to account for skewed distributions yielding sum scores ranging from 0 to 10 with higher scores representing neighbourhoods that were less safe. For the sample of toddlers the mean score was 4.14 (SD=1.31) and reliability was alpha=.29. For the sample of preschoolers, the mean score was 3.31 (SD=1.42) with a reliability of alpha=.37. As would be expected, reliability levels are low due to the variability in safety ratings of different neighbourhoods. A log transformation was performed on this scale to account for the skewed distributions. Resulting scores ranged from 0-2.30 (M=1.37, SD=0.30) for toddlers and from 0-2.3 (M=1.12, SD= .40) for preschoolers.

2.3.5 Neighbourhood Cohesion

Neighbourhood cohesion was based on NLSCY reports of PMK perceptions. The scale consisted of the sum of PMK ratings on 5 Likert-type items : a) if there is a problem, neighbours get together to deal with it b) there are adults in the neighbourhood that children can look up to c)

people are willing to help their neighbours d) you can count on adults in the neighbourhood to watch that children are safe and out of trouble e) when I am away, I know that my neighbours will keep their eyes open for possible trouble. To correct for the skewed distribution of responses, the sum of these 5 items was based on collapsing each item from a 4 point Likert-type scale into a 3 point scale. Scales were collapsed to ensure that each response category had a minimum of a 10% response rate. Scores ranged from 1.00 to 15.00 with higher scores represented less cohesive neighbourhoods. For the toddler group the mean score was 9.15 with a standard deviation of 2.71 and a high reliability (alpha=.87). For the preschool aged children the mean score was 9.06, with a standard deviation of 2.55 and high reliability (alpha=.87).

2.4 Child Outcomes

2.4.1 Toddlers (Children Aged 2-3)

Motor and social development

Motor and social development was assessed based on PMK responses to 15 questions that measure dimensions of motor, social, and cognitive development of young children aged 2-3 years. Each item asks whether or not a child is able to perform a specific task with questions varying by child age. Standardized scores were produced from a sum of all "yes" answers producing a score with a mean of 100 and standard deviation of 15 for each age grouping. Children whose scores were more than one standard deviation below the mean (scores less than 85) were classified as obtaining low scores. In the present sample, scores ranged from 15 to 136 and 15% of toddlers (n=300) obtained low motor and social development scores.

Behaviour problems

Behaviour problems were assessed based on reports of child behavioural competence by the PMK. As part of the Parent Questionnaire mothers of children aged 2-3 completed a portion of the behavioural rating scale used for older children in the survey. The complete behavioural scale was previously used in two Canadian epidemiological studies: the Ontario Child Health Study (OCHS; Offord et al., 1989; Boyle et al., 1987) and the Montreal Longitudinal Survey (MLS;

Tremblay, Pihl, Vitaro & Dobkin, 1994).[3] Items were scored on a three point scale in which a score of 0 indicated an absence of the behaviour in question and scores of 1 and 2 were ordered categories of increasing severity of behaviour (See Appendix A for the item list). The scale consisted of a sum score of 31 items selected based on factor analyses conducted by Statistics Canada. Higher scores represented more behaviour problems or lowered behavioural competence. For toddlers, total behaviour scores ranged from 0 to 56 ($\underline{M}$=17.34, $\underline{SD}$=7.78). The internal consistency of the 31 behavioural items was high (Cronbach's α=.82).

To identify a group of children who are "at-risk" for experiencing problems at school, we selected children whose scores were greater than one standard deviation above the mean (total score greater than 24). In the weighted sample, 14% of toddlers ($\underline{n}$=523) had high behaviour problem scores, a rate similar to other studies (Richman, Stevenson & Graham, 1982). These children are at-risk for experiencing problems at school as they start school with fewer behavioural skills than their peers.

2.4.2 Preschoolers (Children Aged 4-5)

Receptive verbal abilities

Receptive verbal abilities were assessed based on the Peabody Picture Vocabulary Test-Revised (PPVT-R), which is a short 15 minute test of receptive vocabulary for children and adults, that can be administered as early as age 3 (Dunn & Dunn, 1981). The PPVT-R was administered face to face either in English or French. Although the test results in a standardized score ($\underline{M}$=100, $\underline{SD}$=15) and is often considered a measure of cognitive competence, the PPVT-R is not considered equivalent to full-fledged IQ tests that assess multiple abilities such as the WISC-R or the McCarthy Scales of Children's Abilities. An important strength of the PPVT-R is that it does not rely on verbal or written responses and thus seems particularly appropriate for use with

[3] These studies were designed to obtain prevalence estimates in children for specific psychiatric disorders. Reflecting the goals of the initial studies, the behavioural items collected in the NLSCY have been factor analyzed to yield specific clinical diagnostic constructs such as hyperactivity/inattention, prosocial behaviours, emotional/anxiety disorder, physical aggression/opposition, and separation anxiety in toddlers and conduct disorder, hyperactivity, emotional disorder, anxiety, aggression, inattention, and prosocial behaviours in preschoolers (Lipman, Offord, & Dooley, 1996; Offord & Lipman, 1996; Tremblay, et al., 1996). Since the focus of this study is on a global measure of school readiness rather than specific clinical diagnoses, we report on a measure of total behaviour problems based on a sum score of the responses for each age group. Total behaviour problem scores have been used by others, especially as screening tools for preschool aged children (Achenbach & Edelbrock, 1981; Behar & Stringfield, 1974; Richman, Stevenson & Graham, 1975).

economically disadvantaged or immigrant groups who may have difficulty with verbal fluency (Dunn & Dunn, 1981). The PPVT-R has strong psychometric properties (Dunn & Dunn, 1981); it correlates well with measures of intelligence, particularly verbal subscales and is a very good predictor of academic achievement. It is important to emphasize that this verbal ability test only taps one domain of language and cognitive abilities relevant to school achievement. The scores on this test only provide us with a rough proxy of children's verbal abilities. Nevertheless, how well children do on this short test is related to other indicators of school achievement, including grade failure, school achievement scores, and even high school completion. For the present sample of preschoolers, PPVT-R scores ranged from 50-160, with a mean of 99.40 (SD=15.62).

For our descriptive analyses we identified a group of children who are "at-risk" for experiencing problems at school, children whose scores were less than one standard deviation below the mean (score less than 85). In the weighted sample, 16% of the children (n=544) obtained verbal scores that fell one standard deviation below the mean. These children can be considered "at-risk" for academic difficulties as they are less verbally competent than their peers.

Behaviour problems

Behaviour problems were assessed based on reports of child behavioural competence by the PMK. As part of the Parent Questionnaire mothers of children aged 4 and older completed a behavioural rating scale previously used in two Canadian epidemiological studies: the Ontario Child Health Study (OCHS; Offord et al., 1989; Boyle et al., 1987) and the Montreal Longitudinal Survey (MLS; Tremblay, Pihl, Vitaro & Dobkin, 1994). Items were scored on a three point scale in which a score of 0 indicated an absence of the behaviour in question and scores of 1 and 2 were ordered categories of increasing severity of behaviour (See Appendix B for item list). The scale consisted of a sum score of 43 items selected based on factor analyses conducted by Statistics Canada. Higher scores represented more behaviour problems or lowered behavioural competence. For preschool aged children, total behaviour scores ranged from 0 to 66 with a mean of 18.96 (SD=8.75). The internal consistency of the 43 behavioural items was high (Cronbach's α=.86).

To identify a group of preschool aged children who are "at-risk" for experiencing behavioural problems at school, we selected children whose scores were greater than one standard deviation above the mean (total score greater than 28). In the weighted sample, 14.5% of preschoolers

(n=484) had high behaviour problem scores. These children are rated as having fewer behavioural skills than their peers. This classification yields prevalence rates similar to those obtained in other studies. In an epidemiological study of preschool children in the U.K., 15% of children had mild behaviour problems according to maternal reports (Richman, Stevenson, & Graham, 1975). In a study examining a rural community in the United States the prevalence of behaviour problems in preschool aged children was found to be 11% (Earls, 1980) and in the U.S. National Longitudinal Survey of Youth (NLSY) 13% of children aged 4 and 5 obtained high behaviour problem scores (Roth & Brooks-Gunn, in prep).

2.5 Data Analytic Plan

Where sample sizes are large enough, descriptive analyses and figures are provided to allow for an examination of groups who are most "at-risk" for exhibiting low levels of competence or high levels of behaviour problems by neighbourhood and family characteristics.

Multivariate analyses, using OLS Multiple Linear Regressions were used to examine the effects of neighbourhood and family characteristics on measures of motor and social competence for toddlers, verbal abilities for preschoolers, and behaviour problems for both toddlers and preschoolers. Continuous outcome measures were used to allow for comparisons to effects obtained in other studies and to place the present study into the context of previously conducted research. Using models comparable to other studies (Brooks-Gunn et al., 1993; Chase-Lansdale et al., 1997; Klebanov et al., 1997), each measure of child competence (motor and social development, receptive verbal abilities, or behaviour problems) was regressed on various neighbourhood and family characteristics. For each age group and for each competence measure, the first model estimated neighbourhood effects after controlling for province of residence. Subsequent models examined the effects of family characteristics and the mediational role of family characteristics, with the final model including both neighbourhood and family characteristics (see Table 3).

Table 3. Research Questions and Associated Regression Models

How are neighbourhood characteristics associated with the competencies of toddlers (aged 2-3) and preschoolers (aged 4-5)?	
Model 1 (Neighbourhood characteristics)	*Alternate Model 1 (Neighbourhood characteristics)*
Province	Province
Neighbourhood poverty	Neighbourhood female headship
Neighbourhood affluence	Neighbourhood unemployment
How are family socio-economic characteristics associated with children's competencies? Do neighbourhood characteristics affect children's competencies over and above family characteristics?	
Model 2 (Covariates)	*Model 3 (Family socio-economic characteristics)*
Child sex	Household income
Household size	PMK education
PMK age at child birth	Single female headship

To test for mediated effects of neighbourhood characteristics, a series of multiple regressions were conducted according to Baron and Kenny's (1986) criteria. The size of the standardized beta coefficient presented in the regression table provides an estimate of the relative contribution of the variables in the regression equation to the outcome measure. Mediation occurs when a) a significant relationship exists between the predictor and the mediating variable b) there is a significant relationship between the mediator and the outcome variable c) the previous significant relationship between the predictor and the outcome variable is reduced when the mediator is included in the model. That is, the relationship between neighbourhood characteristics and child competence is reduced when family characteristics are included in the model.

Correlation tables for the individual and neighbourhood variables are presented in Table 4 for toddlers aged 2-3 and in Table 5 for preschoolers aged 4-5. Since the effects of neighbourhood poverty and affluence are correlated with neighbourhood effects of female headship, and unemployment, regression models estimated the effects of these characteristics separately as well as in combination.

Table 4: Correlations of Family and Neighbourhood Variables (2-3 yrs.)

	1	2	3	4	5	6	7	8	9	10	11	12
1. Female	1.00	.03	.01	.02	-.01	-.02	-.02	-.02	-.02	.04*	-.002	-.05**
2. Household size		1.00	.08**	.05**	-.05**	-.05**	-.03	.04	-.09**	-.02	-.09**	.03
3. PMK age at birth			1.00	.29**	.21**	-.28**	-.14**	.10**	-.18**	-.03	-.18**	-.14**
4. Income				1.00	.37**	-.57**	-.28**	.34**	-.32**	-.12**	-.29**	-.16**
5. PMK education					1.00	-.26**	-.15**	.21**	-.15**	-.03	-.18**	-.12**
6. Single mother						1.00	.16**	-.16**	.26**	.06**	.22**	.13**
7. Percentage of neighbourhood families income < $20,000							1.00	-.47**	.57**	.25**	.30**	.16**
8. Percentage of neighbourhood families income > $50,000								1.00	-.41**	-.14**	-.29**	-.14**
9.Percentage of neighbourhood single female headship									1.00	.17**	.36**	.17**
10. Unemployment rate										1.00	.10**	.09**
11. Unsafe neighbourhoods											1.00	.21**
12. Low neighbourhood cohesion												1.00

$\underline{p} < .05$, ** $\underline{p} < .01$, *** $\underline{p} < .001$

Table 5: Correlations of Family and Neighbourhood Variables (4-5 yrs.)

	1	2	3	4	5	6	7	8	9	10	11	12
1. Female	1.00	-.02	.02	-.01	.04*	-.01	-.03*	.05**	-.07**	.05**	-.06**	.02
2. Household size		1.00	.10**	.08**	-.03	-.11**	-.08**	.03	-.06**	-.04*	-.06**	-.03
3. PMK age at birth			1.00	.18**	.09**	-.14**	-.11**	.08**	-.09**		-.13**	-.10**
4. Income				1.00	.24**	-.53**	-.31**	.35**	-.21**	-.09**	-.29**	-.18**
5. PMK education					1.00	-.07**	-.14**	.17**	-.06**	-.04*	-.15**	-.12**
6. Single mother						1.00	.18**	-.14**	.24**	.07**	.20**	.18**
7. % Neighbourhood families income < $20,000							1.00	-.49**	.51**	.21**	.24**	.13**
8. % Neighbourhood families income > $50,000								1.00	-.35**	-.16**	-.29**	-.12**
9. % Neighbourhood single female headship									1.00	.16**	.30**	.21**
10. Unemployment rate										1.00	.10**	.08**
11. Unsafe neighbourhoods											1.00	.20**
12. Low neighbourhood cohesion												1.00

* $\underline{p} < .05$, ** $\underline{p} < .01$, *** $\underline{p} < .001$

3. Results

3.1 Toddlers

3.1.1 Motor and Social Competence

How are neighbourhood and family characteristics associated with motor and social competence of toddlers aged 2-3?

For graphic displays, descriptive analyses were conducted for the toddlers who obtained motor and social development scores less than one standard deviation below the mean. The motor and social competence scores of toddlers resulted in small subgroups with unreliable estimates and are not presented here. The multivariate analyses used a larger sample of children since continuous scores were used as the outcome measure.

What are the relative contributions of neighbourhood and family characteristics on toddlers' motor and social competence?

The first model in Table 6, examines the association of neighbourhood poverty and neighbourhood affluence with toddlers' motor and social competence. The second model examines neighbourhood effects over and above the covariates and the third model examines the effects of family characteristics as well as the mediating effects of family characteristics on neighbourhood effects. The first model in Table 6 demonstrates that neither neighbourhood poverty nor neighbourhood affluence is associated with motor and social development. The second and third models in Table 6 show that female child gender, smaller household size, younger maternal age at child birth, and higher levels of PMK education are associated with higher motor and social competence scores. The final model containing both neighbourhood and family characteristics explained the highest proportion of the variability (R^2=.07).

Table 6: Unstandardized Regression Coefficients, Standard Errors, and Standardized Coefficients for Motor and Social Competence Scores for Children Aged 2-3 (Weighted)

	1	2	3
Province	-----	-----	-----
Female		6.48*** (.66) .22	6.57*** (.65) .22
Number of siblings in the household		-.86** (.31) -.06	-.80** (.31) -.06
PMK age at birth		-4.61** (1.51) -.07	-5.78*** (1.58) -.09
Household income			.41 (.37) .03
PMK education			2.30*** (.47) .12
Single mother			1.82 (1.13) .04
Percentage of neighbourhood families with income < $20,000	.02 (.04) .01	.02 (.04) .01	.02 (.04) .02
Percentage of neighbourhood families with income >$50,000	.03 (.01) .04	.03 (.02) .04	.01 (.02) .01
Percentage of neighbourhood single female headed families			
Neighbourhood unemployment			
Constant	98.31	100.68	94.76
R2 Adj.	.001	.06	.07
R2 Change	.001	.06***	.01***
F	1.40	12.98***	12.37***

+ $\underline{p} < .10$, * $\underline{p} < .05$, ** $\underline{p} < .01$, *** $\underline{p} < .001$

Other neighbourhood characteristics such as the percentage of single female headed families and neighbourhood unemployment are associated with neighbourhood poverty and affluence. The effects of these characteristics were estimated in a separate regression model. No significant neighbourhood effects were found for motor and social competence of children aged 2-3 (see model 1, Table 7). Family characteristics such as higher levels of household income, higher levels of maternal education, and single female headship were associated with motor and social competence. The final model including both family and neighbourhood characteristics explained the largest variability (R^2=.06 in the final model; see model 3, Table 7).

Table 7: Unstandardized Regression Coefficients, Standard Errors, and Standardized Coefficients for Motor and Social Competence Scores for Children Aged 2-3 (Weighted)

	1	2	3
Province	-----	-----	-----
Female		5.94*** (.67) .21	6.01*** (.67) .21
Number of siblings in household		-.78* (.34) -.06	-.68* (.34) -.05
PMK age at birth		-1.02 (1.46) -.02	-2.29 (1.54) -.04
Household income			.90** (.36) .08
PMK education			1.11* (.48) .06
Single mother			2.61* (1.21) .06
Percentage of neighbourhood families with income < $20,000			
Percentage of neighbourhood families with income >$50,000			
Percentage of neighbourhood single female headed families	-.01 (.05) -.04	-.08 (.05) -.04	-.07 (.05) -.03
Neighbourhood unemployment	.43 (.74) .02	.18 (.72) .01	.36 (.72) .01
Constant	100.89	100.15	93.97
R^2	.01	.05	.06
R^2 Adj.	.003	.05	.06
R^2 Change	.002	.05***	.01***
F	1.84	9.74***	8.84***

+ $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$

To separate the effects of the various socio-economic neighbourhood characteristics, neighbourhood poverty and affluence were included in the model together with neighbourhood female headship, and neighbourhood unemployment (see model 1, Table 8). When the neighbourhood characteristics were entered into the model in one step, neighbourhood affluence had an impact on motor and social competence. More affluent families in the neighbourhood are associated with higher motor and social competence scores for toddlers. When controlling for neighbourhood female headship and neighbourhood unemployment, neighbourhood affluence is

an important and influential factor. The second model in Table 8 shows that controlling for household size, child sex, and maternal age at child birth do not mediate the impact of neighbourhood affluence. The final model in Table 8 enters the covariates as well as family socio-economic characteristics (model 3, Table 8). Higher levels of household income, higher levels of maternal education, and single female headship mediate the effects of neighbourhood affluence on toddlers' motor and social competence scores (reduction of 29% from beta=.07 to beta=.05).

Table 8: Unstandardized Regression Coefficients, Standard Errors, and Standardized Coefficients for Motor and Social Competence Scores for Children Aged 2-3 (Weighted)

	1	2	3
Province	-----	-----	-----
Female		5.95*** (.67) .21	6.01*** (.67) .21
Number of siblings in the household		-.78* (.34) -.05	-.69* (.34) -.05
PMK age at birth		-1.08 (1.46) -.02	-2.14 (1.54) -.04
Household income			.80* (.37) .07
PMK education			1.00* (.48) .05
Single mother			2.48* (1.21) .06
Percentage of neighbourhood families with income < $20,000	.004 (.04) .003	.01 (.04) .01	.02 (.04) .02
Percentage of neighbourhood families with income >$50,000	.10* (.02) .07	.06** (.02) .07	.04 (.02) .05
Percentage of neighbourhood single female headed families	-.04 (.06) -.02	-.05 (.06) -.02	-.06 (.06) -.03
Neighbourhood Unemployment	.58 (.74) .02	.31 (.73) .01	.39 (.72) .01
Constant	97.77	96.95	92.32
R^2	.01	.06	.06
R^2 Adj.	.01	.05	.06
R^2 Change	.01	.05***	.01**
F	2.14*	8.71***	7.86***

+ $\underline{p} < .10$, * $\underline{p} < .05$, ** $\underline{p} < .01$, *** $\underline{p} < .001$

Table 9: Unstandardized Regression Coefficients, Standard Errors, and Standardized Coefficients for Motor and Social Competence Scores for Children Aged 2-3 (Weighted)

	1	2	3	4	5
Province	-----	-----	-----	-----	-----
Female				5.66*** (.70) .20	5.73*** (.70) .20
Number of siblings in the household				-.66 (.35) -.05	-.55 (.35) -.04
PMK age at birth				-.36 (1.57) -.01	-1.53 (1.64) -.02
Household income					.96** (.38) .08
PMK education					1.03* (.50) .06
Single mother					2.93* (1.27) .07
Percentage of neighbourhood families with income < $20,000	-.003 (.04) -.002	-.000 (.04) -.000	-.000 (.04) -.000	.01 (.04) .01	.02 (.04) .01
Percentage of neighbourhood families with income >$50,000	.06* (.02) .08	.06* (.02) .07	.06* (.02) .07	.06* (.02) .07	.04 (.02) .05
Percentage of neighbourhood single female headed families	-.04 (.07) -.02	-.02 (.07) -.01	-.02 (.07) -.01	-.02 (.07) -.01	-.04 (.07) -.02
Neighbourhood unemployment	.78 (.77) .03	.80 (.77) .03	.80 (.77) .03	.56 (.76) .02	.65 (.75) .02
Unsafe neighbourhoods		-2.20+ (1.32) -.04	-2.13 (1.34) -.04	-2.02 (1.31) -.04	-1.85 (1.31) -.04
Low cohesion neighbourhood			-.05 (.14) -.01	-.11 (.14) -.02	-.08** (.14) -.02
Constant	97.65	100.59	100.85	99.62	93.97
R^2	.01	.01	.01	.05	.06
R^2 Adj.	.01	.01	.01	.04	.05
R^2 Change	.01*	.002	.000	.04***	.01**
F	2.02*	2.10*	1.92*	6.48***	6.27***

+ $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$

In our final set of analyses (see Table 9) we examine the additional contributions of unsafe neighbourhoods as rated by interviewers and maternal ratings of low neighbourhood cohesion to toddlers' motor and social competence. Neighbourhood safety and cohesion are not significant determinants of motor and social competence and do not have an impact on the explanatory power of the model (R^2 remains at .01; see Models 1 and 3, Table 9). The effect of neighbourhood affluence is significant after controlling for neighbourhood safety and is mediated by high levels of household income, high levels of maternal education, and female headship. The effect of neighbourhood affluence is reduced by 29% (from beta=.07 to beta=.05). In the final model controlling for family and neighbourhood characteristics, maternal ratings of cohesion are associated with motor and social competence. As would be expected, the final model containing both neighbourhood and family characteristics has the strongest strong explanatory power for toddlers' motor and social competence (R^2=.06).

For the youngest group of children, neighbourhood affluence is an important determinant of children's motor and social competence. However, family characteristics such as high levels of household income and high levels of maternal education are significant contributors and mediate the effect of neighbourhood affluence for toddlers.

3.1.2 Behavioural problems

How are neighbourhood and family characteristics associated with the behavioural competence of toddlers 2-3 years of age?

Descriptive figures illustrate the relationship between neighbourhood and family socio-economic conditions and high behaviour problem scores for toddlers. Figure 1 shows that the percentage of children who obtain high behaviour problem scores decreases as neighbourhood affluence increases. Neighbourhoods with few female headed families (10% or less) show low rates of behaviour problems but neighbourhoods with more than 10% of female headed families show higher rates of behaviour problems (see Fig. 2). The number of toddlers with high rates of behaviour problems decreases as the level of education in the neighbourhood increases (see Fig. 3). Interviewer ratings of unsafe neighbourhood were associated with preschoolers behaviour problem scores. The percentage of children with high behaviour problem scores showed an increase as neighbourhoods were rated as more unsafe (see Fig. 4). Similarly, the number of

children obtaining high behaviour problem scores increased as neighbourhoods were rated as less cohesive (see Fig. 5).

Figure 1. High Behaviour Problem Scores by Neighbourhood Affluence (Toddlers)

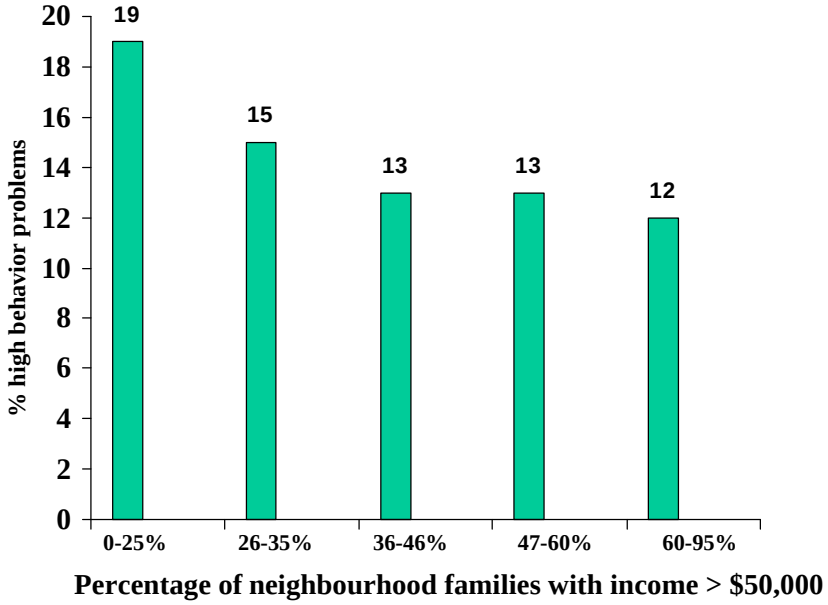


Figure 2. High Behaviour Problem Scores by Neighbourhood Female Headship (Toddlers)

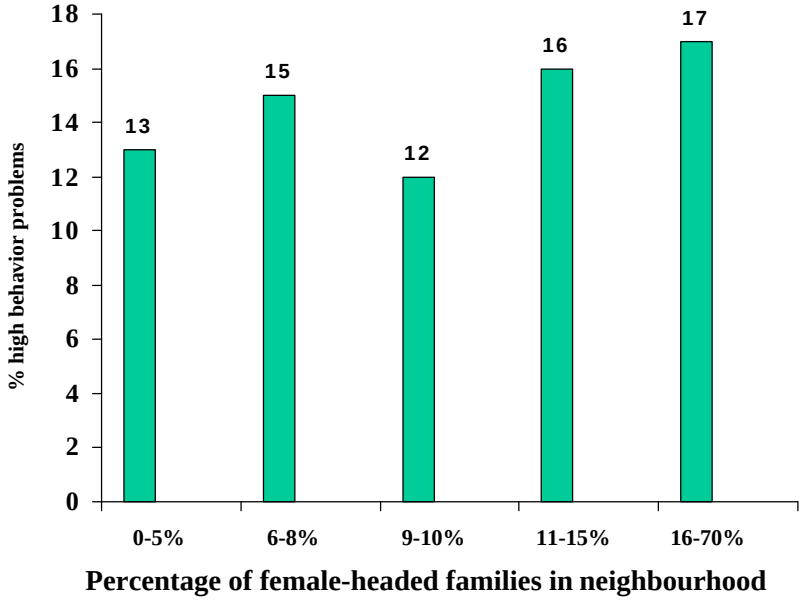


Figure 3. High Behaviour Problem Scores by Neighbourhood Education (Toddlers)

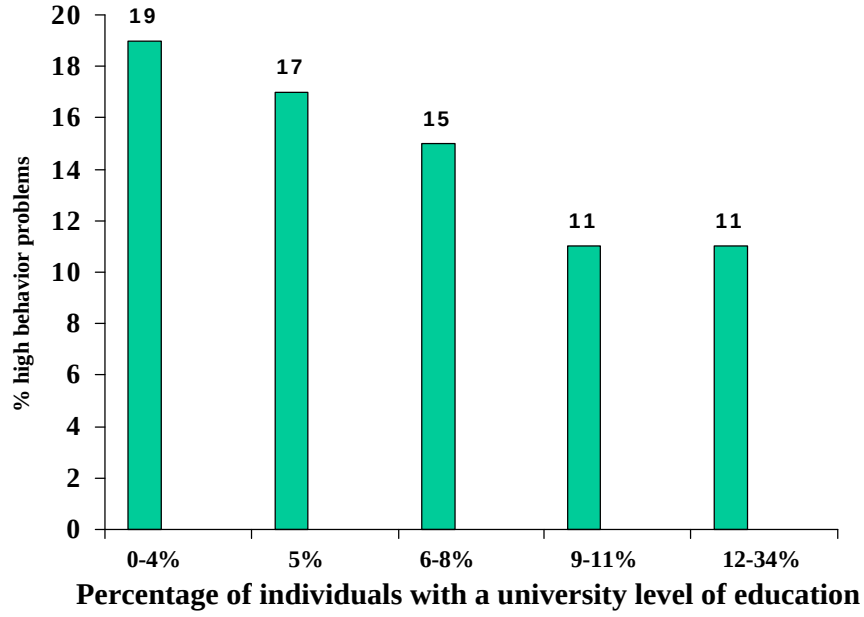


Figure 4. High Behaviour Problem Scores by Unsafe Neighbourhood Ratings (Toddlers)

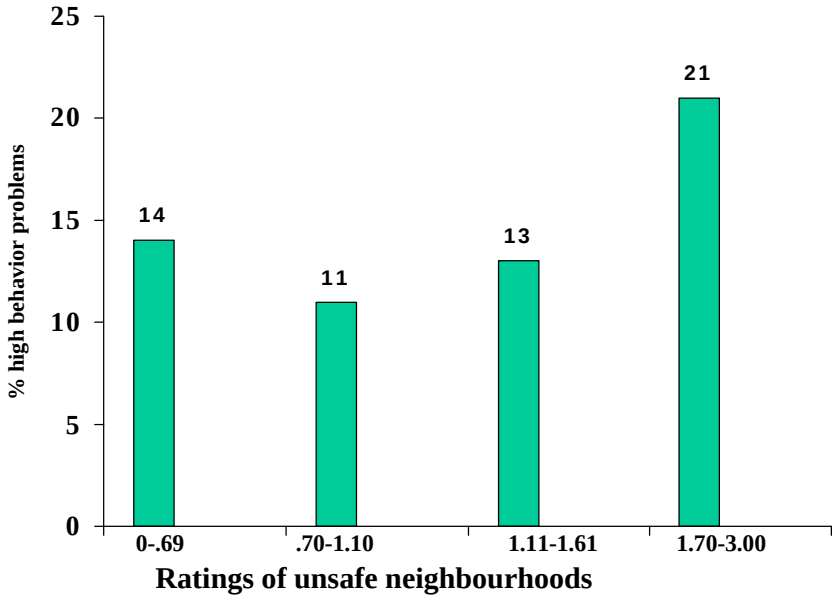
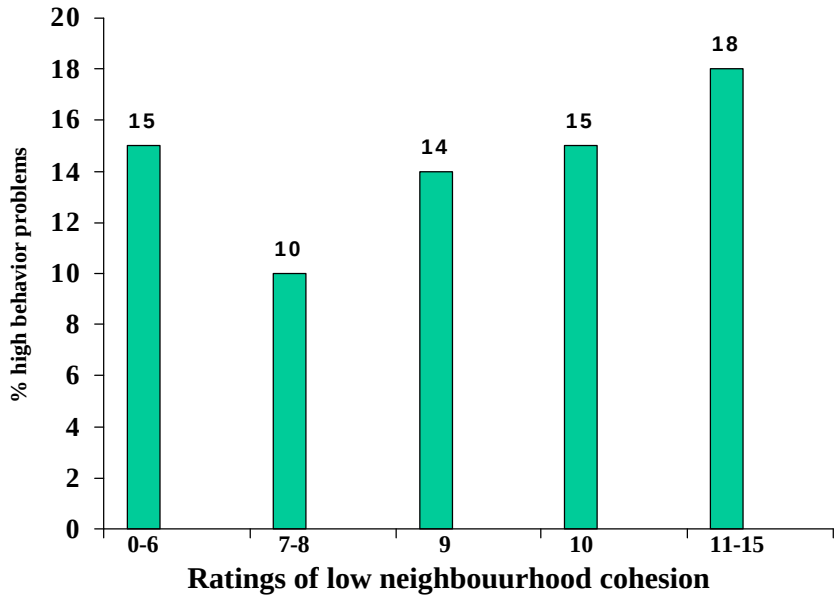


Figure 5. High Behaviour Problem Scores by Low Neighbourhood Cohesion (Toddlers)



As would be expected, there was a large difference in the rate of behaviour problems by child gender. Almost twice as many boys had high behaviour problem scores as girls (19% as compared to 11%) (See Fig. 6). Family characteristics such as household income, maternal level of education, and female headship were also associated with toddlers' behaviour problems. As shown in Figure 7, as household income decreased more children were reported as having high behaviour problem scores. Twice as many children in the lowest income group had high behaviour problem scores as compared to children in the highest income group. Behaviour problem scores were highest for children whose mothers had less than a high school level of education (see Fig. 8). Children living in single female headed families were more likely to obtain high behaviour problem scores as compared to children living in two parent families (see Fig. 9). However, this result needs to be interpreted with caution. Many of the negative effects of growing up in single parent families are mediated by socio-economic conditions (Kohen, Hertzman & Brooks-Gunn, in preparation; Maclanahan & Sandefur, 1994). Also, ratings of behaviour problems based on maternal reports have been shown to be influenced by characteristics such as child health, maternal mental health, and maternal age (Kohen, Brooks-Gunn, McCormick & Graber, 1997; Kohen, Hertzman & Brooks-Gunn, in preparation).

Figure 6. High Behaviour Problem Scores by Child Gender (Toddlers)

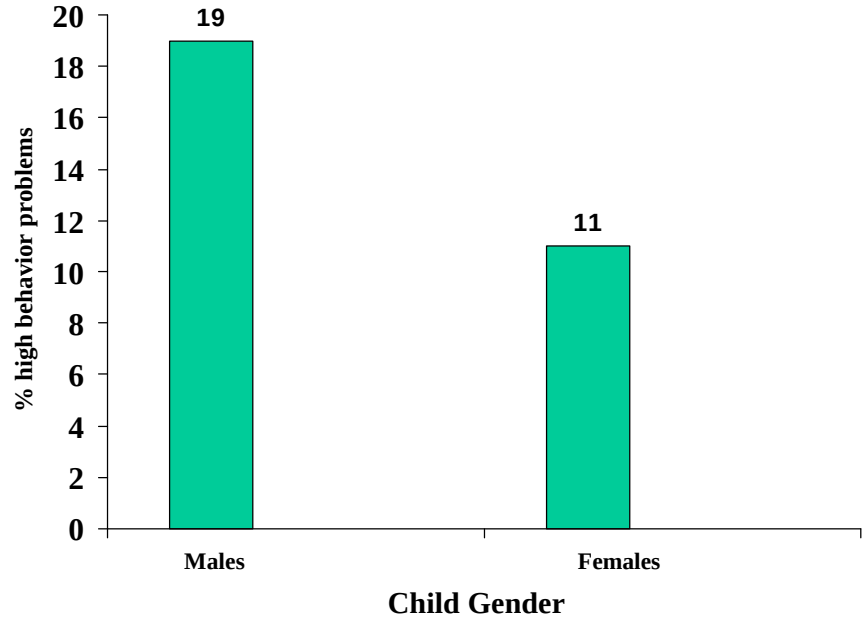


Figure 7. High Behaviour Problem Scores by Family Income (Toddlers)

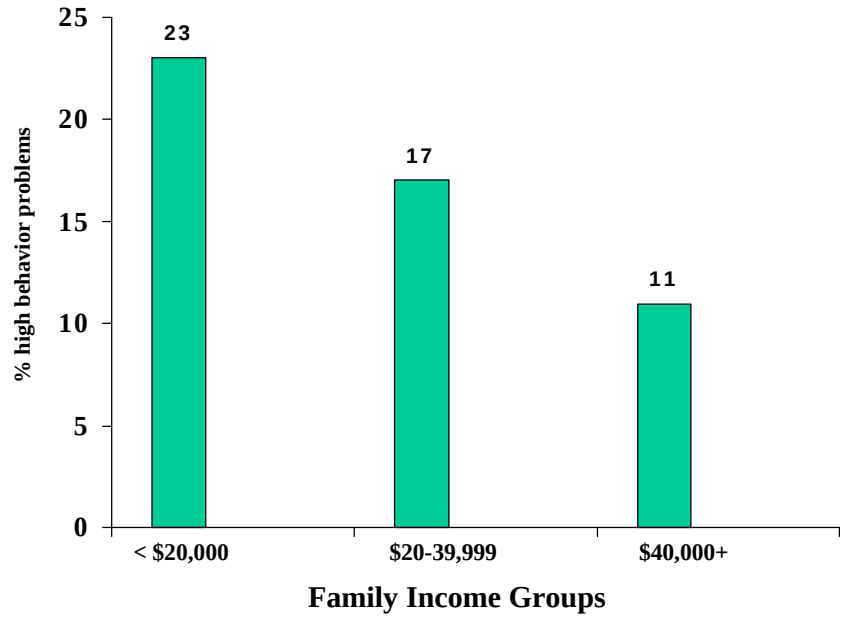


Figure 8. High Behaviour Problem Scores by PMK Education (Toddlers)

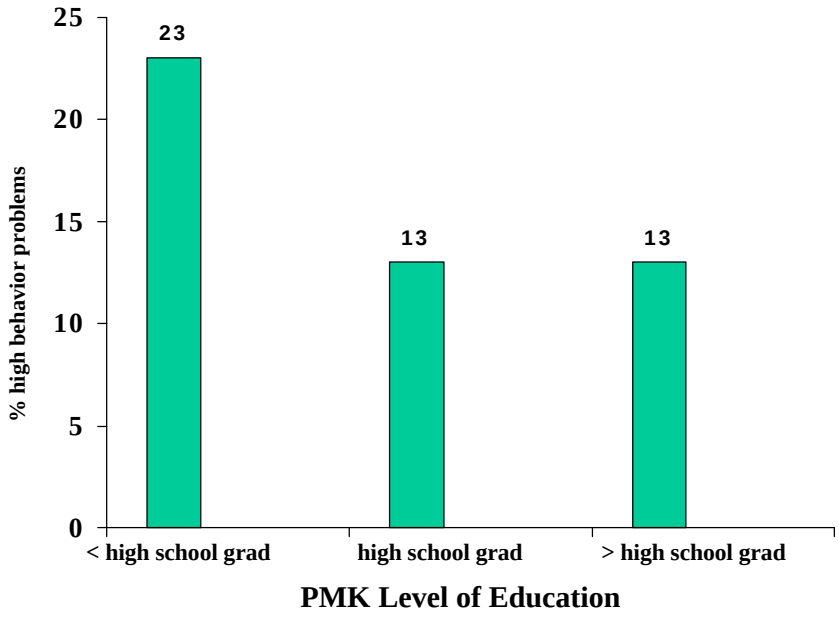
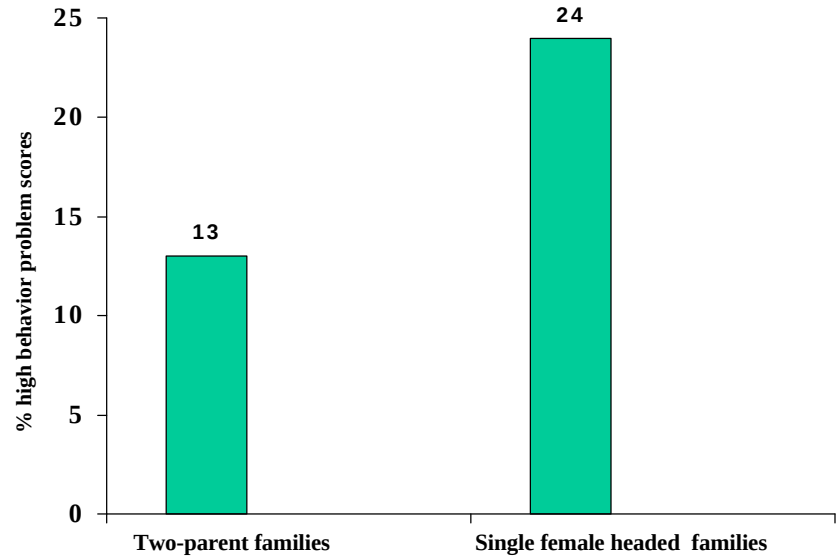


Figure 9. High Behaviour Problem Scores by Single Female Headship (Toddlers)



What are the relative contributions of neighbourhood and family characteristics on toddlers' behavioural competencies?

Multivariate regression analyses examining the associations of neighbourhood and family characteristics on total behaviour problem scores for toddlers were performed. The first model examines the association of neighbourhood poverty and neighbourhood affluence with toddler's behavioural problems. The second model examines neighbourhood effects after controlling for child gender, household size, and maternal age at child birth. The third model examines the effects of family characteristics as mediators of neighbourhood effects. Neighbourhoods with fewer affluent families are associated with higher behaviour problem scores although this effect is only marginally significant in the first model ($\underline{p} < .10$) (see model 1, Table 10). As would be expected, male children, larger households, and younger mothers are associated with higher behaviour problem scores for toddlers. Controlling for household size, child sex, and maternal age at birth, strengthens the effect of neighbourhood affluence (model 2, Table 10). However, the effect of neighbourhood affluence is mediated by familial socio-economic characteristics. Lower levels of household income and lower levels of maternal education are associated with higher behaviour problem scores (model 3, Table 10). Family socio-economic characteristics mediate the effects of neighbourhood affluence on toddler's behaviour problems. As would be expected the final model with both neighbourhood and family characteristics yielded the highest explanatory power (R^2=.05).

Table 10: Unstandardized Regression Coefficients, Standard Errors, and Standardized Coefficients for Behaviour Problem Scores for Children Aged 2-3 (Weighted)

	1	2	3
Province	-----	-----	-----
Female		-2.30*** (.25) -.15	-2.28*** (.25) -.15
Number of siblings in the household		.45*** (.12) .06	.46*** (.12) .07
PMK age at birth		-3.72*** (.57) -.11	-2.48*** (.60) -.07
Household income			-.53*** (.14) -.08
PMK education			-.43* (.19) -.04
Single mother			.61 (.44) .03
Percentage of neighbourhood families with income < $20,000	.01 (.01) .01	-.01 (.01) -.01	-.02 (.01) -.02
Percentage of neighbourhood families with income >$50,000	-.01+ (.01) -.04	-.02* (.01) -.04	-.003 (.01) -.01
Percentage of neighbourhood single female headed families			
Neighbourhood unemployment			
Constant	17.64	21.96	23.71
R2 Adj.	.003	.04	.05
R2 Change	.002	.04***	.01***
F	1.84*	11.10***	11.88***

+ $\underline{p} < .10$, * $\underline{p} < .05$, ** $\underline{p} < .01$, *** $\underline{p} < .001$

To separate the effects of various neighbourhood socio-economic characteristics, an additional set of neighbourhood indicators was examined including the number of single female headed families in the neighbourhood and neighbourhood unemployment. Neighbourhoods with more female headed families were associated with toddlers' higher behaviour problem scores (model 1, Table 11). Male children, larger households, and younger maternal age were associated with higher behaviour problem scores. In addition, lower levels of household income and lower levels of PMK education were associated with high behaviour problem scores and mediated the effect of neighbourhood female headship. The effect of neighbourhood female headship was reduced by 95% (from beta=.04 to beta=.002) when family socio-economic characteristics were

controlled (models 1 and 3, Table 11). The final model containing both neighbourhood and family characteristics explained the largest portion of the variability of the model (R^2=.04).

Table 11: Unstandardized Regression Coefficients, Standard Errors, and Standardized Coefficients for Behaviour Problem Scores for Children Aged 2-3 (Weighted)

	1	2	3
Province	-----	-----	-----
Female		-1.71*** (.27) -.11	-1.75*** (.27) -.11
Number of siblings in household		.39** (.12) .05	.31* (.12) .04
PMK age at birth		-2.39*** (.58) -.07	-1.03 (.60) -.03
Household income			-.40** (.14) -.06
PMK education			-.82*** (.19) -.08
Single mother			.67 (.49) .03
Percentage of neighbourhood families with income < $20,000			
Percentage of neighbourhood families with income >$50,000			
Percentage of neighbourhood single female headed families	.04* (.02) .04	.03 (.02) .03	.002 (.02) .002
Neighbourhood unemployment	.33 (.29) .02	.32 (.29) .02	.24 (.29) .02
Constant	17.01	19.75	22.65
R^2	.01	.02	.04
R^2 Adj.	.004	.02	.03
R^2 Change	.002*	.02***	.01***
F	2.13*	6.34***	8.15***

+ $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$

When neighbourhood poverty and affluence characteristics are included in the model together with neighbourhood female headship, and neighbourhood unemployment (see model 1 Table 12) the effect of neighbourhood affluence is only marginally significant ($p < .10$). Family socio-economic characteristics further reduce the effect of neighbourhood affluence by 67% (from beta=.03 to beta=.01; see models 2 and 3, Table 12).

Table 12: Unstandardized Regression Coefficients, Standard Errors, and Standardized Coefficients for Behaviour Problem Scores for Children Aged 2-3 (Weighted)

	1	2	3
Province	-----	-----	-----
Female		-1.71*** (.27) -.11	-1.75*** (.27) -.11
Number of siblings in the household		.38** (.12) .05	.31** (.12) .04
PMK age at birth		-2.32*** (.58) -.07	-1.03+ (.61) -.03
Household income			-.39** (.15) -.06
PMK education			-.82*** (.20) -.08
Single mother			.69 (.49) .03
Percentage of neighbourhood families with income < $20,000	.02 (.02) .02	.01 (.02) .02	.01 (.02) .01
Percentage of neighbourhood families with income >$50,000	-.01+ (.01) -.03	-.01+ (.01) -.03	-.002 (.01) -.01
Percentage of neighbourhood single female headed families	.02 (.02) .02	.01 (.02) .01	-.01 (.02) -.01
Neighbourhood unemployment	.26 (.29) .02	.26 (.29) .02	.21 (.29) .01
Constant	17.56	20.25	22.61
R^2	.01	.03	.04
R^2 Adj.	.01	.02	.03
R^2 Change	.003*	.02***	.01***
F	2.21**	5.83***	7.31***

+ $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$

The final set of analyses includes the effects of interviewers' ratings of unsafe neighbourhoods and maternal ratings of low neighbourhood cohesion. Neighbourhoods that are rated as unsafe and low in cohesion are associated with toddlers behaviour problems (see Model 3, Table 13). The addition of these two neighbourhood characteristics triples the explanatory power of the model that includes other neighbourhood socio-economic characteristics (from R^2=.01 to R^2=.03; see Models 1 & 3, Table 13). The effects of neighbourhood safety and cohesion remain significant even after controlling for family characteristics. The final model containing the

neighbourhood and family characteristics explained six times the variance of the model containing only the neighbourhood socio-economic characteristics as measured by the change in R^2 from R^2=.01 to R^2=.06, and twice the variability of the models including all neighbourhood characteristics (R^2=.03 from R^2=.06).

Table 13. Unstandardized Regression Coefficients, Standard Errors, and Standardized Coefficients for Behaviour Problem Scores for Children Aged 2-3 (Weighted)

	1	2	3	4	5
Province	-----	-----	-----	-----	-----
Female				-1.68*** (.28) -.10	-1.72*** (.28) -.11
Number of siblings in the household				.34** (.13) .05	.29* (.13) .04
PMK age at birth				-2.21*** (.61) -.07	-1.11+ (.64) -.03
Household income					-.34* (.15) -.05
PMK education					-.69*** (.20) -.07
Single mother					.77 (.51) .03
Percentage of neighbourhood families with income < $20,000	.01 (.02) .01	.01 (.02) .01	.01 (.02) .01	.003 (.02) .004	.002 (.02) -.002
Percentage of neighbourhood families with income >$50,000	-.02* (.01) -.04	-.01 (.01) -.04	-.01+ (.01) -.03	-.01+ (.01) -.03	-.01 (.01) -.01
Percentage of neighbourhood single female headed families	.02 (.03) .01	-.01 (.03) -.01	-.03 (.03) -.02	-.03 (.0) -.03	-.04 (.03) -.04
Neighbourhood unemployment	.13 (.31) .01	.10 (.31) .01	.01 (.31) .00	.02 (.30) .002	-.01 (.30) .00
Unsafe neighbourhoods		2.16*** (.52) .08	1.58** (.53) .06	1.37** (.53) .05	1.14* (.53) .04
Low cohesion neighbourhood			.38*** (.06) .12	.36*** (.06) .12	.32*** (.06) .11
Constant	18.08	15.29	12.88	15.85	18.49
R^2	.01	.01	.03	.05	.06
R^2 Adj.	.01	.01	.02	.04	.05
R^2 Change	.003	.01***	.01***	.02***	.01***
F	2.10**	3.18***	6.04***	8.16***	8.60***

+ $\underline{p} < .10$, * $\underline{p} < .05$, ** $\underline{p} < .01$, *** $\underline{p} < .001$

Neighbourhood characteristics such as affluence and fewer single female headed families are associated with the behavioural competence of toddlers. However, the effects of family characteristics such as high levels of income and high levels of maternal education mediate neighbourhood effects and are important determinants of toddlers behavioural competence.

3.2 Preschoolers

3.2.1 Receptive Verbal Abilities

How are neighbourhood and family characteristics associated with the receptive verbal abilities of preschoolers?

Some descriptive figures are provided showing the relationship between low PPVT-R scores and neighbourhood and family characteristics. Figure 10 demonstrates that the percentage of children who obtain low PPVT-R scores decreases as neighbourhood affluence increases. Examining the percentage of female headed households in the neighbourhood, as neighbourhood female headship increases so does the percentage of children obtaining low PPVT-R scores (see Fig. 11). More than twice as many children from neighbourhoods with the highest percentage of single female headed families obtained low PPVT-R scores as compared to children living in neighbourhoods with the fewest number of single female headed families (22% compared with 10%). Interviewer ratings of unsafe neighbourhoods and maternal ratings of low neighbourhood cohesion were also found to be important for preschoolers' verbal abilities. The percentage of children with low PPVT-R scores increased as neighbourhoods were rated as more unsafe (see Fig. 12). Similarly, the number of children obtaining low PPVT-R scores increased as neighbourhoods were rated as less cohesive (see Fig. 13).

Figure 10. Low PPVT-R Scores by Neighbourhood Poverty

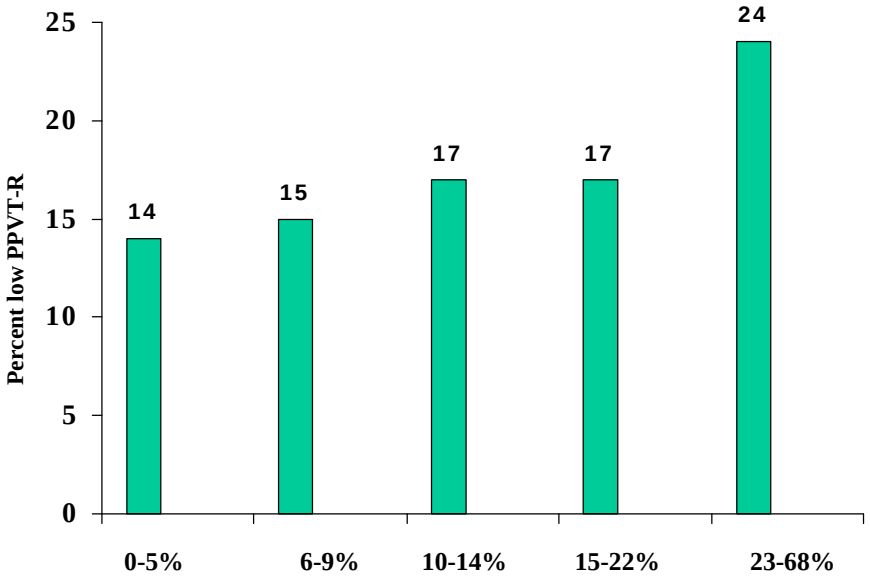


Figure 11. Low PPVT-R Scores by Neighbourhood Affluence

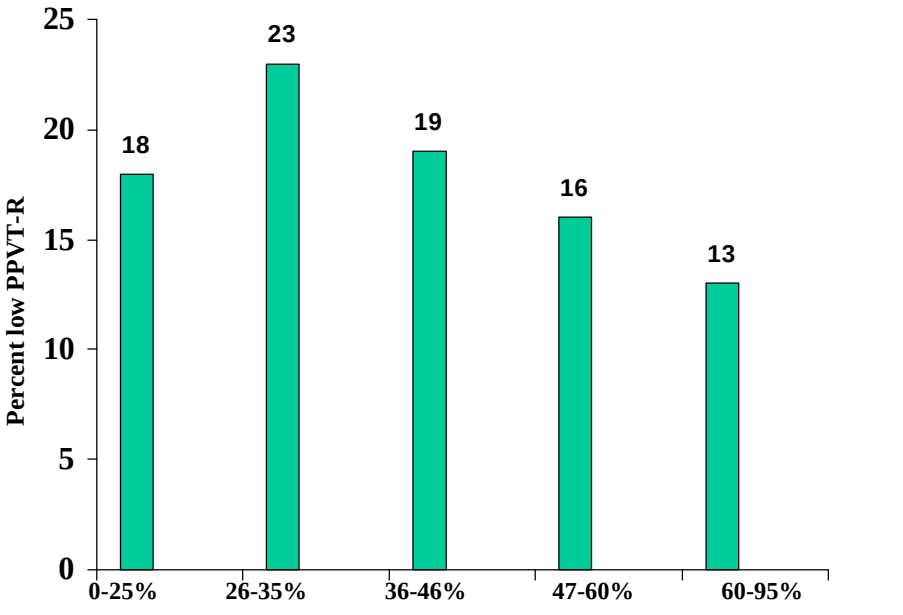


Figure 12. Low PPVT-R Scores by Neighbourhood Female Headship

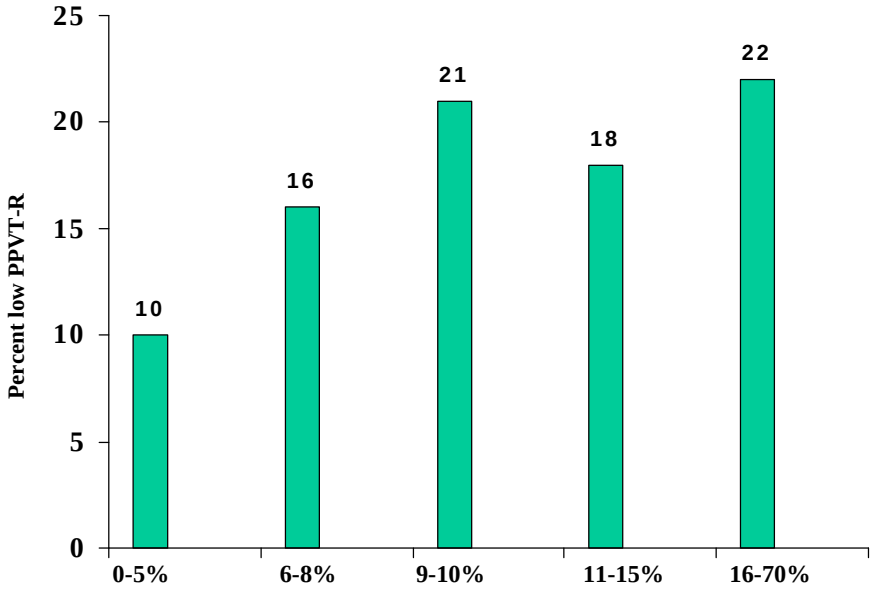
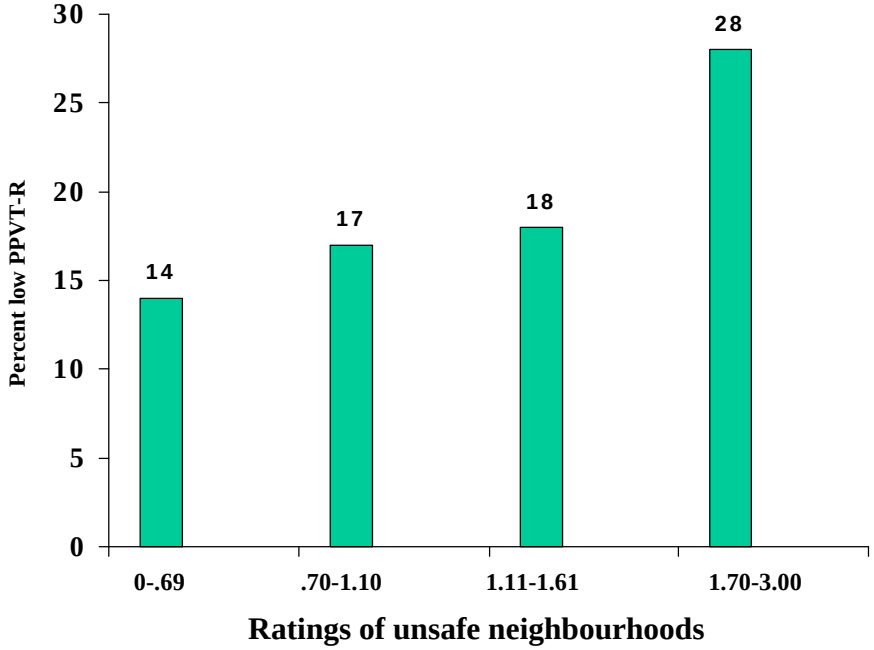


Figure 13. Low PPVT-R Scores by Unsafe Neighbourhood Ratings



Family characteristics such as family income and maternal levels of education are important for children's PPVT-R scores. As shown in Figure 15, the highest percentage of children with low PPVT-R scores were found in the lowest income group, more than twice as many as in the highest income group (32% as compared to 13%). The trend was similar for PMK education. As PMK education increased fewer children obtained low PPVT-R scores. As can be seen in Figure 16, more than twice as many children whose mothers had less than a high school level of education obtained low PPVT-R scores, as compared to children whose mothers had more than a high school level of education.

Figure 14. Low PPVT-R Scores by Ratings of Low Neighbourhood Cohesion

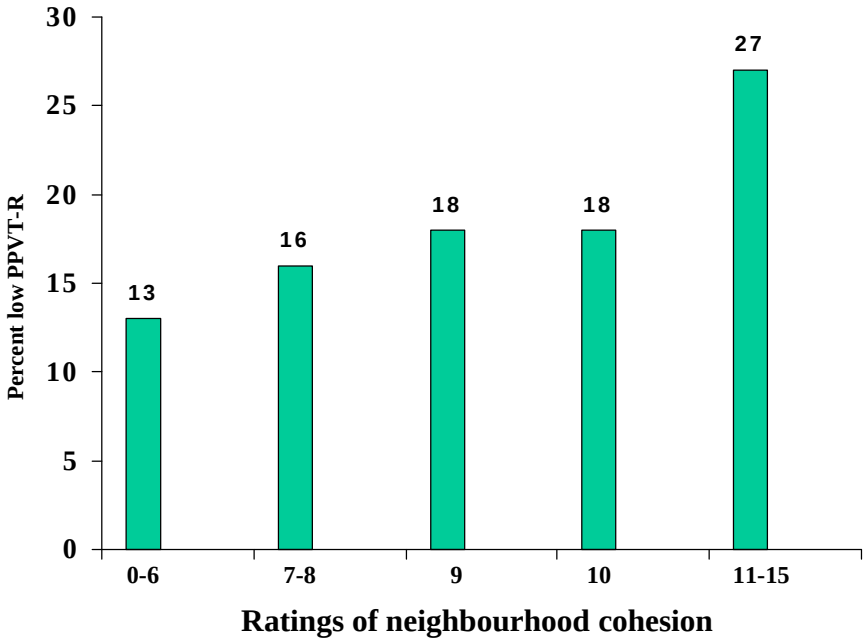


Figure 15. Low PPVT-R Scores by Family Income

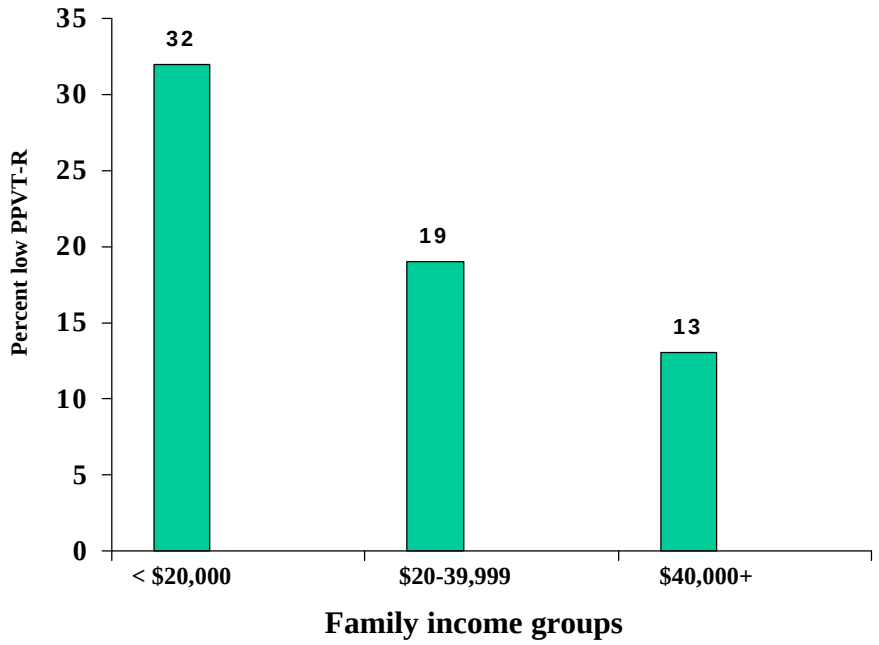
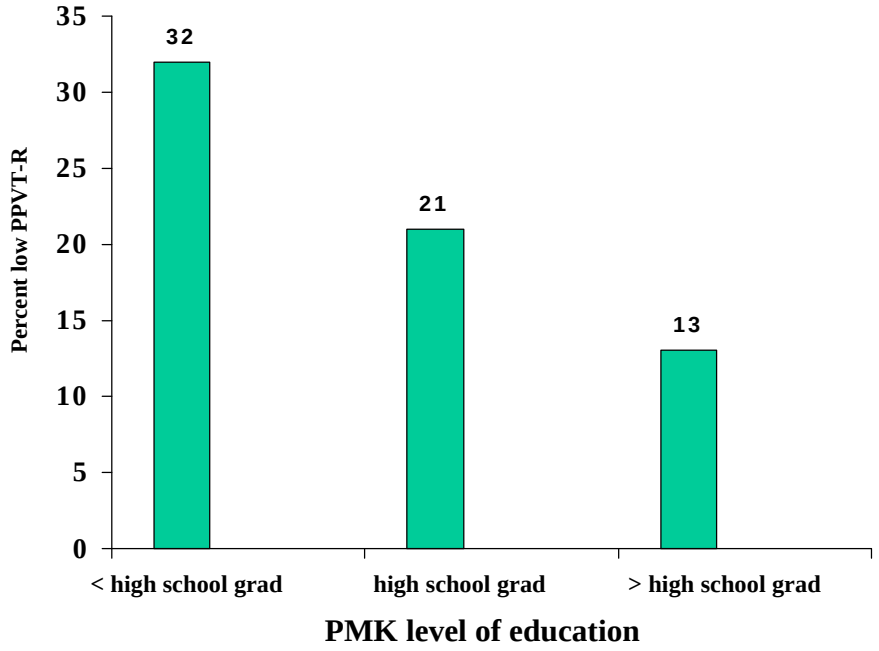


Figure 16. Low PPVT-R Scores by PMK Education



How are neighbourhood and family characteristics associated with preschoolers' verbal abilities?

The first model, in Table 14, examines the association of neighbourhood poverty and affluence with children's verbal ability scores. The second model examines neighbourhood effects after controlling for the covariates. The third model examines neighbourhood effects controlling for family characteristics as well as the mediation of neighbourhood effects. Neighbourhoods with fewer impoverished families and neighbourhoods with more affluent families are associated with higher PPVT-R scores (see model 1, Table 14). Larger households are associated with lower PPVT-R scores. Controlling for household size, child sex, and PMK age at birth do not reduce the effects of neighbourhood poverty and affluence (model 2, Table 14). In the final model, family characteristics such as higher levels of household income and higher levels of maternal education are associated with higher PPVT-R scores for children (model 3, Table 14). Controlling for family socio-economic characteristics, reduces the effect of neighbourhood poverty by 38% (from beta=.08 to beta=.05) and reduces the effect of neighbourhood affluence by 56% (from beta=.09 to beta=.04). The final model with both family and neighbourhood characteristics accounts for four times the variability of the first model estimating neighbourhood poverty and affluence (R^2 =.08 vs. R^2 =.03, respectively).

Table 14: Unstandardized Regression Coefficients, Standard Errors, and Standardized Coefficients for PPVT Scores (Weighted)

	1	2	3
Province	-----	-----	-----
Female		.71 (.53) .02	.54 (.52) .02
Number of siblings in the household		-1.50*** (.26) -.10	-1.41*** (.25) -.10
PMK age at birth		1.09 (1.41) .01	-1.67 (1.40) -.02
Household income			1.62*** (.30) .12
PMK education			3.65*** (.37) .17
Single mother			.24 (.93) .01
Percentage of neighbourhood families with income < $20,000	-.12*** (.03) -.08	-.14*** (.03) -.09	-.08** (.03) -.05
Percentage of neighbourhood families with income >$50,000	.07*** (.02) .09	.06*** (.02) .08	.03+ (.02) .04
Percentage of neighbourhood single female headed families			
Neighbourhood unemployment			
Constant	96.23	97.40	84.65***
R^2	.03	.04	.08
R^2 Adj.	.02	.03	.08
R^2 Change	.02***	.01***	.05***
F	8.43***	9..30***	17.74***

+ p < .10, * p < .05, ** p < .01, *** p < .001

Other neighbourhood characteristics, associated with neighbourhood socio-economic conditions, were examined including the number of single female headed families, and the neighbourhood unemployment rate. Fewer single female headed families in the neighbourhood were associated with higher PPVT-R scores (model 1, Table 15). Household size, child gender, and maternal age at birth entered as covariates did not reduce the effects of neighbourhood female headship on PPVT-R scores (see model 2, Table 15). Controlling for family socio-economic characteristics, reduced the neighbourhood single parent effect by 27% (from beta =.11 to beta=.08). Higher levels of household income and higher levels of maternal education mediated the effect of

neighbourhood female headship on children's verbal ability scores but this effect remained significant (model 3, Table 15).

Table 15. Unstandardized Regression Coefficients, Standard Errors, and Standardized Coefficients for PPVT Scores (Weighted)

	1	2	3
Province	-----	-----	-----
Female		.66 (.54) .02	.44 (.52) .01
Number of siblings in household		-1.50*** (.26) -.10	-1.40*** (.25) -.10
PMK age at birth		1.50 (1.41) .02	-1.73 (1.40) -.02
Household income			1.83*** (.29) .14
PMK education			3.78*** (.37) .18
Single mother			.83 (.94) .02
Percentage of neighbourhood families with income < $20,000			
Percentage of neighbourhood families with income >$50,000			
Percentage of neighbourhood single female headed families	-.26*** (.04) -.11	-.27*** (.04) -.11	-.18*** (.04) -.08
Neighbourhood unemployment	.46 (.57) .02	.41 (.56) .01	.74 (.55) .02
Constant	100.15	100.58	85.23
R^2	.02	.03	.08
R^2 Adj.	.02	.03	.08
R^2 Change	.01***	.01***	.05***
F	5.91***	7.29***	17.95***

+ $\underline{p} < .10$, * $\underline{p} < .05$, ** $\underline{p} < .01$, *** $\underline{p} < .001$

Single parent families are more likely to live in poor neighbourhoods than in affluent neighbourhoods. Neighbourhood poverty may therefore account for some of the single parent neighbourhood effects on children's PPVT-R scores. In fact, there is a significant positive correlation between the number of single parent families in the neighbourhood and neighbourhood poverty (Pearson $\underline{r} = .51$, $\underline{p} < .01$) and a significant negative correlation between the number of single parent families in the neighbourhood and neighbourhood affluence (Pearson $\underline{r} = -.35$, $\underline{p} < .01$). When neighbourhood poverty and affluence characteristics are included in the

model together with neighbourhood female headship, and neighbourhood unemployment (see model 1 Table 16) the effect of neighbourhood female headship is reduced by 55% (from beta=.11 to beta=.05) but remains significantly associated with PPVT-R scores.

Table 16: Unstandardized Regression Coefficients, Standard Errors, and Standardized Coefficients for PPVT Scores (Weighted)

	1	2	3
Province	-----	-----	-----
Female		.59 (.53) .02	.42 (.52) .01
Number of siblings in the household		-1.51*** (.26) -.10	-1.41*** (.25) -.10
PMK age at birth		.95 (1.41) .01	-1.79 (1.40) -.02
Household income			1.64*** (.30) .12
PMK education			3.68*** (.37) .17
Single mother			.60 (.94) .01
Percentage of neighbourhood families with income < $20,000	-.10** (.03) -.06	-.11** (.03) -.07	-.05 (.03) -.03
Percentage of neighbourhood families with income >$50,000	.06*** (.02) .08	.06*** (.02) .08	.02 (.02) .03
Percentage of neighbourhood single female headed families	-.12* (.05) -.05	-.12** (.05) -.05	-.13** (.05) -.05
Neighbourhood unemployment	.87 (.57) .03	.84 (.57) .03	.91 (.55) .03
Constant	96.98***	98.39***	85.38***
R^2	.03	.04	.09
R^2 Adj.	.03	.04	.08
R^2 Change	.02***	.01***	.05***
F	7.79***	8.68***	16.40***

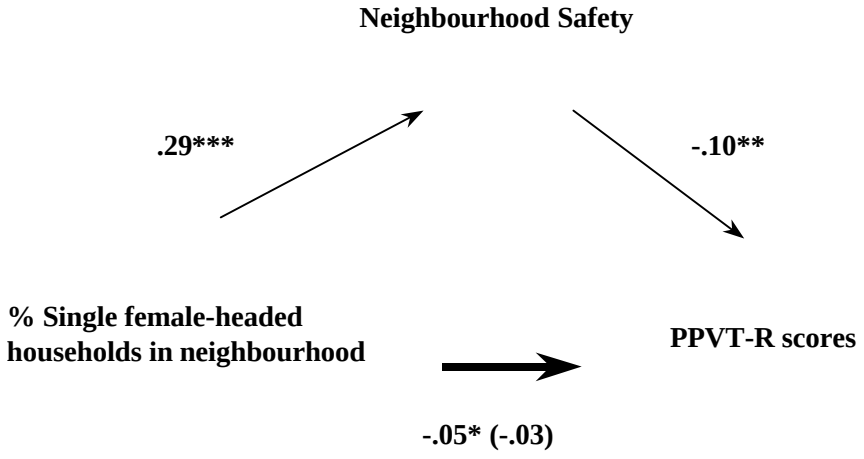
+ $\underline{p} < .10$, * $\underline{p} < .05$, ** $\underline{p} < .01$, *** $\underline{p} < .001$

The second model in Table 16 shows that the addition of household size, child sex and PMK age at birth do not have a large impact on the neighbourhood effects. The final model enters the covariates as well as family socio-economic characteristics (model 3, Table 16). Higher levels of household income and higher levels of maternal education mediate the effects of neighbourhood

poverty and neighbourhood affluence. The effect of neighbourhood poverty is reduced by 57% from beta=.07 to beta=.03 and the effect of neighbourhood affluence is reduced by 63% from beta=.08 to beta=.03.

In our final set of analyses we examine whether the effects of unsafe neighbourhoods as rated by the interviewers and maternal ratings of low neighbourhood cohesion are significant predictors of children's verbal abilities. Safer and more cohesive neighbourhoods are associated with higher verbal ability scores. Ratings of neighbourhood safety mediate the neighbourhood single parent effect on PPVT-R scores (see Fig. 17). Neighbourhoods with more single parent families are associated with observer ratings of unsafe neighbourhoods. Unsafe neighbourhoods are associated with lower PPVT-R ratings. Neighbourhood single female headship is associated with lower PPVT-R scores prior to controlling for neighbourhood safety. Once neighbourhood safety is controlled, the association between neighbourhood single female headship and PPVT-R scores is no longer statistically significant.

Figure 17. Neighbourhood Safety as a Mediator of the Effects of Neighbourhood Female Headship on Children's PPVT-R Scores



Note: Standardized beta coefficients are presented. Coefficient in parentheses represents the effect of % single females in neighbourhood, controlling for neighbourhood safety.
* $p < .05$, ** $p < .001$

The final model controls for family characteristics. Higher levels of household income, and higher levels of maternal education are associated with higher PPVT-R scores. However,

neighbourhood characteristics are associated with PPVT-R scores over and above these family characteristics. When family characteristics are taken into account, fewer single female headed families, and neighbourhood safety and cohesion are associated with higher verbal ability scores (see model 5, Table 17). The final model containing both the neighbourhood and family characteristics explained more than twice the variance of the model containing only the neighbourhood characteristics (R^2=.09 vs. R^2=.04, respectively).

- Neighbourhood socio-economic characteristics such as neighbourhood affluence, neighbourhood poverty, single female headship as well as neighbourhood safety and cohesion have an effect on preschoolers' verbal ability scores.

- Family characteristics such as high levels of household income and maternal education are associated with higher verbal ability scores for children. These family characteristics serve a role in mediating the effects of neighbourhood socio-economic characteristics.

- The effects of neighbourhood female headship on children's verbal ability scores are mediated by neighbourhood safety.

3.2.2 Behavioural Problems

How are neighbourhood and family characteristics associated with preschoolers' behavioural competencies?

Descriptive figures illustrate the relationship between high behaviour problem scores and neighbourhood and family characteristics. Figure 18 shows that the percentage of children who obtain high behaviour problem scores increases as the number of neighbourhood families living in poverty increases. Figure 19 demonstrates that the percentage of children who obtain high behaviour problem scores is stable in all but the most affluent neighbourhoods which exhibit a lower rate of behaviour problem scores. Neighbourhoods with few female headed families (10% or less) show relatively low rates of behaviour problems but neighbourhoods with more than 10% of female headed families show a behaviour problem rate of 19% (see Fig. 20). That is, approximately one in five children living in neighbourhoods with a "high" proportion of female headed families obtained high behaviour problem scores. As with the PPVT-R scores, interviewer ratings of unsafe neighbourhoods were associated with preschoolers behaviour

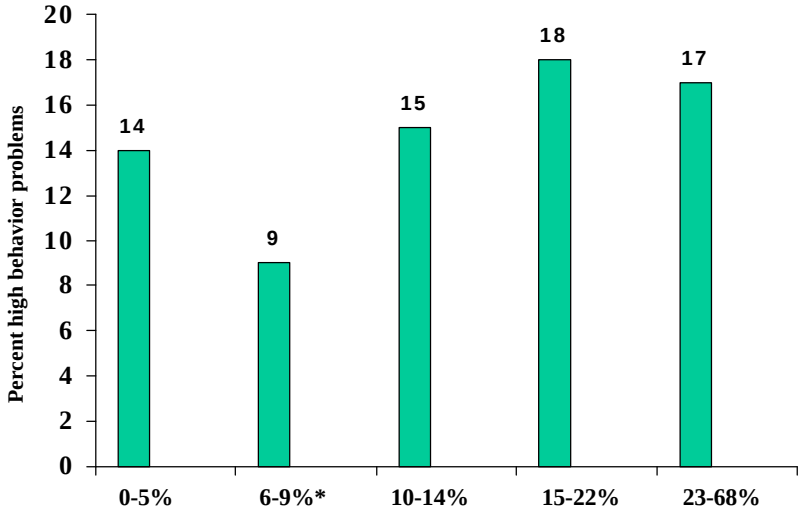
problem scores. The percentage of children with high behaviour problem scores increased as neighbourhoods were rated as more unsafe (see Fig. 21). Similarly, the number of children obtaining high behaviour problem scores increased as neighbourhoods were rated as less cohesive (see Fig. 22).

Table 17. Unstandardized Regression Coefficients, Standard Errors, and Standardized Coefficients for PPVT Scores (Weighted)

	1	2	3	4	5
Province	-----	-----	-----	-----	-----
Female				.48 (.54) .02	.28 (.53) .01
Number of siblings in the household				-1.47*** (.26) -.10	-1.34*** (.26) -.09
PMK age at birth				.03 (1.45) .00	-2.06 (1.43) -.03
Household income					1.47*** (.31) .11
PMK education					3.67*** (.38) .17
Single mother					.74 (.95) .02
Percentage of neighbourhood families with income < $20,000	-.07* (.03) -.05	-.07* (.03) -.05	-.07* (.03) -.05	-.09** (.03) -.06	-.03 (.03) -.02
Percentage of neighbourhood families with income >$50,000	.07*** (.02) .09	.05*** (.02) .07	.05** (.02) .07	.04** (.02) .06	.02 (.02) .02
Percentage of neighbourhood single female headed families	-.12** (.05) -.05	-.08 (.05) -.03	-.06 (.05) -.02	-.06 (.05) -.03	-.10* (.05) -.04
Neighbourhood unemployment	.83 (.58) .03	.88 (.58) .03	.92 (.58) .03	.91 (.58) .03	.89 (.57) .03
Unsafe neighbourhoods		-3.75*** (.73) -.10	-3.43*** (.73) -.09	-3.54*** (.73) -.09	-2.18** (.73) -.06
Low cohesion neighbourhood			-.39*** (.11) -.06	-.40*** (.11) -.07	-.25* (.11) -.04
Constant	96.86	101.22	104.20	106.78	91.02
R^2	.03	.04	.04	.05	.09
R^2 Adj.	.02	.03	.04	.04	.08
R^2 Change	.02***	.01***	.004***	.01***	.04***
F	6.89***	8.35***	8.67***	9.08***	14.90***

+ $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$

Figure 18. High Behaviour Problem Scores by Neighbourhood Poverty



*** small n (n=61)**

Figure 19. High Behaviour Problem Scores by Neighbourhood Affluence

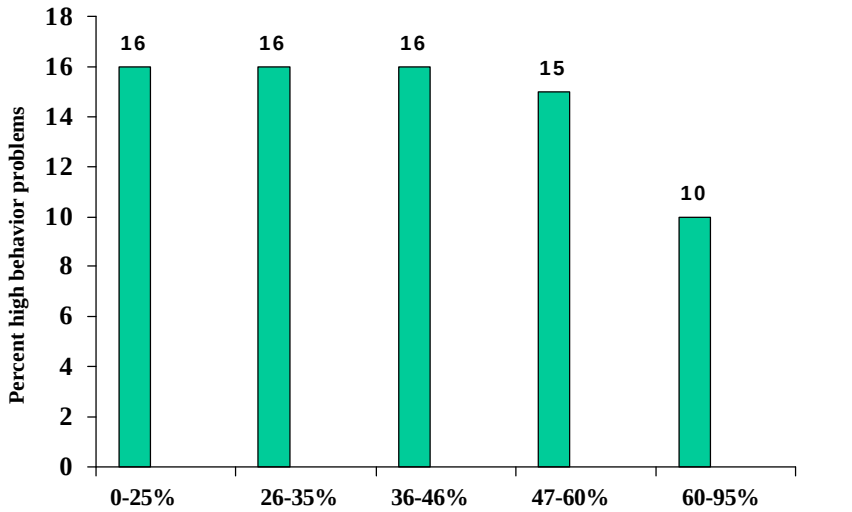


Figure 20. High Behaviour Problem Scores by Neighbourhood Female Headship

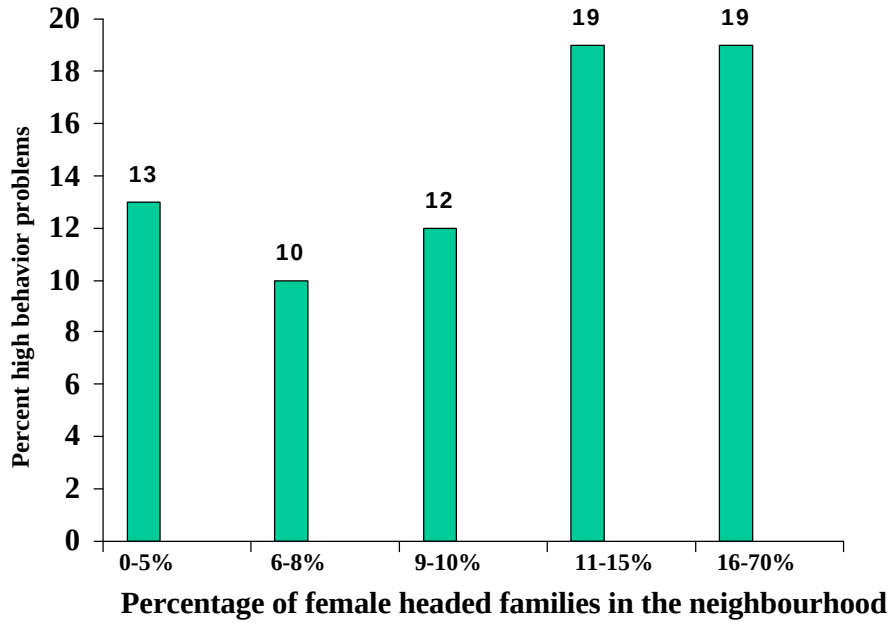


Figure 21. High Behaviour Problem Scores by Ratings of Unsafe Neighbourhoods

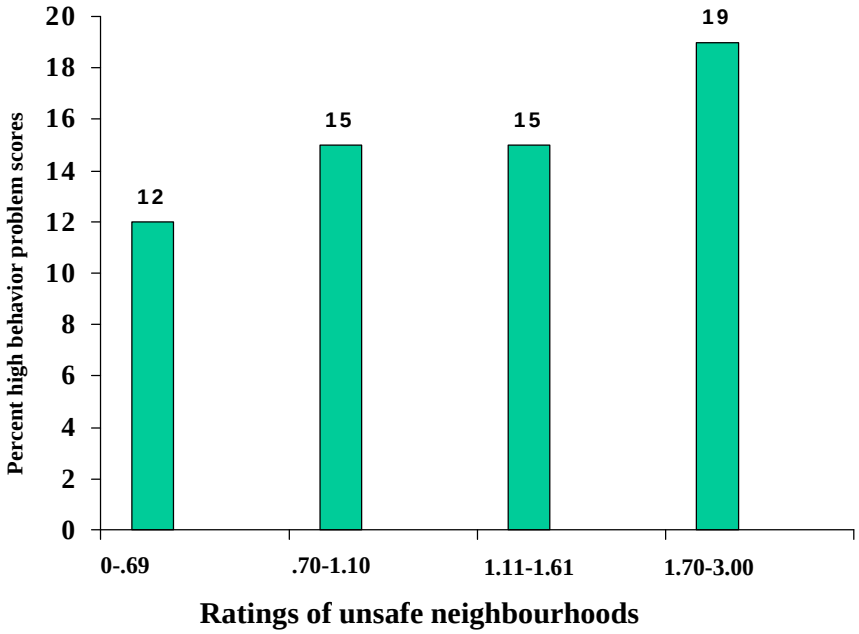
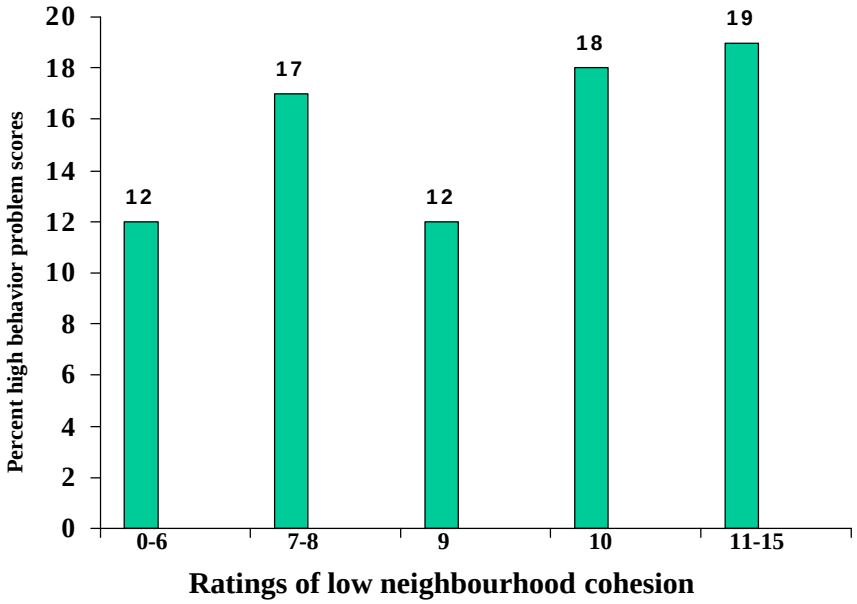


Figure 22. High Behaviour Problem Scores by Ratings of Low Neighbourhood Cohesion



As would be expected, there was a large difference in the rate of behaviour problems by child gender. Almost twice as many boys had high behaviour problem scores as girls (19% as compared to 10%) (See Fig. 23). Family characteristics such as maternal level of education and female headship were also associated with preschoolers' behaviour problems. As shown in Figure 24, there was an inverse relationship between maternal education and children's behaviour problem scores. As PMK education increased the number of children with behaviour problems decreased. Children living in single parent families were more likely to obtain high behaviour problem scores as compared to children living in two parent families (see Fig. 25). As previously stated, the effects of single versus two parent families need to be interpreted with caution since there are various other socio-economic influences that are confounded with the effects of single female headship.

Figure 23. High Behaviour Problem Scores by Child Gender

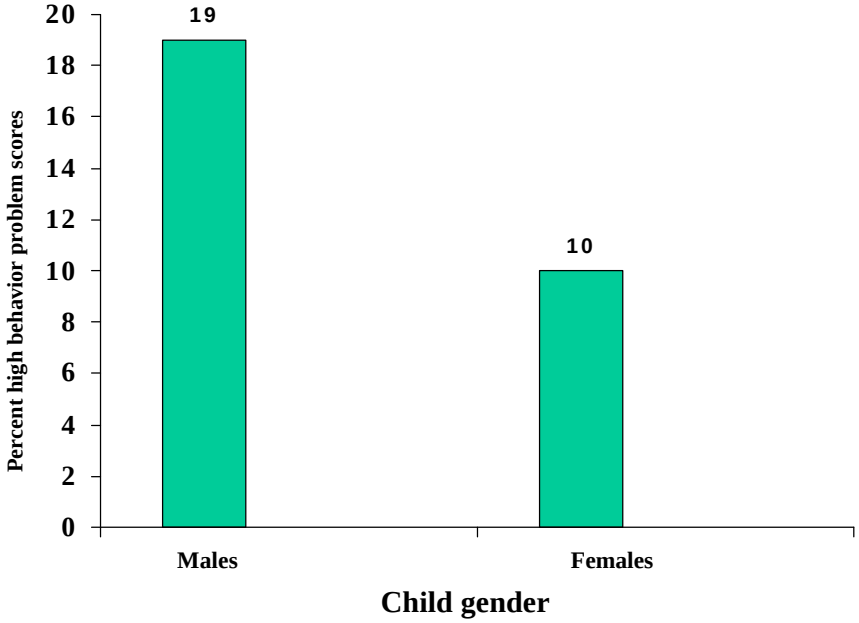


Figure 24. High Behaviour Problem Scores by PMK Education

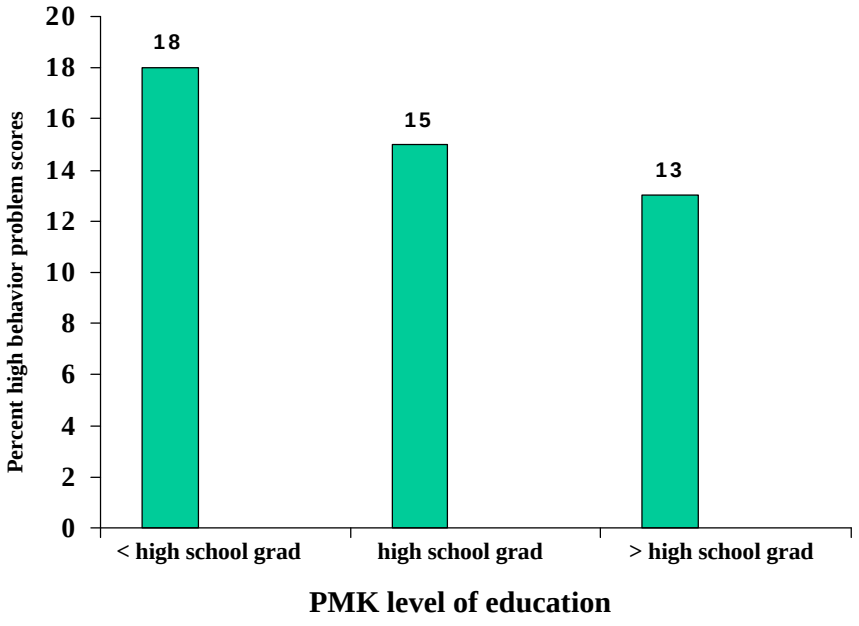
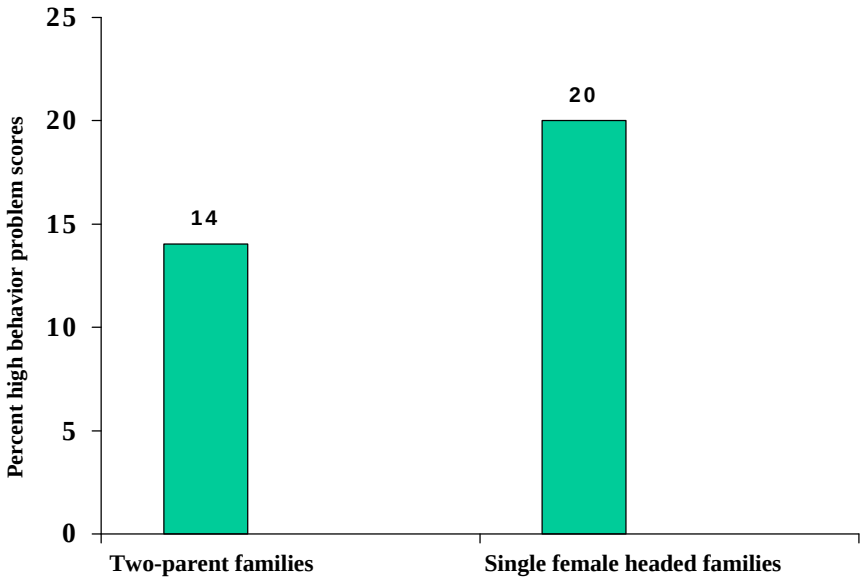


Figure 25. High Behaviour Problem Scores by Female Headship



What are the relative contributions of neighbourhood and family characteristics on preschoolers' behavioural competencies?

Multivariate analyses examining the associations of neighbourhood and family characteristics on total behaviour problem scores were performed similarly to the analyses for the other outcomes. The first model examines the association of neighbourhood poverty and affluence with children's behavioural problems. The second model examines neighbourhood effects over and above the covariates. The third model examines the association of family characteristics and the mediation of neighbourhood effects on children's behaviour. Neighbourhoods with fewer affluent families are associated with higher behaviour problem scores for children (see model 1, Table 18). Male children obtain higher behaviour problem ratings than females. Controlling for household size, child sex, and PMK age at child birth, reduced the effect of neighbourhood affluence by only 1% (from beta=.10 to beta=.09) but the effect of neighbourhood affluence remained statistically significant (model 2, Table 18). Family characteristics such as lower levels of PMK education and single female headship are associated with higher behaviour problem scores for children (model 3, Table 18). Controlling for family socio-economic characteristics reduces the effect of neighbourhood affluence by 20% (from beta=.10 to beta=.08) but the effect of neighbourhood affluence remains statistically significant. The final model with both family and neighbourhood

characteristics accounts for twice the variability of the first model estimating neighbourhood poverty and affluence (R^2=.06 vs. R^2=.03 respectively).

Table 18. Unstandardized Regression Coefficients, Standard Errors, and Standardized Coefficients for Behaviour Problem Scores for Children Aged 4-5 (Weighted)

	1	2	3
Province	-----	-----	-----
Female		-2.77*** (.30) -.16	-2.73*** (.30) -.16
Number of siblings in the household		-.001 (.14) .00	.04 (.14) .01
PMK age at birth		-.19 (.78) -.004	.45 (.79) .01
Household income			.09 (.17) .01
PMK education			-.45* (.21) -.04
Single mother			2.76*** (.53) .11
Percentage of neighbourhood families with income < $20,000	.01 (.02) .01	.004 (.02) .004	-.01 (.02) -.01
Percentage of neighbourhood families with income >$50,000	-.04*** (.01) -.10	-.04*** (.01) -.09	-.04*** (.01) -.08
Percentage of neighbourhood single female headed families			
Neighbourhood unemployment			
Constant	22.37	23.76	23.38
R^2			
R^2 Adj.	.03	.05	.06
R^2 Change	.01***	.03***	.01***
F	8.74***	13.30***	13.49***

+ p < .10, * p < .05, ** p < .01, *** p < .001

Other neighbourhood socio-economic characteristics were examined including the number of single parents families in the neighbourhood and neighbourhood unemployment. Neighbourhoods with higher percentages of single female headed families and high rates of unemployment were associated with higher behaviour problem scores (model 1, Table 19). Child gender mediated the effect of neighbourhood single female headship as indicated by a 25% reduction from beta=.04 to beta=.03. The effect of neighbourhood unemployment remained

statistically significant over and above familial characteristics. Lower levels of PMK education and single female headed families were associated with higher behaviour problem scores, but neighbourhood unemployment remained significantly associated with behaviour problem scores after controlling for these characteristics (model 3, Table 19).

Table 19: Unstandardized Regression Coefficients, Standard Errors, and Standardized Coefficients for Behaviour Problem Scores for Children Aged 4-5 (Weighted)

	1	2	3
Province	-----	-----	-----
Female		-2.84*** (.30) -.16	-2.80*** (.30) -.16
Number of siblings in household		.01 (.14) .001	.05 (.14) .01
PMK age at birth		-.36 (.78) -.01	.41 (.79) .01
Household income			-.05 (.17) -.01
PMK education			-.52* (.21) -.04
Single mother			2.59*** (.53) .10
Percentage of neighbourhood families with income < $20,000			
Percentage of neighbourhood families with income >$50,000			
Percentage of neighbourhood single female headed families	.06* (.02) .04	.04 (.02) .03	.004 (.02) .003
Neighbourhood unemployment	.66* (.32) .04	.85** (.31) .05	.77* (.31) .04
Constant	19.70	21.48	22.11
R^2	.02	.05	.06
R^2 Adj.	.02	.04	.06
R^2 Change	.004**	.03***	.01***
F	6.79***	12.01***	12.67***

+ p < .10, * p < .05, ** p < .01, *** p < .001

When neighbourhood poverty and affluence characteristics are included in the model together with neighbourhood female headship and neighbourhood unemployment (see model 1 Table 20), the effect of neighbourhood affluence remains unchanged. The effects of neighbourhood single female headship and neighbourhood unemployment are mediated by neighbourhood affluence. The effect of single female headship is reduced by 75% (from beta =.04 to beta=.01) and the effect of neighbourhood unemployment is reduced by 25% (from beta=.04 to beta=.03). Neither

effect remains significantly associated with children's behaviour problem scores after controlling for neighbourhood affluence. Controlling for child gender, household size, and PMK age at child birth reduces the effect of neighbourhood affluence by 1% (see model 2, Table 20). In the final model, entering all family and neighbourhood characteristics, lower levels of PMK education and single female headship are associated with high behaviour problem scores. However, the significant effects of neighbourhood affluence and neighbourhood unemployment remain.

Table 20: Unstandardized Regression Coefficients, Standard Errors, and Standardized Coefficients for Behaviour Problem Scores for Children Aged 4-5 (Weighted)

	1	2	3
Province	-----	-----	-----
Female		-2.80*** (.30) -.16	-2.77*** (.30) -.16
Number of siblings in the household		-.01 (.14) -.001	.03 (.14) .004
PMK age at birth		-.20 (.78) -.004	.42 (.79) .01
Household income			.10 (.17) .01
PMK education			-.45* (.21) -.04
Single mother			2.80*** (.53) .11
Percentage of neighbourhood families with income < $20,000	-.004 (.02) -.01	-.003 (.02) -.003	-.01 (.02) -.01
Percentage of neighbourhood families with income >$50,000	-.04*** (.01) -.10	-.04*** (.01) -.09	-.04*** (.01) -.08
Percentage of neighbourhood single female headed families	.01 (.03) .01	.001 (.03) .000	-.02 (.03) -.02
Neighbourhood unemployment	.55+ (.32) .03	.74* (.32) .04	.71* (.31) .04
Constant	22.00	23.46	23.30
R^2	.03	.05	.07
R^2 Adj.	.03	.05	.06
R^2 Change	.01***	.03***	.01***
F	7.52***	11.84***	12.24***

+ $\underline{p} < .10$, * $\underline{p} < .05$, ** $\underline{p} < .01$, *** $\underline{p} < .001$

Table 21. Unstandardized Regression Coefficients, Standard Errors, and Standardized Coefficients for Behaviour Problem Scores for Children Aged 4-5 (Weighted)

	1	2	3	4	5
Province	-----	-----	-----	-----	-----
Female				-2.67*** (.30) -.15	-2.63*** (.30) -.15
Number of siblings in the household				-.10 (.15) -.01	-.06 (.15) -.01
PMK age at birth				.30 (.80) .01	.69 (.80) .02
Household income					.16 (.17) .02
PMK education					-.39 (.21) -.03
Single mother					2.59*** (.54) .10
Percentage of neighbourhood families with income < $20,000	.01 (.02) .01	.004 (.02) .01	.01 (.02) .01	.01 (.02) .01	.002 (.02) .003
Percentage of neighbourhood families with income >$50,000	-.04*** (.01) -.09	-.03*** (.01) -.08	-.03*** (.01) -.07	-.03*** (.01) -.07	-.03*** (.01) -.07
Percentage of neighbourhood single female headed families	-.01 (.03) -.01	-.02 (.03) -.02	-.05 (.03) -.04	-.07* (.03) -.05	-.08** (.03) -.06
Neighbourhood unemployment	.65* (.33) .04	.64+ (.33) .04	.58 (.32) .03	.76* (.32) .04	.74* (.32) .04
Unsafe neighbourhoods		1.21** (.41) .06	.79+ (.41) .04	.68 (.40) .03	.42 (.41) .02
Low cohesion neighbourhood			.51*** (.06) .15	.52*** (.06) .15	.48*** (.06) .14
Constant	21.86	20.45	16.51	17.54	17.86
R^2	.03	.04	.06	.08	.09
R^2 Adj.	.03	.03	.05	.07	.08
R^2 Change	.01***	.003**	.02***	.02***	.01***
F	8.12***	8.18***	12.48***	15.06***	14.49***

+ $p < .10$

The final set of analyses includes observer ratings of unsafe neighbourhoods as well as PMK ratings of low neighbourhood cohesion. For preschoolers' behaviour problems, neighbourhoods that are rated as unsafe and neighbourhoods that are rated low in cohesion are associated with preschoolers behaviour problems (see models 2 and 3, Table 21). The addition of these two neighbourhood characteristics double the explanatory power of the model (from R^2=.03 to R^2=.06, see models 1 and 3, Table 21). Ratings of low neighbourhood cohesion mediate the effects of neighbourhood safety on preschoolers' behaviour problems. When cohesion is controlled the effect of neighbourhood safety is reduced by 33% (beta = .06 to beta= .04).

Neighbourhood characteristics are associated with preschoolers' behaviour problem scores over and above family characteristics. In the model containing each of the various neighbourhood characteristics, when family characteristics are taken into account, neighbourhoods with fewer affluent families, fewer female headed families, and high unemployment rates are associated with high behaviour problem scores for preschoolers. In addition, interviewer observations of poor physical conditions of the neighbourhood and PMK perceptions of low neighbourhood cohesion are also associated with children's behaviour problem scores, although the effect of neighbourhood safety is mediated by neighbourhood cohesion. The final model containing both the neighbourhood and family characteristics explained more than three times the variance of the model containing only the neighbourhood socio-economic characteristics (as demonstrated by a change in R^2 from .03 to R^2=.09), and a third more variability than the models including cohesion and safety (as demonstrated by a change in R^2 from .06 to R^2=.09).

- Neighbourhood characteristics such as neighbourhood affluence, single female headed families, and neighbourhood unemployment are associated with higher behaviour problem scores in preschoolers.

- Ratings of unsafe neighbourhoods are associated with behaviour problems but these effects are mediated by PMK ratings of neighbourhood cohesion.

- Family characteristics such as low levels of PMK education and single female headship are associated with higher ratings of behaviour problems but neighbourhood effects persist over and above family effects.

4. Summary of Key Findings

- Neighbourhood characteristics are important determinants of children's competencies prior to the beginning of formal education.
- The number of affluent neighbours has a positive effect on children's competencies, rather than the number of poor neighbours having a negative effect.
- Family characteristics such as higher levels of income and higher levels of PMK education are associated with children's competencies.
- Family characteristics mediate neighbourhood effects for toddlers but do not mediate all neighbourhood effects for preschoolers.
- There are more direct neighbourhood effects over and above family characteristics on preschoolers than on toddlers.

5. Discussion

5.1 Neighbourhood Effects

The effects of neighbourhood conditions are apparent in children as young as 2 and 3 years of age. Neighbourhood conditions were significant predictors of each of the measures of children's competencies examined in this study. Overall our results show that neighbourhoods with more affluent families and neighbourhoods rated as more safe and more cohesive were associated with motor and social as well as behavioural competencies of toddlers and verbal abilities and behavioural competencies of preschoolers. The findings for the youngest children are mediated by family characteristics such as household income and PMK education. The neighbourhood effects for preschoolers are significant even after controlling for family socio-economic characteristics. The neighbourhood effects on preschoolers are similar to findings from other studies (Brooks-Gunn et al., 1993; Chase-Lansdale et al. 1997). However, the neighbourhood effects found on the youngest group of children have not previously been investigated.

5.2 Family Characteristics and Mediated Effects

Young children spend a large proportion of time with parents and caregivers in the home. Parental characteristics such as high levels of household income and high levels of PMK education were important determinants of toddlers' and preschoolers' competencies associated with school readiness.

For the youngest group of children, neighbourhood effects included the effects of neighbourhood affluence and neighbourhood single female headship. These neighbourhood effects were mediated by family socio-economic characteristics. Toddlers are constrained by parental decisions about experiences within the neighbourhood and spend a large portion of their time interacting with primary caregivers. For toddlers, neighbourhood effects operate via effects on parents and parental socio-economic resources. For the group of preschoolers, neighbourhood characteristics such as neighbourhood affluence, low rates of unemployment, and neighbourhood safety and cohesion have direct effects on children's competencies over and above family characteristics. As children get older their interactions and experiences within the neighbourhood increase and neighbourhood characteristics exert a more direct impact.

It should be noted that the size of the estimated effects of neighbourhood conditions was smaller than the estimated effects for family characteristics, as would be expected for young children. For both toddlers and preschoolers, family characteristics such as maternal education and family income were significant predictors of children's competencies associated with school readiness. For toddlers and preschoolers, families serve as the primary influences in promoting children's well-being. Community influences begin to emerge over and above more proximal family characteristics for preschool aged children.

5.3 Study Limitations

We have conceptualized the neighbourhood as a rather large area that may be incongruent with neighbourhood environments of young children. However, the enumeration area linkages were the only ones available for the present study (note: 30% of respondents did not have postal code information). Our conceptualization does allow for a replication of studies conducted by our colleagues on a nationally representative sample of Canadian children (Brooks-Gunn et al., 1993; Chase-Lansdale et al. 1997). The perception of a neighbourhood as a geographic unit also implies a certain homogeneity in terms of shared institutions and public spaces including hospitals, schools, community centers, and parks. A related issue is that is not addressed in the present study is that of self-selection and the process by which families select themselves into different neighbourhoods (Tienda, 1991).

Maternal reports of children's competencies are one indicator of child competence and may be influenced by other characteristics such as child gender, child health, and maternal mental health. Additional studies need to be conducted using other measures of children's competencies including standardized measures, teacher, observer and self-reports. In this study, the two competency measures for toddlers were both based on maternal reports. In addition, the results for toddlers' motor and social competencies are based on small sample sizes and analyses should be replicated on larger samples.

Although the explanatory power of our regression models is modest, it is comparable to other studies and our findings replicate those from other studies (Brooks-Gunn, Duncan, Klebanov, & Sealand, 1993; Chase-Lansdale et al., 1997). In addition, numerous factors associated with young children's competencies have not been included in our analyses, contributing to the modest explanatory power of the regression models. A higher proportion of variability in

preschoolers competencies is explained when other factors known to influence children's competencies are included. For example, factors such as maternal employment, mental health characteristics such as depression, coping, and social support as well as measures of parenting and physical qualities of the home environment are important determinants and have been included in other studies (Chase-Lansdale et al., 1997).

5.4 Future Research

This study leads to other important areas of research. We have focused on family socio-economic characteristics as mediators of neighbourhood effects but we have not examined other processes by which neighbourhood effects may operate. For example, are neighbourhood influences mediated by family processes such as maternal mental health or parenting behaviours? There is also a need to examine the effects of neighbourhood and family influences on older children, especially the group of school aged children who participated in the NLSCY. Neighbourhood effects appear to exert larger, more direct effects as children get older. We begin to see this in our examination of toddlers and preschoolers. School aged children as compared to preschoolers have more interactions with the community through experiences of school and peers. As children age they also gain more independence in making decisions and choosing friends and leisure environments. The additional benefit of examining the effects of neighbourhoods on school aged children is the availability of maternal reports, standardized measures, and teacher ratings of competence.

5.5 Summary

Similar to the longitudinal studies conducted on children of different ages (Brooks-Gunn, Duncan & Aber, 1997) children growing up in affluent neighbourhoods that are safe and have high levels of cohesiveness appear to be at an advantage in terms of competencies associated with school readiness. These findings are consistent with a theory of collective socialization, that the presence of affluent neighbours is associated with positive effects rather than the presence of poor neighbours being associated with negative effects. In addition, measures of perceived neighbourhood cohesion and neighbourhood safety are also important characteristics for children's development. As suggested by Jencks and Mayer (1990), affluent neighbourhoods may have adult members that monitor children, serve as role models, or exert informal social control contributing to children's socialization and safety. Our models show an indirect effect of

neighbourhood characteristics for toddlers that is mediated by family characteristics. Neighbourhood effects for preschoolers remain significant when family characteristics are controlled, suggesting direct effects as children get older.

5.6 Policy Implications

A crucial time for investing in the health and well-being of children is in the preschool period. Children's well-being and competencies have roots early in life. It is critical to invest in primary prevention initiatives. Investments in healthy child development have been demonstrated as being more cost effective than dealing with long-term consequences such as delinquency, criminal involvement, and mental health problems (Schweinhart et al, 1993). The conditions of neighbourhoods, particularly neighbourhood affluence, have an impact on young children's competencies both directly as well as indirectly. These influences exert their effect prior to the beginning of formal education. Other resources within the community that are important for children's well-being include the availability of recreational spaces such as parks and community centres, the accessibility and availability of programs and services such as mother-toddler programs, and quality child care arrangements. Neighbourhoods must be safe and free of violence with additional benefits accruing to neighbourhoods that have shared values and expectations.

Efforts to improve conditions that maximize all children's healthy development and well-being will have a positive impact on all children, especially those living in the poorest socio-economic conditions. Evidence from international and inter-provincial comparisons shows that improving the conditions of children who are the least well-off does not have a negative impact on the most affluent. In fact, improving conditions for those living in low socio-economic conditions helps improve conditions for those living in high socio-economic conditions. Children must have equal access to nurturing, stimulating, supportive, caring and safe environments. At present, access to these factors differs by socio-economic status.

Appendix A

Behavioural Items for Toddlers Aged 2-3

1. Can't sit still, is restless or hyperactive
2. Is distractible, has trouble sticking to any activity
3. Fidgets
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. Cannot settle to anything for more than a few moments
8. Is inattentive
9. Will try to help someone who has been hurt *
10. Offers to help others who are having difficulty with a task *
11. Comforts a child who is crying or upset *
12. Helps other children who are feeling sick *
13. Takes the opportunity to praise the work of less able children *
14. Seems to be unhappy, sad or depressed
15. Is not as happy as other children
16. Is too fearful or anxious
17. Is worried
18. Is nervous, highstrung or tense
19. Has trouble enjoying him/herself
20. Is defiant
21. Gets into many fights
22. Punishment doesn't change behaviour
23. Has temper tantrums or hot temper
24. Has difficulty awaiting turns in games or groups
25. When another child accidentally hurts him/her, assumes that the other child meant to do it and then reacts with anger and fighting
26. Has angry moods
27. Kicks, bites, hits other children
28. Cries a lot
29. Clings to adults or is too dependent
30. Constantly seeks help
31. Gets too upset when separated from parents

* Reverse coded.

Appendix B

Behavioural Items for Preschoolers Aged 4-5

1. Can't sit still, is restless or hyperactive
2. Is distractible, has trouble sticking to any activity
3. Fidgets
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. Cannot settle to anything for more than a few moments
8. Is inattentive
9. Difficult to feed
10. Will try to help someone who has been hurt *
11. Volunteers to clean up a mess someone else has made *
12. If there is a quarrel or dispute, will try to stop it *
13. Offers to help others who are having difficulty with a task *
14. Comforts a child who is crying or upset *
15. Spontaneously helps to pick up objects which another child has dropped *
16. Will invite bystanders to join in a game *
17. Helps other children who are feeling sick *
18. Takes the opportunity to praise the work of less able children *
19. Seems to be unhappy, sad or depressed
20. Is not as happy as other children
21. Is too fearful or anxious
22. Is worried
23. Cries a lot
24. Appears miserable, unhappy, tearful or distressed
25. Is nervous, highstrung or tense
26. Has trouble enjoying him/herself
27. Gets into many fights
28. When another child accidentally hurts him/her, assumes that the other child meant to do it and then reacts with anger and fighting
29. Physically attacks people
30. Threatens people
31. Is cruel, bullies or is mean to others
32. Kicks, bites, hits other children
33. When mad at someone, tries to get others to dislike that person

34. When mad at someone, becomes friends with another as revenge
35. When mad at someone, says bad things behind the other's back
36. When mad at someone, says to others: let's not be with him/her
37. When mad at someone, tells the other one's secrets to a third person
38. Destroys his/her own things
39. Steals at home
40. Destroys things belonging to family or other children
41. Tells lies or cheats
42. Vandalizes
43. Steals outside the home

*Reverse coded.

References

Achenbach, T. M., & Edelbrock, C. S. (1981). Behavioural problems and competencies reported by parents of normal and disturbed children aged four through sixteen. *Monographs for the Society for Research in Child Development*, 46(1, Serial No.188).

Alexander, K. L., & Entwisle, D. R. Achievement in the first 2 years of school: Patterns and processes. *Monographs of the Society for Research in Child Development* 1988; 53(2).

Baron, R., & Kenny, D. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, 51(6), 1173-1182.

Behar, L. (1977). The Preschool Behaviour *Questionnaire Journal of Abnormal Child Psychology*, 5(3): 265-275.

Behar, L., & Stringfield, S. (1974). A behaviour ratings scale for the preschool child. *Developmental Psychology*, 10(5): 601-610.

Boyle, M.H., Offord, D. R., Hoffman H.G., Catlin, G.P., Byles, J.A., Cadman, D.T., Crawford, J.W., Links, P.S., Rar-Grant, N.I., & Szatmari, P. (1987). Ontario Child Health Study: I Methodology. *Arch Gen Psychiatry*, 44: 826-831.

Bronfenbrenner, U. (1979). *The Ecology of Human Development*. Cambridge, MA: Harvard University Press.

Brooks-Gunn, J., Denner, J., & Klebanov, P. K. (1995). Families and neighbourhoods as contexts for education. In E. Flaxman E. and A. H. Passow (Eds.), *Changing Populations/ Changing Schools: Ninety-fourth Yearbook of the National Society for the Study of Education, Part II* (pp. 233-252). Chicago, Illinois; The National Society for the Study of Education.

Brooks-Gunn, J. & Duncan, G. (1997). The effects of poverty on children. *Future of Children*, 7(2), 55-71.

Brooks-Gunn, J., Duncan, G. J., & Aber, J. L. (Eds.) (1997). *Neighbourhood poverty: Context and consequences for children*. Vol. 1.

Brooks-Gunn, J., Duncan, P., Klebanov, P. K., & Sealand, N. (1993). Do neighbourhoods influence child and adolescent development? *American Journal of Sociology*, 99(2), 353-95.

Chase-Lansdale, P. L., Gordon, R. A., Brooks-Gunn, J., & Klebanov, P. K. (1997). Neighbourhood and family influences on the intellectual and behavioural competence of preschool and early schoo-age children. In J. Brooks-Gunn , G. J. Duncan, & J. L. Aber (Eds.). *Neighbourhood poverty: Context and consequences for children. Vol. 1.* NY: Russell Sage.

Darlington, R. B., Royce, J.M., Snipper, A.S., Murray, H.W., & Lazar, I. (1980). Preschool programs and later school competence of children from low-income families. *Science*, 208(4440), 202-204.

Doherty, G. (1997). *Zero to Six: The Basis for Adult Success*. Paper prepared for the ARB, HRDC.

Duncan, G. J., & Brooks-Gunn, J. (1997). *Consequences of Growing Up Poor*; NY: Russell Sage.

Duncan, J. G., Brooks-Gunn, J. & Klebanov, P. K. (1994). Economic deprivation and early childhood development. *Child Development*, 65 (2), 296-318.

Dunn, L. M., & Dunn, L. M. (1981). *Peabody Picture Vocabulary Test- Revised*. American Guidance Service.

Earls F. (1980). Prevalence of behaviour problems in 3 year old children. *Archives of General Psychiatry*, 37, 1153-7.

Guo, G., Brooks-Gunn, J., & Harris, K. M. (1996). Parental labor-force attachment and grade retention among urban Black children. *Sociology of Education*, 69, 217-236.

Hertzman, C. (1992). The lifelong impact of childhood experiences. *Daedalus*, 123(4), 167-180.

Jencks, C., & Mayer, S. (1990). The social consequences of growing up in a poor neighbourhood. In *Inner-City Poverty in the United States*, edited by L. E. Lynn Jr. and M. G. McCeary. Washington, D.C: National Academy Press.

Kagan, S. L. (1995). Normalizing preschool education: The illusive imperative. In Flaxman E and Passow AH (Eds.). *Changing Populations/Changing Schools: Ninety-fourth Yearbook of the National Society for the Study of Education, Part II* (pp. 84-101). Chicago, Illinois; The National Society for the Study of Education.

Klebanov, P.K., Brooks-Gunn, J., Chase-Lansdale, L., & Gordon, R. (1997). Are neighobourhood effects on young children mediated by features of the home environment. In J. Brooks-Gunn, G. Duncan, & J.L. Aber (Eds), *Neighbourhood poverty: Context and Consequences for children.* (Volume I). (pp.119-145). New York: Russell Sage Foundation Press.

Kohen, D. E., Brooks-Gunn, J., McCormick, M, & Graber, J. A. (1997). Concordance of maternal and teacher ratings of school and behaviour problems in children of varying birth weights. *Journal of Developmental and Behavioural Pediatrics*, 18(5), 295-303.

Kohen, D. E., Hertzman, C., & Brooks-Gunn, J. (in prep.). Family Socio-Economic Indicators and Behavioural Readiness to Learn.

Kohn M., & Rosman, B. L. (1973). A two factor model of emotional disturbances in the young child: validity and screening efficiency. *Journal of Child Psychology and Psychiatry*, 14, 31-56

Lipman, E. L., Offord, D. R., & Dooley, M. D. (1996). What do we know about children from single-mother families? Questions and answers from the National Longitudinal Survey of Children and Youth. Ministry of Industry. *Growing Up in Canada: National Longitudinal Survey of Children and Youth.* Ottawa: HRDC.

Maccoby, E., & Martin, J. (1983). Socialization in the context of the family: Parent-child interaction. In E. M. Hetherington (Ed.), *Handbook of child psychology, Vol. 4: Socialization, personality and social development*. NY: Wiley.

Mayer, S. E., & Jencks, C. (1989). Growing up in poor neighbourhoods: How much does it matter? *Science*, 243: 1441-45.

McGauhey, P. & Starfield, B. (1993). Child health and the social environment of white and black children. *Social Science Medicine*, 36(7), 867-874.

McLanahan, S., & Sandefur, G. D. *Growing Up With a Single Parent: What Hurts, What Helps?* Cambridge, Mass. Harvard University Press, 1994.

Offord, D. R., Boyle, M. H., Fleming, J. E., Blum, H. M., & Grant, N. I. (1989). Ontario Child Health Study: Summary of selected results. *Can J Psychiatry*, 34: 483-491.

Offord, D. R., & Lipman, E. L. Emotional and behavioural problems. Ministry of Industry. *Growing Up in Canada: National Longitudinal Survey of Children and Youth*. Ottawa: HRDC, 1996.

Richman, N., Stevenson, J. E., & Graham, P. J. (1982).*Pre-school to school: A behavioural study*. NY: Academmic Press.

Richman, N., Stevenson, J. E, & Graham, P. J. (1975) Prevalence of behaviour problems in 3-year-old children: An epidemiological study in a London borough. *J. Child Psychol. Psychiatry*, 16, 277-287.

Roth, J., & Brooks-Gunn, J. Behaviour Problem Index. Manuscript in preparation.

Sampson, R. J. (1991). Linking the micro and macro -level dimensions of community social organization. Social Forces, 70(1), 43-64.

Sampson, R. J., Raudenbush, S. W., & Earls, F. (1997). Neighbourhoods and violent crime: A multilevel study of collective efficacy. Science.

Schweinhart, L.J., Barnes, H.V., & Weikart, D.P. (1993). Significant benefits: The High/Slope Perry Preschool Study through age 27. *Monographs of the High-Slope Educational Research Foundation*, No. 10. Ypsilanti, MI: High/Slope Press, 1993.

Tienda, M. (1991). Poor people and poor places: Deciphering neighbourhood effects on poverty outcomes. In *Macro-Micro Linkages in Sociology*, edited by J. Haber. Newberry, CA: Sage.

Tremblay, R. E., Boulerice, B., Harden, P. W., McDuff, P., Perusse, D., Pihl, R. O., & Zoccolillo, M. (1996). Do children in Canada become more aggressive as they approach adolescence? Ministry of Industry. *Growing Up in Canada: National Longitudinal Survey of Children and Youth*. Ottawa: HRDC, 1996.

Tremblay, R. E., Pihl, R. O., Vitaro, F., & Dobkin, P.L. (1994). Predicting early onset of male antisocial behaviour from preschool behaviour. *Arch Gen Psychiatry*, 51: 732-739.

Wilson, W. J. (1987). *The Truly Disadvantaged: The Inner City, the Underclass and Public Policy.*