Attendance in Educational Preschool Services: A Protective Factor in the Development of Children from Low-Income Families?

Isabelle Laurin, Ph.D.^{1,2}, Danielle Guay, MSc¹, Michel Fournier, MA¹, Nathalie Bigras, Ph. D.^{3,4}, Anabel Solis¹

ABSTRACT

OBJECTIVES: Describe the preschool education of children in educational services. Study the effects of components of preschool educational service attendance on the development of kindergarten children, based on income.

METHOD:

A sample of 1,184 children was extracted from a survey frame that included Montreal children assessed in the 2012 *Quebec Survey of Child Development in Kindergarten* (2012 QSCDK). Data collected from the parents of these children allowed us to document the following components of educational service attendance (independent variables): longitudinal profile of the service used; age at entry; duration; average weekly attendance; and cumulative time. Linking QSCDK data provided a measure of development of children in kindergarten (dependent variable). Various logistic regression models using different combinations of components of educational service attendance were tested. Akaike information criterion enabled us to select the model that best explains the data.

RESULTS:

Children from low-income families are proportionately fewer to attend a preschool educational service than children from better-off families (79.6% vs. 90.5%; chi-square test (1 df), $p < 0.001$). Children from low-income families who attended only an early childhood centre (Centres de la petite enfance) are less likely to be vulnerable in two or more domains of development compared to their peers who did not attend educational services (OR 0.23; 95% CI: 0.06–0.92). Children who started attending an educational service before the age of 12 months are less likely to be vulnerable in two or more domains of development (OR: 0.38; 95% CI: 0.18–0.81).

CONCLUSION:

Attending an early childhood centre (Centre de la petite enfance) is beneficial to the development of children from low-income families.

KEY WORDS:

Child development; public policy; daycare services; preschool educational services; public prekindergarten; school readiness, early development instrument (EDI).

Can J Public Health 2015;106(7)(Suppl. 2):eS14–eS20
doi: 10.17269/CJPH.106.4825

In 2006, the Director of Public Health affiliated with the Agence de la santé et des services sociaux de Montréal (the Montreal Agency's DSP) conducted the *Enquête sur la maturité scolaire des enfants montréalais* [Survey of the School Readiness of Montreal Children] targeting children attending five-year-old kindergarten in Montreal public schools¹. The survey revealed that one in three kindergarten children was vulnerable in at least one domain of development measured with the *Early Development Instrument* (EDI). When the results were shared with actors in the field, concerns focused on one key question: What connection is there between the preschool education of the children evaluated and their school readiness?

To shed more light on the question, when a province-wide version of the 2006 survey was undertaken in 2012—the *Quebec Survey of Child Development in Kindergarten* (QSCDK)²—, the Montreal Agency's DSP conducted a complementary study—the *Montreal Survey on the Preschool Experiences of Children in Kindergarten* (MSPECK)—with parents of a sample of Montreal children evaluated for the QSCDK. Several dimensions were assessed, including children's educational service trajectories.

In Quebec, children's preschool education trajectories is neither uniform nor necessarily continuous: some children stay at home, others attend childcare services or four-year-old kindergarten, while still others do a combination thereof. Children's experience in educational contexts have been shown to influence their developmental trajectories and play a role in their subsequent educational success^{3,4}. Moreover, attendance in educational services is an effective means of mitigating the effects of social health inequalities on the development of children from socioeconomically disadvantaged backgrounds^{3,5,6}.

In recent years, studies have examined more precisely the different components of the childcare experience in order to identify those most

likely to influence child development. The most influential component would appear to be the quality of the child's personal experience^{7,8}. In Quebec, quality varies significantly from one type of child care to another⁹, with the highest quality being observed in early childhood centre (CPE) daycare centres followed by CPE family daycares^{10–12}. A second component of interest is cumulative experience, based on the duration and intensity of attendance. Research to date has not made it possible to determine the age at entry or number of hours per week that is optimal for child development, partly because this varies considerably based on the daycare attended and the developmental domain studied. Nevertheless, studies tend to show that daycare attendance beginning in the first year of life and continuing until school entry, at an intensity of more than 30^{13,14} or 45 hours¹⁵ per week, depending on the study,

Author Affiliations

1. Direction régionale de santé publique du CIUSSS du Centre-Sud-de-l'Île-de-Montréal, Montréal (Québec)
2. École de santé publique, Université de Montréal, Montréal (Québec)
3. Département de didactique, Université du Québec à Montréal, Montréal (Québec)
4. Département de psychologie, Université du Québec à Montréal, Montréal (Québec)

Correspondence: Isabelle Laurin, Ph.D., Direction régionale de santé publique du CIUSSS du Centre-Sud-de-l'Île-de-Montréal, 1301, Sherbrooke Est, Montréal (Québec) H2L 1M3, Tel.: 514-528-2400, ext. 3971, E-mail: ilaurin@santepub-mtl.qc.ca

Funding: This project received tripartite financial support from Avenir d'enfants, the Director of Public Health affiliated with the Agence de la santé et des services sociaux de Montréal, and the ministère de la Santé et des Services sociaux.

Acknowledgements: We would like to thank Lise Lemay for her work reviewing the literature, and Pierre Toussaint, Mathieu Masse-Jolicoeur and Monique Messier for their judicious comments.

Conflict of Interests: None to declare.

appears to be associated with negative consequences, especially for affective, social and emotional development. On the other hand, daycare attendance initiated after the first year of life and continued at a moderate intensity until school entry appears to be beneficial, particularly for language and cognitive development^{13,16}.

Table 1. Definition of Educational Services

Educational childcare services regulated by the ministère de la Famille [Ministry of Families]

Early Childhood Centre

An early childhood centre (CPE) is a non-profit organization or cooperative that provides subsidized (\$7 a day) places in its childcare centres. It is run by a board of directors comprised of at least seven members, at least two-thirds of whom are parents who are users or future users of the CPE.

Daycare

Daycares are usually for-profit operations, which may or may not offer subsidized (\$7 a day) places. They must have a parents' committee that is consulted on all aspects of the care of the children attending the daycare.

Subsidized (\$7 a day) Family Daycare

A family daycare is operated in a private residence by an individual certified by a family child care coordinating office [bureau coordonnateur de la garde en milieu familial]. Certified individuals who operate family daycares by themselves may provide educational childcare services for a maximum of six children, including two under the age of 18 months. Operators who are assisted by another adult may provide services to seven to nine children, no more than four of whom may be under the age of 18 months.

Four-Year-Old Kindergarten (regulated by the ministère de l'Éducation, du Loisir et du Sport [Ministry of Education, Recreation and Sports])

Part-time kindergarten, sometimes known as "junior kindergarten", is provided free-of-charge to four-year-old children. It is reserved for children who are handicapped or from disadvantaged neighbourhoods. In Montreal, children spend 11.75 hours/week in class with a teacher and 11.75 hours/week in an educational service run by an educator.

Studies that have paid particular attention to socioeconomically disadvantaged children have shown the latter to be less likely to attend daycare on a regular basis during the preschool period⁹. However, socioeconomically disadvantaged children who do attend high quality daycare before school entry arrive better equipped to undertake their school careers than peers who have stayed at home^{14, 17}. They also derive greater developmental benefit from their experience than their more socioeconomically advantaged peers^{7,18}, but such benefit also depends on the type of daycare attended and the child's cumulative experience. Socioeconomically disadvantaged children in Quebec are more likely to attend poorer quality childcare services^{11, 19}. However, there is no difference between the quality of the services provided by CPE daycare centres in disadvantaged neighbourhoods and the quality of services provided by those in more affluent neighbourhoods¹¹. Few Quebec studies have examined the developmental advantages associated with attendance in public four-year-old kindergarten, despite the fact that such kindergartens have existed in disadvantaged neighbourhoods since the early 1970s. A study by Desrosiers and Ducharme found no significant difference in language skills as assessed in five-year-old kindergarten based on attendance or non-attendance of four-year-old kindergarten²⁰. However, more recent results have shown that, with regard to children from the most highly disadvantaged backgrounds, proportionally fewer of those who attended four-year-old kindergarten have a vulnerability in one or more developmental domains (regardless of whether they attended daycare or not) than of those who did not attend four-year-old kindergarten or childcare services².

Most studies on preschool education have been conducted outside Quebec, as can be seen from this brief review of the scientific literature. Their applicability to the situation in Quebec is somewhat limited due to the province's unique constellation of preschool education services. The Quebec studies mentioned have tended to focus primarily on the types of daycare attended, not examining the effect of children's cumulative experience on their development. The results of the *Quebec Longitudinal*

Study of Child Development (QLSCD) concern educational service attendance between 1997 and 2002, while MSPECK results provide a more recent perspective. This article has two objectives: first, to describe the preschool trajectory of Montreal children in educational services, i.e. childcare services regulated by the ministère de la Famille [Ministry of Families] and four-year-old kindergarten in public schools (Table 1); and second, to examine the effects of different components of educational service attendance on child development as measured in five-year-old kindergarten based on family income.

METHOD

Study population

MSPECK's target population was children attending five-year-old kindergarten on the Island of Montreal. The survey frame comprised all children in Montreal whose development was evaluated in the QSCDK, a census survey of all children attending five-year-old kindergarten in all the schools in the province of Quebec. The response rate for Montreal was 78%². A probability sample of 1184 children, stratified by Pampalon's material deprivation index²¹ (with over-representation of the lowest quintile), language of instruction (French/English), and school status (private/public) was obtained.

A structured questionnaire developed by the Montreal Agency's DSP and the Institut de la statistique du Québec (Quebec Institute of Statistics-ISQ) was used to document children's preschool experiences. Data collection was conducted by the ISQ by telephone between April 25 and July 2, 2012²². Interviewers asked to speak to the parents of selected children; mothers represented 72% of respondents. The study received approval from the ethics committees of both the Montreal Agency's DSP and the ISQ.

Definition of variables

Independent Variables: Components of educational service attendance during early childhood

The MSPECK documented the preschool trajectory of children in educational services over five reference periods: from birth to 11 months, from 12 to 17 months, from 18 to 35 months, from 36 to 47 months, and from 48 months to entry into five-year-old kindergarten. For each of these periods, parents would indicate whether their child stayed at home or attended child care, the main type of child care used, and the average number of hours of attendance per week. Parents were also asked to specify the age at which children began attending child care. For the period between 48 months and entry into five-year-old kindergarten, attendance in four-year-old kindergarten at a public school was recorded as well. The variables of interest—the components of preschool educational service attendance—were constructed based on this information.

The *longitudinal profile of educational services attended* was obtained using the main type of educational service attended during each period: exclusively CPE, regulated childcare services other than exclusively CPE, exclusively four-year-old kindergarten, regulated childcare services followed by four-year-old kindergarten, no service attended. A second, more detailed classification system was used to break down the "regulated childcare services other than exclusively CPE" category as follows: exclusively subsidized daycare, exclusively another type of daycare, exclusively subsidized family daycare, a combination of regulated childcare services. The longitudinal profile was used as an approximate measure of the quality of the educational service experience, given that average quality varies depending on the type of service, and the MSPECK contains no measure of the quality of the educational service attended.

The other variables concerned components of the cumulative educational service experience. The *age at beginning of attendance* was categorized using two sets of groupings (under 12 months, 12 months and older/no attendance; under 18 months, 18 months and older/no attendance) and the *duration of attendance* according to two groupings (less than 42 months, 42 months and older). *Average weekly attendance* was based on the number of hours of attendance per week for each attendance period and was weighted according to the length of the

period; a value of 0 was assigned to children who attended no educational services. Weekly attendance was used along a continuum (from 0 to 53 hours), and also divided into categories (45 hours or less, more than 45 hours; 30 hours or less, more than 30 hours). Finally, the *cumulative time of attendance* was calculated based on the number of hours of attendance per week for each attendance period, based on the assumption that the child had attended for the entire year. The number of hours was then converted into an equivalent number of months based on a rate of attendance of 35 hours a week, ranging from 0 to 75.3 months.

Dependent variable: state of child's development in kindergarten

The permanent code given to each child by the ministère de l'Éducation, du Loisir et du Sport [Ministry of Education, Recreation and Sports] was used to link MSPECK data with QSCDK data. This made it possible to access the different measures of child development in kindergarten obtained with the EDI, a teacher-completed instrument assessing five domains of child development: physical health and well-being, social competence, emotional maturity, cognitive and language development, and communication skills and general knowledge²³. The EDI has good reliability and validity coefficients^{1,23}.

Based on the information collected with the EDI, children were given a score for each domain of development. Children were considered vulnerable in a domain if they scored at or below the 10th percentile of the distribution for all Quebec children in the domain. Vulnerability in two or more of the domains, no matter which ones, was used as the dependent variable. This made it possible to exclude children who were only vulnerable in either the cognitive and language domain or the communication skills and general knowledge domain due to lack of familiarity with the language of instruction. The results of analyses that focused specifically on immigrant children in the 2006 *Survey of the School Readiness of Montreal Children* supported this decision²⁴.

Family income

The low income measure (LIM) for the family was chosen as the measure of the family's socioeconomic status. The LIM takes into account both family income and the number of people in the family as reported by the parent. We used Statistics Canada's 2011 low income cut-offs before tax for census metropolitan areas of 500,000 inhabitants or more, based on the number of people in the family²⁵. Low-income families were those that fell below the low income cut-off and better-off families were those that were above the low income cut-off.

Analyses

In our analyses, we have used the weighting established by ISQ²², and focused on a sub-group of 1104 children for whom we were able to determine whether or not their families were below the low income cut-off. Chi-square tests were conducted to compare children's preschool education trajectories based on whether or not they came from low-income families.

Logistic regression was used to predict the probability of kindergarten children being vulnerable in two or more development domains based on the different components of educational service attendance. We adopted an approach that juxtaposed alternate models: ten models that employed different combinations of the various components of educational service attendance and that plausible from a theoretical point of view were tested. Each of the models incorporated effects differentiated by income, and employed the same set of control variables (child age and sex, and maternal education) selected using Greenland's *change-in-estimate* strategy²⁶. The Akaike information criterion (AIC) was used to determine the parsimonious model that best explained the data²⁷, which is presented in the results section. Analyses were conducted with STATA version 13.

Table 2. Characteristics of Study Subjects (n= 1104) as a Function of Family Income (Weighted Data)

	Kindergarten children	
	Low-income families (n = 441) %	Better-off families (n = 663) %
Females	49.8	51.3
Age (years, months)		
4.6-4.11	8.9	10.8
5.0-5.2	23.4	27.6
5.3-5.5	25.2	23.9
5.6-5.8	24.3	24.2
5.9-6.2	18.2	13.4
Born in Quebec	64.7	88.3
Single-parent families	25.9	9.5
Maternal education *		
High school incomplete	18.3	2.6
High school diploma	25.0	9.5
College-level diploma	23.9	21.8
University-level diploma	32.8	66.1
Low birth weight	8.7	6.1
Vulnerable in two or more domains of development	23.4	11.1

* For single parent families headed by a father (1.8%), this refers to paternal education.

RESULTS

Table 2 presents the characteristics of children in the study based on whether or not they come from a low-income family (39.9%).

Proportionally fewer children from low-income families attended educational services prior to school entry than children from better-off families (79.6% vs. 90.5%; chi-square test (1 df), $p < 0.001$). Moreover, when children from low-income families did attend educational services (Table 3), attendance began at a later age and a greater proportion had an average weekly attendance of 30 hours or less (43.6% vs. 35.0%; chi-square test (1 df), $p = 0.014$). Children from low-income families were thus more likely to have a low cumulative time of attendance in educational services (59% vs. 32%). Finally, proportionally fewer children from low-income families exclusively attended CPE (21% vs. 37%) while proportionally more attended public four-year-old kindergarten (37% vs. 15%).

No statistically significant difference in the proportions of children vulnerable in two or more developmental domains was observed between children who had attended an educational services and those who had not (14.8% vs. 21.4%; chi-square test (1 df), $p = 0.063$). Table 4 presents a logistic regression model of the combination of components of educational service attendance that best predicted vulnerability in two or more domains.

The model produced five statistically significant results, including four concerning the longitudinal profile of educational services attended prior to entry into five-year-old kindergarten. Children from low-income families who had exclusively attended a CPE were less likely to be vulnerable in two or more developmental domains than children who had attended: i) no educational service (odds ratio (OR) 0.23); ii) regulated childcare services other than exclusively a CPE (OR 0.28, 95% CI: 0.11-0.70, data not shown in Table 4) or iii) regulated childcare services followed by public four-year-old kindergarten (OR 0.36, 95% CI: 0.13-0.99, data not shown in Table 4). Children from better-off families who had exclusively attended CPE were less likely to be vulnerable in two or more domains of their development than those who had attended regulated childcare services followed by public four-year-old kindergarten (OR 0.31, 95% CI: 0.11-0.87, data not shown in Table 4).

Table 3. Distribution of kindergarten children having attended an educational service* during early childhood based on components of educational service attendance and family income

	Children from low-income families (n = 351) %	Children from better-off families (n = 600) %	Chi-square test
Longitudinal Profile of Educational Services Attended			p<0.001
Exclusively CPE	21.3	36.7	
Exclusively subsidized daycare	15.0	10.2	
Exclusively another type of daycare	5.4	10.2	
Exclusively subsidized family daycare	9.1	7.0	
Exclusively four-year-old kindergarten	19.7	5.6	
Regulated childcare services [†] followed by four-year-old kindergarten	17.1	9.0	
Combination of regulated childcare services	12.6	21.3	
Age at beginning of attendance (months)			p<0.001
< 12	10.0	16.1	
12 – 17	11.2	25.6	
18 – 35	25.8	32.7	
36 – 47	22.3	15.2	
48 or more	30.8	10.4	
Duration of attendance (months)			p<0.001
6 or 12	33.9	10.8	
18 or 24	23.4	17.8	
30 or 36	2.0	2.9	
42 or 48	31.9	57.2	
54	8.9	11.3	
Average weekly attendance (hours)			p=0.098
< 16	4.3	3.9	
16 – 30	39.3	31.1	
31 – 45	50.1	59.0	
> 45	6.3	6.0	
Cumulative time of attendance (months [‡])			p<0.001
Low (24 or less)	58.6	31.5	
Average (25–48)	32.2	55.7	
High (over 48)	9.2	12.9	

* Children who did not attend educational services during early childhood are not included. They represent 20.4% of children from low-income families and 9.5% of children from better-off families.

[†] This may be a CPE, a daycare (subsidized or not), a subsidized family daycare, or a combination of such services.

[‡] Number of months equivalent to attendance at a rate of 35 hours per week.

A second component of educational service attendance that had an effect on child development as measured was the age at the beginning of attendance. Independent of family income, children who started before the age of 12 months were less likely to be vulnerable in two or more domains of their development than children who started at a later age or who attended no educational service at all (OR 0.38). Average weekly attendance did not help explain child vulnerability.

Table 4. Logistic regression of the effects of components of educational service attendance on the vulnerability of kindergarten children in two or more domains of development

	Odds ratio	95% CI
Longitudinal Profile of Educational Services Attended		
Children from better-off families		
Exclusively CPE ^{*, †, ‡, §}	0.19	0.05 – 0.69
Regulated childcare services other than exclusively CPE	0.33	0.11 – 1.04
Exclusively four-year-old kindergarten	0.44	0.10 – 1.97
Regulated childcare services followed by four-year-old kindergarten [§]	0.59	0.18 – 2.01
No educational service attended	0.59	0.19 – 1.87
Children from low-income families		
Exclusively CPE ^{*, **, ††}	0.23	0.06 – 0.92
Regulated childcare services other than exclusively CPE ^{*, , **}	0.82	0.28 – 2.40
Exclusively four-year-old kindergarten	0.47	0.18 – 1.24
Regulated childcare services followed by four-year-old kindergarten ^{†, ††}	0.63	0.20 – 1.95
No educational service attended ^{‡, ¶}	1.00	
Age at beginning		
< 12 months	0.38	0.18 – 0.81
Other	1.00	
Average weekly attendance (continuous)	1.02	0.99 – 1.04

Control variables: age, sex, and maternal education.

*, †, ‡, §, ||, **, †† Identical exponents indicate a significant difference in odds ratios with a threshold of 0.05.

DISCUSSION

This study offers an unprecedented look at the preschool education of the Montreal children evaluated in the QSCDK. It is the first study of this magnitude of the situation in Quebec.

The findings regarding educational service attendance cannot be readily compared to those of the two major Quebec surveys on the topic—the *Quebec Longitudinal Study of Child Development (QLSCD)*⁹ and the *Survey on the Childcare Use, Needs and Preferences of Families*²⁸—which focus exclusively on childcare services, including non-regulated childcare services (excluded from our study), providing no findings on the preschool experience as a whole and few based on socioeconomic status. The only comparable result concerns educational service attendance during the preschool period, which they found to be lower among children from low-income families than among their more affluent peers. Our results go a step further, and show that children from low-income families start educational services later and that their intensity of attendance is lower. Also, as observed by Japel,¹¹ proportionally fewer children from low-income families attend CPE. The fact that a large proportion of children from low-income families attend public four-year-old kindergarten, with or without prior attendance in childcare services, is not surprising given that, in Quebec, it is specifically intended for such children. As it is recognized that CPE provide the highest quality services in Quebec,^{10–12} our study would therefore suggest that children from low-income families have lower quality preschool educational experiences.

What effect does attendance in an educational service have on the level of child development in kindergarten? An initial general finding would seem to indicate that whether or not a child attends an educational service before school entry does not seem to make any difference in terms of vulnerability in two or more domains of development. This result conflicts with the findings of a large number of studies that were conducted using the EDI^{4,29–31} and show that attending an educational service prior to school entry is more beneficial than not attending anything, but these studies focused on vulnerability in one or more domains of development. What happens when we examine the impact of the different components of educational service attendance on development? Which components have the most protective effect on child development? Our results indicate that children from low-income

families who exclusively attend CPE during the preschool period are four times less likely to be vulnerable in two or more domains of development than low-income peers who have not attended any educational services. However, no protective effect on the development of children from low-income families was observed for the other educational service attendance profiles (including for public four-year-old kindergarten). No observable benefit was found for children from better-off families for attendance in educational services of any type as compared to attendance in no educational service at all.

To our knowledge, three studies that employed the EDI have also examined the protective effects of attendance in different types of educational services on development; however, none presented its results as a function of socioeconomic status. In their study on children in Niagara, Ontario, Vanderlee and Noel found attendance in junior kindergarten to be more beneficial than non-attendance,³² but they found childcare attendance to be of no benefit. A second Ontario study (Offord), of all the children in the province, reached the same conclusion regarding junior kindergarten, but found benefits associated with attendance in a part-time preschool education program as well.²⁹ The study conducted in Saskatchewan by Quennell and Smart showed attendance in a preschool program or childcare service to have a protective effect compared to not attending anything. However, children who attended a prekindergarten program for socioeconomically disadvantaged children were more likely to be vulnerable in two or more domains of development than those who stayed at home.³³ Our results are more revealing in terms of the benefits associated with attendance in public four-year-old kindergarten as they are derived from an analysis based on socioeconomic status. We observed no developmental benefit (with regard to vulnerability in two or more domains) linked to attendance of public four-year-old kindergarten. However, a developmental benefit (concerning vulnerability in one or more domains) is apparent in the results of the provincial survey from which our Montreal sample was taken.² It should be remembered that our model included a set of control variables—child age and sex as well as maternal education—not considered in the provincial survey. Moreover, in our study, groups were differentiated according to family income, while in the provincial study, the neighbourhood deprivation index was used. Given these methodological differences, our study suggests that attendance in public four-year-old kindergarten prior to entry to school is not, in itself, a sufficient means of mitigating the effects of social health inequalities on the development of children from low-income families.

A second component of interest in the model is the age at the beginning of attendance. Our findings show that children who began attending an educational service before the age of 12 months were almost three times less likely to be vulnerable in two or more domains of their development than those who started later or who never attended an educational service. This protective effect is observed among low-income children and more affluent children alike. To our knowledge, only Vanderlee and Noel also included age in their analyses of development as measured with the EDI³². However their results cannot be compared with ours: instead of considering the age of entry into an educational service as we have, they have presented their results by age group according to the type of service attended and the average hours per week in care. Several studies that have examined this component's effect on development present their results by domain of development, using measures other than the EDI^{13,14,16}. As mentioned in the introduction, the conclusion that can be drawn is that attendance in an educational service during the first year of life is beneficial for certain components of development, but may have an adverse effect on others. Further analysis based on the five domains of development measured with the EDI would therefore be of definite interest.

In short, insofar as educational services play a recognized role in mitigating social inequalities, our most interesting finding concerns children from low-income families. The model shows that it is beneficial for such children to attend CPE, and to start doing so before the age of 12 months. However, our findings also indicate that only a small proportion of such children experience this benefit, as few attend CPE and those who do tend to be older when they start. That said, children from low-income families who do not attend CPE are not necessarily

destined to have difficulty when they start school. It should be remembered that three quarters of such children are not vulnerable in two or more domains of their development.

Limitations of the study

One of this study's limitations is tied to the fact that a considerable proportion of the children in the sample were born outside Quebec, and that, as a result, information on their preschool education was available only for the period after their arrival in the province. Moreover, the study's observational design made it difficult to distinguish the effect of educational services from the variables associated with them. Although the results were adjusted to take into account a series of confounding variables that had been identified, it is still possible that the effects presented were partially confounded by the effects of the other variables.

CONCLUSION

This study is a partial response to a series of questions raised by the publication in 2006 of the *Survey of the School Readiness of Montreal Children* and the resulting widespread intersectoral mobilization³⁴. The results, which demonstrate the greater protective effect of CPE, lend support to the second recommendation put forward in the Montreal Agency's DPH's report on social inequalities in health,³⁵ which calls for the number of places in CPE in deprived neighborhoods to be increased, and for such places to be made more economically accessible to low-income families.

REFERENCES

1. Laurin I, Lavoie S, Guay D, Durand D, Boucheron L. L'Enquête sur le développement des enfants à leur entrée à l'école. *Santé publique* 2012;(1) january-february:7–21.
2. Institut de la statistique du Québec. Enquête québécoise sur le développement des enfants à la maternelle - Portrait statistique pour le Québec et ses régions administratives. Québec (Québec) : Institut de la statistique du Québec, 2013. Online : <http://www.stat.gouv.qc.ca/statistiques/sante/enfants-ados/developpement-enfants-maternelle.html> (accessed July 5, 2015).
3. Burger K. How does early childhood care and education affect cognitive development? An international review of the effects of early interventions for children from different social backgrounds. *Early Child Res Q* 2010;25(2):140–65. doi: 10.1016/j.ecresq.2009.11.001.
4. Desrosiers H. Conditions de la petite enfance et préparation pour l'école : l'importance du soutien social aux familles. Dans : Institut de la statistique du Québec (éd.), *Étude longitudinale du développement des enfants du Québec - ÉLDEQ* (Vol. April 2013, p. 16). Québec : Institut de la Statistique du Québec, 2013.
5. Haskins R, Garfinkel I, McLanahan S. Helping parents helping children: Two-generation mechanisms – Introduction: Two-generation mechanisms of child development. *Future Child* 2014;24(1):3–13.
6. Geoffroy M-C, Côté SM, Giguère C-E, Dionne G, Zelazo PD, Tremblay RE, Boivin M, Séguin JR. Closing the gap in academic readiness and achievement: The role of early childcare. *J Child Psychol Psychiatry* 2010;51(12):1359–67. doi: 10.1111/j.1469-7610.2010.02316.x.
7. Burchinal MR, Kainz K, Cai Y. How well do our measures of quality predict child outcomes? Dans : Zaslow M, Martinez-Beck I, Tout K, Halle T (éds.), *Quality Measurement in Early Childhood Setting* :p11-31. Washington, DC: Brooks Publishing, 2011.
8. Bigras N, Lemire J, Tremblay M. Le développement cognitif des enfants qui fréquentent les services de garde. In : Bigras N, Lemay L (éds.), *Petite enfance, services de garde éducatifs et développement des enfants. État des connaissances*. Québec : Presses de l'Université du Québec, 2012 : p.21-72.
9. Giguère C, Desrosiers H. Les milieux de garde de la naissance à 8 ans : utilisation et effets sur le développement des enfants. In : Institut de la statistique du Québec (éd.), *Étude longitudinale du développement des enfants du Québec (ÉLDEQ 1998–2010) – De la*

- naissance à 8 ans (Vol. 5, p. 28). Québec : Institut de la statistique du Québec, 2010.
10. Drouin C, Bigras N, Fournier C, Desrosiers H, Bernard S. Enquête québécoise sur la qualité des services de garde éducatifs - Grandir en qualité 2003. Québec : Institut de la statistique du Québec, 2004.
 11. Japel C, Tremblay RE, Côté S. La qualité, ça compte! Résultats de l'Étude longitudinale du développement des enfants du Québec concernant la qualité des services de garde. *Choix IRPP* 2005;11(4).
 12. Bigras N, Bouchard C, Cantin G, Brunson L, Coutu S, Lemay L, et coll. A comparative study of structural and process quality in center-based and family-based child care services. *Child Youth Care Forum* 2010;39(3):129–50. doi: 10.1007/s10566-009-9088-4.
 13. NICHD Early Child Care Research Network. Early child care and children's development prior to school entry: Results from the NICHD study of early childcare. *Am Educ Res J* 2002;39(1):133–64. doi: 10.3102/00028312039001133.
 14. Loeb S, Bridges M, Bassok D, Fuller B, Rumberger RW. How much is too much? The influence of preschool centers on children's social and cognitive development. *Econ Educ Rev* 2007;26(1):52–66. doi: 10.1016/j.econeducrev.2005.11.005.
 15. Vandell DL. Early child care: The known and the unknown. *J Dev Psychol* 2004;50(3):387–414. doi: 10.1353/mpq.2004.0027.
 16. Fram MS, Kim J, Sinha S. Early care and prekindergarten care as influences on school readiness. *J Fam Issues* 2012;33(4):478–505. doi: 10.1177/0192513X11415354.
 17. Duncan GJ, Magnuson K. Investing in preschool programs. *J Econ Perspect* 2013;7(2):109–32. PMID: 25663745. doi: 10.1257/jep.27.2.109.
 18. Geoffroy M-C, Côté SM, Borge AIH, Larouche F, Séguin JR, Rutter M. Association between nonmaternal care in the first year of life and children's receptive language skills prior to school entry: The moderating role of socioeconomic status. *J Child Psychol Psychiatry* 2007;48(5):490–97. PMID: 17501730. doi: 10.1111/j.1469-7610.2006.01704.x.
 19. Bigras N, Pomerleau A, Malcuit G, Blanchard D. Le développement des enfants vivant dans des conditions de risques psychosociaux: les services de garde peuvent-ils faire une différence? *Revue de psychoéducation* 2008;37(1):1–25.
 20. Desrosiers H, Ducharme A. Commencer l'école du bon pied. Facteurs associés à l'acquisition du vocabulaire à la fin de la maternelle. In : Institut de la statistique du Québec (éd.), *Étude longitudinale du développement des enfants du Québec (ÉLDEQ 1998–2010)* vol. 4, no.1. Québec : Institut de la statistique du Québec, 2006.
 21. Pampalon R, Hamel D, Raymond G. Indice de défavorisation pour l'étude de la santé et du bien-être au Québec – mise à jour 2001. Québec : Institut national de santé publique du Québec, 2004. Online : http://www.inspq.qc.ca/pdf/publications/295-IndiceDefavorisation_2001.pdf (accessed on December 4, 2012).
 22. Thibodeau K, Gingras L. Enquête montréalaise sur le parcours préscolaire des enfants de maternelle (EMEP). Rapport méthodologique. Québec : Institut de la statistique du Québec, 2013.
 23. Janus M, Brinkman S, Duku E, Hertzman C, Santos R, Sayers M, et al. *The Early Development Instrument: A Population Based Measure for Communities: A Handbook on Development, Properties and Use*. Hamilton, ON: Offord Centre for Child Studies, 2007.
 24. Boucheron L, Durand D, Fournier M, Lavoie S. Enquête sur la maturité scolaire des enfants montréalais - Qu'en est-il des enfants issus de l'immigration? Montréal (Québec) : Direction de santé publique de l'Agence de la santé et des services sociaux de Montréal, 2012.
 25. Statistique Canada. Tableau 2. Seuils de faible revenu (base 1992) avant impôt, 2011. Online : <http://www.statcan.gc.ca/pub/75f0002m/75f0002m2013002-fra.pdf> (accessed on December 4, 2012).
 26. Maldonado G, Greenland S. Simulation study of confounder-selection strategies. *Am J Epidemiol* 1993;138(11):923–36. PMID: 8256780.
 27. Burnham KP, Anderson DR. *Model Selection and Multimodel Inference: A Practical Information-Theoretic Approach*, 2nd ed. New York, NY: Springer, 2002.
 28. Gingras L, Audet N, Nanhou V. Enquête sur l'utilisation, les besoins et les préférences des familles en matière de services de garde 2009. Portrait québécois et régional. Québec : Institut de la statistique du Québec, 2011.
 29. Gaskin A. *The Offord Centre for Child Studies. School Readiness to Learn Ontario SK Cycle 2 Results. Based on the Early Development Instrument Data Collection for Senior Kindergarten Students in Ontario*. Hamilton : The Offord Centre for Child Studies, McMaster University, 2009. Online: [http://www.citywindsor.ca/residents/socialservices-/Childrens-Services/The-Early-Development-Instrument-\(EDI\)/Documents/EDI%202006%20TO%202009%20ONTARIO%20COHORT%20GROUP%20REPORT.pdf](http://www.citywindsor.ca/residents/socialservices-/Childrens-Services/The-Early-Development-Instrument-(EDI)/Documents/EDI%202006%20TO%202009%20ONTARIO%20COHORT%20GROUP%20REPORT.pdf) (accessed on June 10, 2014).
 30. Sayers M, West S, Lorains J, Laidla B, Moore TG, Rachel R. Starting school: A pivotal transition for children and their families. *Fam Matter* 2012;90:45–56.
 31. Doyle O, McEntee L, McNamara K. Skills, capabilities and inequalities at school entry in a disadvantaged community. *Psychiatry* 2010;64(11):1305–12.
 32. Vanderlee ML, Noel S. *Niagara Children's Charter Enacted: 2009 Report on How Well Our Children 0–6, Their Families and Their Communities Are Being Served*. Niagara, NY: Early Years Niagara, 2009.
 33. Quennell M, Smart K. *Understanding the Early Years Regina Community Mapping Report*. Research report addressed to Regina: Understanding the Early Years initiative, 2010.
 34. Laurin I, Bilodeau A, Giguère N, Lebel A. L'initiative des sommets montréalais: ses retombées sur la mobilisation - Le point sur... l'action intersectorielle no 1. Montréal : Centre de recherche Léa-Roback sur les inégalités sociales de santé, 2014. Online: <http://www.centreleoroback.org/fr/activites/publications/> (accessed on June 15, 2015).
 35. Le Blanc MF, Raynault MF, Lessard R. Rapport du directeur de santé publique 2011. Les inégalités sociales de santé à Montréal. Le chemin parcouru. 2^e éd. Montréal : Direction de santé publique de l'Agence de la santé et des services sociaux de Montréal, 2012.