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ORIGINAL PAPER

Predictors of Development of Vulnerable Children Receiving Child Welfare Services

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Abstract This study aims to identify the risk and protective factors most associated with cognitive/language and socio-emotional development of vulnerable children receiving preventive or protective services. 185 children at Time 1 and 161 children at Time 2 (post-test) were recruited from child preventive and child protective services. Child functioning, family and community environment, and parent–child relationship were evaluated. Bivariate then multivariate analyses were performed based on the results obtained in the initial analyses; a set of multiple regressions formed the basis of path analyses for each of the dependent variables. Data from the second measurement time were used mainly for sample replication. Parental stress and child abuse potential were negatively related to the children's socio-emotional development. Parental stress was also negatively related to cognitive/language development. The quality of the home environment was positively associated with the children's cognitive/language and socio-emotional development. Socio-economic risk and social support were not directly associated with outcomes. However, socio-economic risk was inversely related to the quality of the home environment, whereas social support seemed to act as a moderator of child abuse potential and the quality of the home environment. These trends were mostly confirmed at Time 2. The decrease in parental risk factors between Times 1 and 2 was associated with an improvement in socio-emotional development, whereas improvement in the quality of the home environment was associated with better performance in cognitive/language tests. Results suggest the importance of taking action at several systemic levels to improve the development of vulnerable children.

Keywords Child development outcome · Protective factors · Risk factor · High risk children · Child · Maltreatment

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Introduction

Violence and neglect toward children is a major social problem. Each year, between 4 and 16 % of children are physically abused, and one in ten is neglected or psychologically abused (Clément et al. 2012; Gilbert et al. 2009). Child victims of maltreatment are more likely to have physical, psychological, cognitive, and behavioural problems (English et al. 2005; Gilbert et al. 2009; Kendall-Tackett and Giacomoni 2005; Peirson et al. 2001; Ward et al. 2010). The risk that these children will have re-victimisation trajectories is also increased; experiences of victimisation are associated with increased probability of physical, sexual, and psychological victimisation within the family, by peers, and within the community. (Finkelhor et al. 2005). Furthermore, the capacity for future social and economic integration of maltreated children, particularly those who have been neglected or who are victims of chronic maltreatment, is jeopardised, and there is an increased likelihood that these children will have problems

related to substance abuse, mental health, crime, under-education, and poverty (Currie and Widom 2010; Jonson-Reid et al. 2012; Nikulina et al. 2011). Nevertheless, the relationship between victimisation and problematic adult trajectories is mediated over the short and medium term by the impact of maltreatment, i.e., the presence of physical and mental health problems, as well as behavioural problems or delinquency during childhood and adolescence (Jonson-Reid et al. 2012).

Children whoses reports of maltreatment have not been substantiated or who are highly vulnerable also have significant needs. For one thing, cases reported to youth protection, whether substantiated or not, are more similar than different (Drake et al. 2003; Hussey et al. 2005; Kohl et al. 2009). Leiter et al. (1994) previously found that among ten indicators related to children's functioning at school and delinquent behaviour, the only indicator that distinguished substantiated from unsubstantiated cases regarded behavioural problems reported by teachers at school. Children of substantiated cases present more behavioural problems. Hussey et al. (2005) also found that, compared to children in reports considered unsubstantiated, children in substantiated reports presented no difference for the following dimensions: externalising problems, internalising problems, anxiety, depression, post-traumatic stress, socialisation, and daily functioning skills. In this same study, one difference was observed, however, between children reported to youth protection and children who are unreported but at risk: the former presented more externalising behaviours. Campbell et al. (2012) also found that children who are the subject of an investigation by child protection have more behavioural problems compared to children who are at risk but not reported. Furthermore, at-risk children receiving preventive services have as many developmental delays as do children receiving protective services (Casanueva et al. 2008; Kyte et al. submitted; Moreau et al. 2001).

Other studies have documented the risk factors associated with vulnerable children. We note that risk factors and protective factors associated with problematic development of children at risk are often the same as those associated with maltreatment, although a small number of studies document specific factors associated with the development of maltreated children. Recent research by Harden and Whittaker (2011), Cole (2005), Jaffee (2007), and Stahmer et al. (2009) provides further understanding of the relationship between, on the one hand, the quality of the home environment, and on the other hand, cognitive, socio-emotional, social, and behavioural development of at-risk and maltreated children. The quality of the proximal environment, as measured by the HOME inventory (cognitive stimulation and emotional support), positively influence the cognitive, social, emotional, social, and behavioural development of maltreated children in the short and medium term. Positive changes in the responsive and stimulating behaviours of parents are associated with improved language skills of these children (Jaffee 2007). A stimulating and responsive environment thus contributes significantly to ensuring a positive trajectory for children who have had contact with protective services. These relationships are also observed in several at-risk population samples (Bradley et al. 2001; Chazan-Cohen et al. 2009; Rijlaarsdam et al. 2012). Enriching and secure experiences in the early years of children's lives seem to act as a protective factor for children exposed to stressful and vulnerable environments (Mistry et al. 2008; Mueller et al. 2010). Indeed, Rijlaarsdam et al. (2012) found that the negative effects of poverty on children's development are reduced when the quality of the home environment is high.

Other factors related to the quality of the home environment (and associated with increased likelihood of maltreatment) are similar to those that compromise children's development. Emotional negativity (anger, hyperactivity), poor parent–child relationships, negative perception of the child and of oneself, parental stress, spousal violence and family conflict, low degree of family cohesion, and low social support are strongly related to risk of maltreatment (Carter and Myers 2007; Crittenden 2008; Dubowitz and Bennett 2007; Lacharité et al. 2006; Park et al. 2011; Slack et al. 2011; Stith et al. 2009). Other studies have examined the influence of demographic and socio-economic factors on child development and the increased risk of maltreatment. Young maternal age at childbirth, high number of children in the family, poor housing conditions, lack of neighbourhood safety, and economic insecurity are associated with low cognitive, social, and behavioural performance in children (Barth et al. 2008; Campbell et al. 2010; Chamberlain et al. 2006; Harden and Whittaker 2011; McKenzie et al. 2011; Park et al. 2011; Putnam-Hornstein and Needell 2011; Slack et al. 2011). Despite the similarity of risk factors documented according to the presence of likehood or maltreating behaviours, parents of children whose reports are substantiated present more personal, family, and social risk factors compared to parents of children who are vulnerable but not in contact with protective services or whose reports are unsubstantiated (Campbell et al. 2010; Casanueva et al. 2008; Kotch and Thomas 1986; Trocmé et al. 2009).

In sum, the factors associated with the risk of maltreatment and developmental problems are often similar; they are also related to various ecological levels. However, it is the combination of risk factors more than individual risk factors that makes a difference (Sameroff 2009). The degree and combination of certain factors may be more significant for children who receive protective services than they are for children whose maltreatment is not substantiated or whose risk of maltreatment is not reported. Finally, the quality of the home environment is a vital protective factor when children are exposed to social risks;

positive changes in outcomes are linked to improvement in the quality of the home environment.

This study aims to identify the factors most associated with cognitive/language and socio-emotional development of children in a sample of vulnerable children receiving preventive or protective services. The sample consisted of two groups of children, one having been exposed to an innovative intervention project, and the other receiving current services. More specifically, the study will document the relative influence of parental, family, social, and economic factors on child outcomes. Finally, the study will assess whether improvement in the quality of the home environment is associated with socio-emotional and cognitive/language development. The information was collected at two measurement times: at pre-test (Time 1) and at post-test (Time 2).

1. Parental stress, child abuse potential, and socio-economic deprivation (risk factors) are negatively associated with children's socio-emotional and cognitive/language development; conversely, the quality of the home environment and social support are positively associated with socio-emotional and cognitive/language development.
2. The prediction model observed at a Time 1 will be replicated at Time 2, 12–18 months later.
3. The reduction of risk factors and the improvement of protective factors between T1 and T2 are associated with an improvement in children's socio-emotional and cognitive/language development.

Method

Participants

The study is a secondary analysis stemming from the AIDES Initiative (Inter-Agency Partnership for Child Development and Safety), a research project in Quebec, Canada, which examined the experimental implementation of an ecosystemic-empowerment framework of practice within child preventive and child protective systems. The experimental intervention took the form of a family assessment that included a complete analysis of children's developmental needs using an ecosystemic analytical framework based on the Framework for the Assessment of Children in Need and their Families (Department of Health 2000). Children and families of the control group received current services and were not received the family assessment intervention. To be eligible for participation, target children had to be less than 9 years old and exposed to multiple individual, family, and community risk factors for child maltreatment. These risk factors included children's individual characteristics (behavioural problems or victimisation), family dysfunction/violence (e.g., neglect, domestic violence, substance abuse, parental criminality) and social disorganisation (e.g., extreme poverty, unsafe neighbourhood, lack of community support). Presence of an intellectual limitation or pervasive developmental disorder was an exclusion criterion. The families of the target children had to receive services from at least two institutions whose programmes focus on family preservation. The goal of the experimental intervention was threefold: (1) support practices based on a systemic analysis of children's needs, (2) strengthen participation and collaboration between parents and practitioners, and (3) improve inter-agency collaboration.

Four regions were selected from rural, urban, and semi-urban settings. A total of 81 children at baseline (Time 1) and 73 children at post-test (Time 2) were recruited from the child preventive services versus 104 at Time 1 and 88 at Time 2 from child protective services. In total, the combination of both groups represented 185 children at Time 1 and 161 at Time 2. Child functioning, family and community environment, and parent–child relationship were evaluated at the two measurement times, which were separated on average by 15 months (between 12 and 18 months).

For the purposes of our secondary analysis, we compared the data from Time 1 and Time 2 to verify whether the results observed at Time 1 were reproduced at Time 2. In addition, for each measurement time, we grouped the data into experimental and control group and according to whether the children were recruited from preventive or protective services The impact of the intervention at Time 1 was null. Replication analysis at Time 2 was only confirmatory. Moreover, another secondary analysis from the same database showed that the children recruited from these two settings had similar outcomes; a third of the children aged five and under presented developmental delays and concerns (Kyte et al. submitted).

The portrait that emerged at Times 1 and 2 highlights the complex needs of the families that participated in our study. Table 1 describes the characteristics of the children and their families according to whether they were recruited from preventive or protective services. The average age of the children was 50 months. Approximately one half of the families were single-parent; more than a third of families had three or more children; nearly six out of ten respondents had educational levels less than ninth grade; 40–50 % of households had annual incomes of less than $15,000. Finally, there was a significant difference in employment status between groups, with respondents in the protection group more likely to be unemployed: more than eight out of ten parents recruited from protective services were significantly more unemployed, while the same was true for seven out of ten parents recruited from preventive

Table 1 Demographic characteristics of the participants by place of recruitment

	Prevention ($N = 81$)	Protection ($N = 103$)	χ^2	T
Child's age in months (mean/standard deviation)	50(29)	49(34)		−0.80
	%			
Single-parent family	47	56	1.605	
Families with three or more children	36	37	4.220	
Partial primary and secondary education of main responding parent	59	63	3.813	
Annual family income less than $15,000	47	53	3.142	
Main respondent unemployed	**68**	**83**	**5.329***	

* $p \leq 0.05$; ** $p \leq 0.01$; *** $p \leq 0.001$

services. This was the only significant difference in terms of socio-demographic characteristics between the two groups of families.

One out of three children aged 5 years and younger had cognitive/language delays, and an average of one out of twelve children had socio-emotional problems. Between a third and half of the parents reported internalising or externalising problems in their child. Between 20 and 34 % of parents reported high levels of parental stress; more than nine out of ten parents considered the support they received as mostly unhelpful. Parents recruited from preventive services generally reported more parenting difficulties. Parents recruited from protective services were less satisfied with the support provided by the formal support network. Neglect or parental lifestyle problems (strongly associated with neglect) was the most common issue in nearly eight out of ten situations. Only 32 % of children recruited from preventive services had not been reported or did not have a protection file during the project period or prior year; the safety and development of 24 % of these children was not considered compromised during the period in which the initiative was implemented (Chamberland et al. 2012).

Procedures

Data collection was associated with key moments in the intervention process both prior to application of the intervention measures proposed by the project (pre-test, Time 1) and following intervention (post-test, Time 2). The dependant and independent variables were evaluated at the two measurement times, which were separated on average by 15 months (between 12 and 18 months). Two research assistants met with the families in their homes: one interviewed the parents (Socio-Demographic Questionnaire, HOME (observations and interview), PSI, CAPI, FSS, CBCL), and the other used the assessment tools with the children (CDAS, PPVT-R); the visits lasted approximately two and half hours. All instruments administered at both measurement times were used in the analysis. Only data from the principal caregivers were used for the purposes of this article.

Measures

Several instruments were administered to the children and their families at Times 1 and 2. The instruments can be grouped into two areas: child development/functioning and family environment/parent–child relationship.

Child Development/Functioning

Child Development Assessment Scale 0–5 years Old (CDAS) (Pomerleau et al. 2005)

The CDAS was created to assess the overall development of young children regarding their cognitive ability, gross/fine motor skills, and socio-emotional development. The CDAS is a series of grids divided into different age groups according to the various developmental markers from 0 to 5 years. It is adapted from the Bayley Scales of Infant Development to measure mental, physical, and socio-emotional development. The administration of the CDAS requires that the evaluator observe the child in a series of tasks or situations and indicate whether the child has passed or failed the observation. The CDAS also informs whether the child's development is adequate, needs to be monitored, is at risk, or requires referral to a developmental specialist.

The reliability of the CDAS was verified by a 2-week test–retest (correlations ranged from $r = 0.71-0.41$), inter-rater reliability (kappa scores ranged from 0.94 to 0.87), and internal consistency (Kuder-Richardson coefficients ranged from 0.5 to 0.80 depending on the age of the child). Concurrent validity was established using the Bayley Scales of Infant Development and the Stanford-Binet Intelligence Scale for the motor skills and cognitive ability scales of the CDAS; significant correlation was found ranging from 0.40 to 0.80.

Peabody Picture Vocabulary Test–Revised (PPVT-R) (6–9 years) (Dunn and Dunn 1981)

The PPVT-R was adapted and validated for the French-Canadian context. It measures the number of words

understood by a child and can be used with any age group up to 18 years (Dunn and Dunn 1981). The scale consists of two parallel forms (A & B). For the AIDES Initiative, only Form A was used; it consisted of five warm-up exercises followed by 170 items ranked in order of increasing difficulty. The total score achieved was then normalised by age and compared to 2,038 French-speaking children within a Canadian sample. Statistical analysis demonstrated satisfactory internal and external validity (correlation coefficient of 0.71 among other vocabulary tests; Dunn et al. 1993).

Child Behaviour Checklist (CBCL) (Achenbach and Rescorla 2000, 2001)

The CBCL is a questionnaire completed by the primary caregiver describing the child's emotional and behavioural difficulties. There are also two versions of the instrument, one for children aged 18 months to 5 years and another for children aged 6–18 years. The French-Canadian version for children aged 18 months to 5 years used in this study was revised by (Lemelin and St-Laurent 2002). It consists of 100 items grouped into several sub-scales to specify problematic behaviours exhibited by the child: emotional reactivity, anxiety/depression, somatic complaints, social problems, withdrawal, sleep difficulties, attention problems, and aggressive behaviour. The CBCL for children aged 6–18 years consists of 113 items to specify problematic behaviours for the following sub-scales: aggressive behaviour, anxiety/depression, attention problems, delinquent rule-breaking behaviour, social problems, somatic complaints, and thought problems. Answers are given using a 3-point Likert scale: "not true," "a little or sometimes," and "very true or often true." The two versions of the instruments provided scores in relation to internalising, externalising, and overall behavioural problems. A normative sample of 700 parents from the 18-month to 5-year-old group and 1,753 parents from the 6- to 18-year-old group allowed us to determine a clinical range of behaviour problems and indicated that 15 % of the children presented internalising, externalising, or overall behavioural problems (Lemelin and St-Laurent 2002). The CBCL (preschool age and school age) is widely used in research on child behavioural development and is supported by extensive validity and reliability data over the last 25 years. Test–retest and internal consistency coefficients for internalizing, externalizing and total problem scores were in the range of 0.90 and over. Cross-informant correlations (mother vs. father; parent vs. teacher) ranged from 0.59 to 0.67. Problem scores of the CBCL were shown to discriminate between referred and non-referred children (criterion-related validity) and to be correlated to other measures of maladaptive behaviour (convergent and construct validity).

Construction of the Child Functioning Scores

To reduce the diversity of data sources according to children's age group and to intersect the data to evaluate the same developmental construct, two general variables were compiled to produce an overall socio-emotional development score and an overall cognitive/language score for each child. Regarding cognitive/language development, for children aged 72 months and older, the standardised PPVT-R score transformed into a z-value (from the mean and standard deviation of the sample) was used. For children younger than 72 months, the weighted CDAS-cognitive/language score transformed into a z-value (from the mean and standard deviation of the sample) was used. This procedure provided a common variable (z-value) for cognitive/language development for all children in the sample at Times 1 and 2. Regarding socio-emotional development, for children aged 18 months and older, the total gross CBCL score transformed into a z-value (from the mean and standard deviation of the sample) was used. Because the CBCL measures maladaptive behaviour, the total problem score has been reversed in order to be coherent with the general construct of positive socio-emotional development (the lower the CBCL scores, the better the socio-emotional development indices). Thus, for these children, the higher the z-value, the more their behaviour resembled that of other children (unless they presented socio-emotional problems). For children younger than 18 months, the weighted CDAS-socio-emotional score transformed into a z-value (from the mean and standard deviation of the sample) was used. This procedure provided a common variable (z-value) for socio-emotional development for all children in the sample at Times 1 and 2.

Family Environment/Parent–Child Relationship

Socio-Demographic Questionnaire

This questionnaire was created by the research team and was used to establish a socio-demographic picture of the families participating in the study. It aimed to obtain information regarding the structure of the family (number of children and adults living in the home). The questionnaire also documented educational levels, employment and income of the parents, and type of housing of the participants. Information about the types of services received by the family was also included. It is important to note that this questionnaire was developed specifically for this research project.

An index of socio-economic risk was compiled from the following information: age of parent (24 years or less = 1, other = 0); number of children (3 children or more = 1, other = 0); housing density (cramped = 1, other = 0); annual family income ($15,000 or less = 3; $15–24,000 = 2;

$24–40,000 = 1; $40,000 or more = 0); educational level (primary school = 2, secondary school not completed = 1; secondary school or college completed = 0). The total score for socio-economic risk varied between 0 and 8. For this sample, the mean was 1.32 with a standard deviation of 1.04.

Home Observation for Measurement of the Environment (HOME) (Caldwell and Bradley 1984)

The HOME inventory is designed to measure the quality of a child's environment. It refers to the level of support and stimulation that a child receives in their family environment and focuses on the child as a recipient of inputs from objects, events, and transactions within family surroundings. The HOME consists of four versions depending on the age of the child. For the purpose of this study, only the first three inventories were used: infant/toddler (IT) HOME, early childhood (EC) HOME, and middle childhood (MC) HOME. Internal consistency of the IT HOME had Cronbach's alphas of 0.84 and ranged from 0.49 to 0.78 for the six sub-scales. Additionally, Kuder-Richardson coefficients were 0.89 and ranged from 0.44 to 0.89 for each of the sub-scales (Caldwell and Bradley 2003).

Parenting Stress Index (PSI) (Abidin 1983)

The PSI is a questionnaire that describes the level of psychological tension experienced by the primary caregiver. It is based on an underlying assumption that the characteristics of both the parent and child contribute to stress in the interaction. It was translated into French and validated in Québec by Bigras et al. (1996) in a sample of parents exhibiting maltreating behaviours. The short-version of 36 items was used in the present study. The questionnaire was divided into three sub-scales: parental distress, parent–child dysfunctional interaction, and difficult child. Answers were recorded using a 5-point Likert scale; the sub-scales were then calculated to produce an overall score. This score was then converted into a percentile indicating whether parental stress was low, normal, or high (above the 85th percentile). A score in the 95th percentile indicates that the child's safety and development may be compromised (Lacharité et al. 1999). The PSI is the most widely used questionnaire on parental stress (Abidin 2012; Haskett et al. 2006). Test–retest and internal consistency coefficients for the scales and total stress scores were in the range of 0.85 and more. PSI scores were shown to discriminate between maltreating and non-maltreating parents and to be correlated to other measures of adaptive problems in the parent–child subsystem such as parental depression and social isolation, quality of parent–child interactions, and child adjustment.

Child Abuse Potential Inventory (CAPI) (Milner 1986)

The CAPI was designed as a screening tool for use in differentiating abusers from non-abusers in investigations of potential child abuse. This caregiver self-report measure estimates the risk of a parent physically abusing a child (higher scores correspond to higher abuse potentials). The questionnaire consists of 160 questions answered in a closed, agree/disagree format (Milner 1994). The physical abuse scale contains six descriptive factor scales: distress, rigidity, unhappiness, problems with child and self, problems with family, and problems from others. The CAPI also contains three validity scales: lie scale, random scale, and inconsistency scale. These validity scales attempt to qualify response distortion indexes (i.e., faking good index, faking bad index, random response index). In addition, two special scales were developed: the ego-strength scale and the loneliness scale.

Reliability of the CAPI has been computed by means of internal consistency and test–retest. Reliability scores range from 0.92 to 0.95 (Milner 1994). Construct validity was established using the substantial body of literature, with major risk factors being drawn from the literature on family violence. Predictive validity was established using a prospective study, which found a significant relationship between abuse scores and subsequent physical abuse, a modest relationship between abuse scores and later child neglect, and no significant relationship between abuse scores and later occurrence of failure to thrive in children.

Family Support Scale (FSS) (Dunst et al. 2006)

The FSS measures the quality of social support available to parents over the last 6 months (Dunst et al. 1994). The French-Canadian version was translated and adapted by Lacharité (1996). The instrument consists of 18 statements related to individuals, groups, or organisations providing support or intervening with families with young children. Two additional blank items may be completed if the parent receives support from resources other than those mentioned. Answers are indicated on a Likert-type scale ranging from "not at all helpful" or "did not need help" to "extremely helpful." A normative sample (Lacharité et al. 2005) of 394 parents indicated that a parent with a score of 1.61 or less (below the 25th percentile) had low social support, while a score higher than 2.33 (above the 75th percentile) indicated that the parent had a high quality social network. Thus, 25 % of parents of the normative sample had particularly low social support (Lacharité 1996). Internal consistency coefficients were in the range of 0.82 and higher. Social support scores were shown to correlate with a wide range of parental adaptive dimensions

(social isolation, parenting stress, sense of parental competence, and parental practices).

Data Analysis

Bivariate analyses were first performed between the independent variables [socio-economic risk, parental stress (total scale and three sub-scales), formal and informal social support, child potential abuse, and quality of a home environment] and the dependent variables (socio-emotional and cognitive/language development). Multivariate analyses were then performed based on the results obtained in the initial analyses. In particular, a set of multiple regressions formed the basis of path analyses for each of the dependent variables at Time 1 and at Time 2. Data from Time 1 and Time 2 were analyzed independently. Because the second measurement time was used for sample replication, the variables entered for the multiple regressions at Time 2 were taken from the results obtained at Time 1.

Results

Table 2 presents the results of correlations between the independent and dependent variables at Time 1 and Time 2. Regarding the children's socio-emotional development, several of the independent variables are significantly correlated at both Time 1 and Time 2. In addition, the correlations are in the direction expected by the hypotheses: good socio-emotional development of the children is associated with low parental stress (all scales), low child abuse potential, and good quality of the home environment (at Time 1 only). With regard to cognitive/language development, parental stress (dysfunctional interaction) is negatively correlated, while quality of the home environment is positively correlated at both Time 1 and Time 2.

The variable for socio-economic risk is not correlated with any of the child development variables, nor is it correlated with parental variables (parental stress, child potential abuse). On the other hand, it is negatively correlated with the quality of the home environment at Time 1 ($r = -0.27$, $p < 0.01$) and Time 2 ($r = -0.23$, $p < 0.01$; Figs. 1, 2). Thus, the lower the indicator for socio-economic risk, the higher the quality of the home environment. Because of this correlation, socio-economic risk was included in the multiple regression analysis to isolate the specific contribution of the quality of the home environment in predicting child developmental outcomes at Time 1 and Time 2.

The variables related to social support (informal and formal) are not correlated with any of the other dependent variables of the study at either Time 1 or Time 2 (Figs. 1, 2). On closer examination, however, it may be observed that the correlation between, on the one hand, the child potential abuse and the quality of the home environment, and on the other hand, the children's socio-emotional and cognitive/language development is moderated by the factors of social support (Table 3). In this respect, the variables of social support (formal and informal) were dichotomised into two main categories. The cut-off point was the median, resulting in two new category-type variables: formal support (low vs. high) and informal support (low vs. high). Correlations between the two dependent variables (socio-emotional and cognitive/language) and the two independent variables (child potential abuse and quality of the home environment) were calculated for each of the four sub-groups thus formed. Table 3 shows the partial correlations between the dimensions of child development and the CAPI and HOME, taking into account the two variables of social support. For each type of social support at Time 1, a difference of ≥ 0.23 between the "low support" sub-group and the "high support" sub-group is considered significant. This is particularly the case for the

Table 2 Predictors of socio-emotional/language development (CDAS) for children receiving child welfare services at Time 1 and 2

	CDAS			
	Socio-emotional development		Cognitive/language development	
	Time 1 (N = 184)	Time 2 (N = 160)	Time 1 (N = 181)	Time 2 (N = 134)
PSI—Parental distress	−0.37***	−0.34***	−0.05	−0.14
PSI—Dysfunctional interaction	−0.37***	−0.44***	−0.22**	−0.28**
PSI—Difficulty in children	−0.47***	−0.56***	−0.09	−0.19*
PSI—Parental stress total	−0.48***	−0.53***	−0.13	−0.23**
CAPI	−0.29***	−0.28**	−0.04	−0.12
HOME	0.19**	0.03	0.16*	0.17*
Socio-economic risk	−0.01	0.11	−0.11	−0.08

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

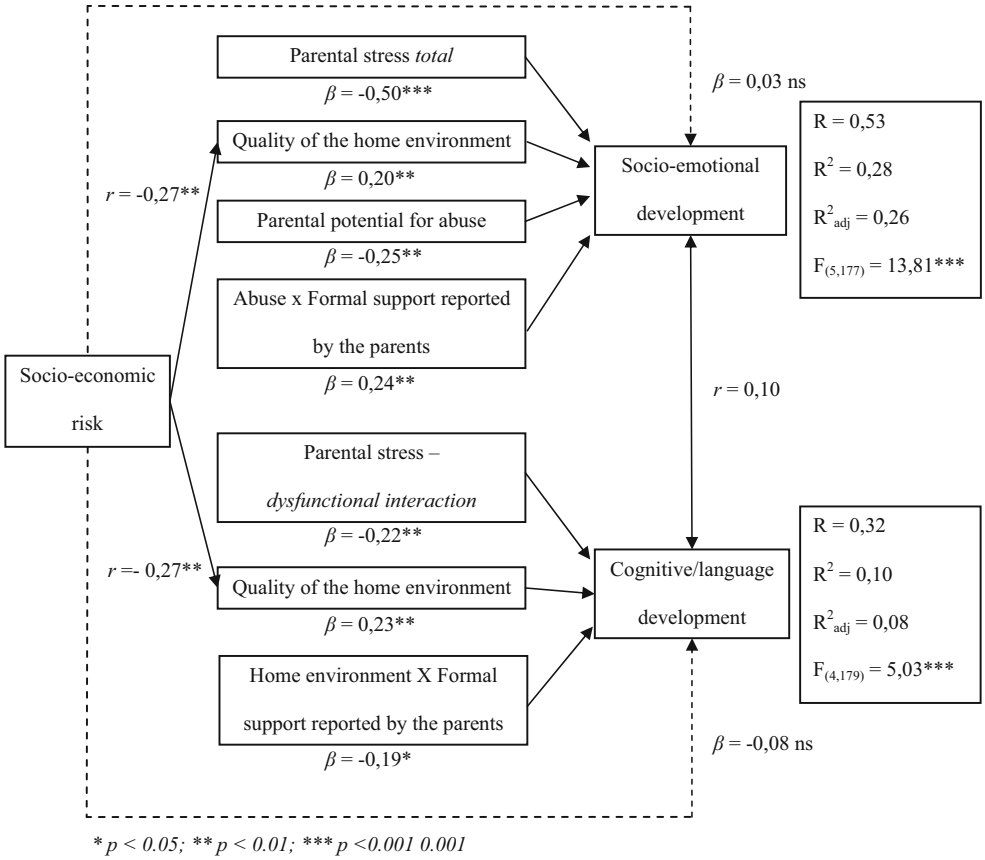

Fig. 1 Path analysis of the predictors of socio-emotional/language development for children receiving child welfare at Time 1

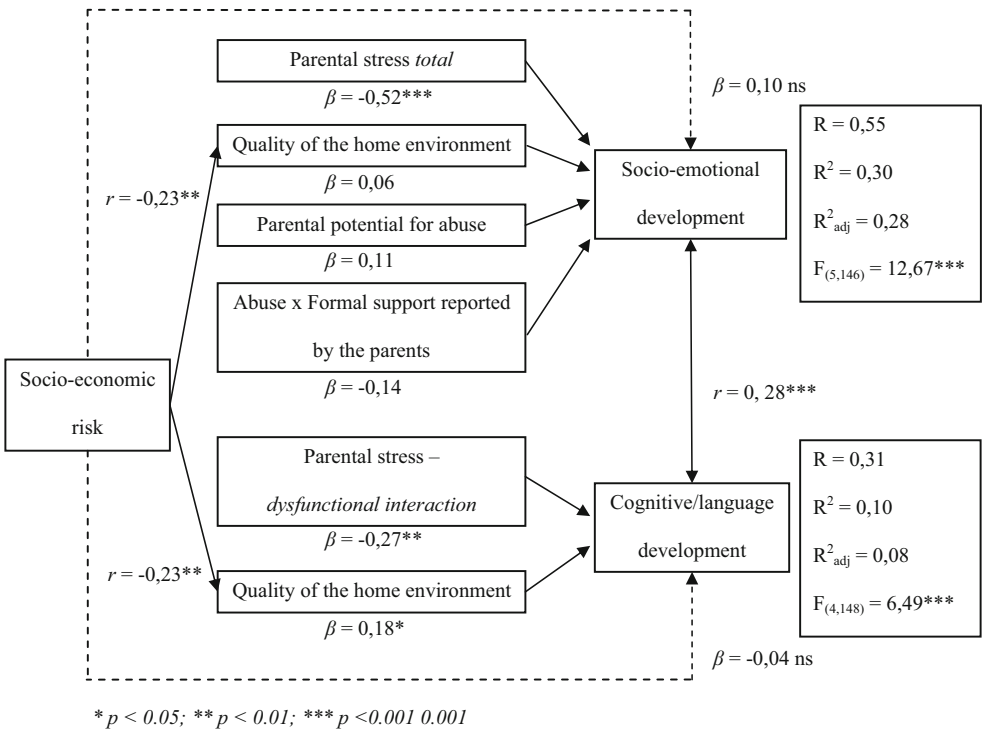

Fig. 2 Path analysis of the predictors of socio-emotional/language development for children receiving child welfare at Time 2

Table 3 Partial correlation between socio-emotional/language development for children receiving child welfare services and CAPI and HOME scores according of the level of perceived support at Time 1 and 2

	CAPI		HOME	
FSS	Time 1 (N = 184)	Time 2 (N = 160)	Time 1 (N = 181)	Time 2 (N = 134)
Socio-emotional development CDAS				
Low formal support	**−0.16**	**−0.05**	0.32**	0.09
High formal support	**−0.45*****	**−0.49*****	0.11	−0.02
Low informal support	−0.30**	−0.16	0.20*	0.01
High informal support	−0.29**	−0.43***	0.10	0.05
Cognitive/language development CDAS				
Low formal support	−0.14	0.04	**0.31****	0.17
High formal support	0.04	−0.26*	**0.08**	0.21
Low informal support	−0.17	−0.02	0.26*	0.21
High informal support	0.11	−0.30*	0.10	0.15

Correlation pairs in bold have significant differences between low and high within each Time

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

relationship between the children's socio-emotional development and the child potential abuse, which seem moderated by the degree of formal support reported by the parents. Only when formal support is high is it possible to observe a significant correlation between these two variables (Time 1: $r = -0.45$, $p < 0.001$); when formal support is low, the correlation is not significant (Time 1: $r = -0.16$, n.s.) This is also the case for the relationship between the children's cognitive/language development and the HOME, which seems moderated by the degree of informal support reported by the parents. Only when formal support is low is it possible to observe a significant correlation between these two variables (Time 1: $r = 0.31$, $p < 0.001$); when formal support is high, the correlation is not significant (Time 1: $r = 0.08$, n.s.) At Time 2, a difference of ≥0.30 between the "low support" sub-group and the "high support" sub-group is considered significant and suggests the presence of a moderating effect. This is particularly the case for the relationship between the children's socio-emotional development and the CAPI, which seem moderated by the degree of formal support reported by the parents. Only when formal support is high is it possible to observe a significant correlation between these two variables (Time 2: $r = -0.49$, $p < 0.001$); when formal support is low, the correlation is not significant (Time 2: $r = -0.05$, n.s.).

Using the data from Time 1, hierarchical multiple regression analyses were performed separately for the two dependent variables (socio-emotional development and cognitive/language development). In the first analysis (socio-emotional development), the independent variables were selected on the basis of bivariate correlations. These variables were socio-economic risk, parental stress (total scale), the HOME, the CAPI, and the CAPI interaction factor × formal support. In the second analysis (cognitive/language development), the independent variables were socio-economic risk, parental stress (dysfunctional interaction), the HOME, and the HOME interaction factor × formal support. The results are presented in Fig. 1. The same analyses were repeated with the data from Time 2, the results of which are presented in Fig. 2.

At Time 1, it can be observed that 28 % of the variance ($R^2 = 0.28$) in the socio-emotional development of the child and 10 % of the variance ($R^2 = 0.10$) in cognitive/language development are significantly explained by the independent variables. Parental stress ($\beta = -0.50$, $p < 0.001$), the HOME ($\beta = 0.20$, $p < 0.01$), the CAPI ($\beta = -0.25$, $p < 0.01$), and the CAPI interaction factors x formal support ($\beta = 0.24$, $p < 0.01$) contributed specifically to the children's socio-emotional development. Parental stress (dysfunctional interaction sub-scale; $\beta = -0.22$, $p < 0.01$), the HOME ($\beta = 0.23$, $p < 0.01$), and the HOME interaction factor x formal support ($\beta = -0.19$, $p < 0.05$) contributed specifically to the children's cognitive/language development. The results at Time 2 show that the percentage of variance explained was essentially the same (as it was at Time 1) for the children's socio-emotional and cognitive/language development. This suggests that all the variables considered contributed to this variance. The specific contribution of parental stress is particularly robust in explaining these two dimensions of child development.

An additional analysis was performed for each subject on the differences observed between Time 1 and Time 2. Table 4 presents the correlations between the changes (T2–T1) for each dependent and independent variable (with the exception of socio-economic risk, reported only at Time 1). The results show that improvement (positive T2–T1) in the

Table 4 Correlations between the differences of CDAS scores at Time 1 and 2 and the socio-economic risk at Time 1, and the differences of the CAPI, the HOME, and PSI scores at Time 1 and 2

	T2 less T1 CAPI	T2 less T1 HOME	T2 less T1 PSI dysfunctional interaction	T2 less T1 PSI parental stress total	Socio-economic risk Time 1
T2 less T1–CDAS socio-emotional development	−0.16*	0.10	−0.32***	−0.37***	−0.15†
T2 less T1–CDAS cognitive/language development	0.07	0.20*	−0.11	−0.14	−0.08

† $p < 0.1$; * $p < 0.05$; *** $p < 0.001$

children's socio-emotional development is associated with a decrease (negative T2–T1) in parental potential for abuse ($r = -0.16$, $p < 0.05$), parental stress–dysfunctional interaction scale ($r = -0.32$, $p < 0.001$), and parental stress–total scale ($r = -0.37$, $p < 0.001$). It can also be observed that improvement in the children's socio-emotional development between Time 1 and Time 2 is marginally correlated with lower socio-economic risk at Time 1 ($r = -0.15$, $p = 0.056$). Table 4 also shows that improvement in the children's cognitive/language development between Time 1 and Time 2 is associated with improvement in the quality of the home environment ($r = 0.20$, $p < 0.05$) during the same period.

Discussion

The majority of the hypotheses advanced in this study were confirmed by bivariate and path analyses. In effect, the parental risk factors of parental stress and, to a lesser extent, child abuse potential were negatively related to the children's socio-emotional development. Furthermore, parental stress was related to cognitive/language development. In general, these factors were associated more with socio-emotional than cognitive development. The robustness of the data is even greater given that two additional analyses were consistent in this regard. Indeed, these trends were replicated for the data at Time 2, the correlations and prediction model proving stable over a period of nearly one and half years. In addition, the decrease in parental risk factors between Times 1 and 2 was associated with an improvement in socio-emotional development but not in cognitive/language development. In general, the risk factors predicted mostly socio-emotional development. Several studies have shown that emotional negativity, parental stress, and family conflict are strongly related to risk of maltreatment (Slack et al. 2011; Stith et al. 2009) and that child victims of maltreatment are more likely to have physical, psychological, cognitive, and behavioural problems in childhood and adulthood (Gilbert et al. 2009a, b; Nikulina et al. 2011). In this sample, the majority of children were victims or at risk of neglect or psychological maltreatment, two problems strongly associated with poor outcomes (Chamberland et al. 2012; Éthier et al. 2004; Lacharité et al. 2006). The stronger relationship with socio-emotional development may be attributed to the fact that this information was self-reported by the parents; it is therefore possible that the more parents perceived their relationship with their child as stressful and difficult the more they were likely to identify difficulties in their child.

The quality of the home environment was positively associated with the children's cognitive/language development at both measurement times, and to a lesser extent, with their socio-emotional development, the latter trend not being confirmed at the second measurement time. These data support the results of several studies carried out with the same instrument (HOME) in population and clinical samples (Bradley et al. 2001; Chazan-Cohen et al. 2009; Harden and Whittaker 2011; Rijlaarsdam et al. 2012; Stahmer et al. 2009). In addition, improvement in the quality of the home environment between pre- and post-test was associated with better performance in cognitive/language tests. Jaffee (2007) also demonstrated that positive changes in the HOME were related to language improvement. The observed relationships are all the more relevant since the instruments used to measure the home environment and cognitive development of the children were administered by two independent observers.

Two factors were not directly associated with outcomes—socio-economic risk and social support—which nevertheless acted indirectly. In this way, socioeconomic risk was inversely related to the quality of the home environment: the higher the quality of the environment, the lower the socio-economic risk. In sum, children of the most disadvantaged families benefited from the least favourable environment. In this study, social support reported by parents seemed to act as a moderator of victimisation potential (CAPI) and the quality of the home environment (HOME). In particular, the less formal social support was seen as helpful, the more the quality of the home environment was positively related to cognitive/language development. This trend was not observed in the second measurement time, however. It seems that in the absence of support, mobilising parents to provide a healthy

environment is vital. Other studies have found that the quality of the home environment protects children from adverse contexts outside the home (Mistry et al. 2008; Mueller et al. 2010; Rijlaarsdam et al. 2012).

Child abuse potential was negatively associated with socio-emotional development when parents perceived formal support as helpful at Time 1. In sum, when parents had positive relationships with one or more practitioners, the observed relationships were in the expected direction: parents who revealed a difficult relationship with their child were more likely to report significant difficulties in the child at the socio-emotional level. This outcome is particularly relevant. A positive perception of the formal support network may indicate a relationship of trust between the parents and practitioners, enabling the parents to reveal a difficult relationship with their child. Moreover, we have already seen that parents who receive preventive services report more parental distress and child abuse potential and perceive their children more negatively compared to parents who receive protective services (Chamberland et al. 2010; Kyte et al. submitted). Whereas, in the first case, parents request assistance, in the second case, parents are provided with court-ordered assistance, which is often characterised by mistrust and involuntariness. As such, parents in the preventive system are more comfortable in their organisational setting (i.e., their community) to share their concerns about their parental role, given that the preventive system is geared more toward family preservation and engaging, building trust, and fostering collaboration with families. More than twice as many families receiving preventive services reported having a positive relationship with formalised support systems compared to families receiving protective services (Chamberland et al. 2010; Kyte et al. submitted). The former may have felt less threatened by the practitioner and more able to candidly report their concerns about their children and their parental role. For families receiving protective services, revealing or even becoming aware of their parental difficulties was more unlikely, given the relationship of authority and coercion generally assumed by child protection workers; these parents were perhaps more guarded about their information out of fear that their concerns would only serve to validate the maltreatment report. This interpretation is consistent with the observations of Lacharité (2011), who emphasises that a significant obstacle to the development of alliances between practitioners and parents is that latter have no means of assessing the consequences of revealing such or such information.

Limitations

There are several limitations to this study. First, the study is based on secondary analysis of data collected as part of a project with a different goal, which was to evaluate the implementation and impact of an intervention. Although it was quite appropriate in this context to use the same sample for answering questions that examine the determinants of child development, the choice of variables was nonetheless based on considerations that limit the scope of the finding made here. In particular, the range of variables examined in the study was modest. Many other relevant variables merit inclusion in a study whose purpose is to understand all the factors influencing child development.

Another limitation is that the measures of parent–child relationships were self-reported and subject to exaggeration or minimisation of symptoms. Triangulation of observations from various sources is a necessary procedure to control for measurement errors in a study such as this.

Another limitation is that the sample of children and families in this study was atypical. It is therefore impossible to generalise the results to the general population. The findings of the study apply only to those children and parents receiving services from public institutions. Situations of psychosocial vulnerability unknown to these institutions were not represented in this study. Finally, the data were collected from French-speaking children living in Quebec, which limits the geographical and linguistic scope.

Conclusion

In general, path analyses support the relevance of ecosystemic analyses of child development (Bronfenbrenner 1976, 1986, 1996, 2001, 2005). Indeed, the prediction of developmental outcomes is the result of interaction between several parental, family (microsystem), social (mesosystem), and economic (exosystem) factors. Rather, it is the combination and interaction of risk factors that predicts problematic development, while protective factors may compensate for the presence of risk factors (Appleyard et al. 2005; Sameroff 2009). More specifically, Bronfenbrenner (1996) PPCT model (process, person, context, time) is especially relevant for understanding child development in a temporal and pathway perspective, in which a decrease in risk factors and improvement in protective factors is associated with improvement in development indicators one and a half years later. In effect, parental stress and potential for victimisation (process), the quality of the home environment, social support, and socio-economic risk (context) at Time 1 (time) helped predict child development at Time 2. The results of this secondary analysis suggest the importance of taking action at several systemic levels to improve the development of vulnerable children. First, direct action with children (e.g., stimulation activities, day-care resources) is essential to prevent or minimise developmental delays. Family intervention aimed at reducing stress and parental distress, improving parenting skills, and

supporting parents in their ability to provide a stimulating, safe, and caring environment for their children is also needed. Furthermore, providing services does not itself guarantee that parents will be supported. Good analyses of family needs, and intervention plans consistent with these analyses, are crucial for engaging parents in a process of change (Chamberland et al. 2013). Finally, reducing socio-economic risk factors can increase the ability of parents to respond to the developmental needs of their children. Parental income, employability, and education, and housing, are areas of intervention inadequately addressed by social workers. Inter-agency collaboration and community involvement are thus crucial. Nevertheless, many obstacles still exist today, in particular, parallel mandates, "siloed" interventions, and training and tools specific to each professional organisation, sector, or discipline.

In short, if we hope to significantly alter the trajectories of children with complex needs, social responses must be coherent (i.e., deriving from a comprehensive and integrated understanding of children's needs), appropriate (i.e., taking into account the level of needs, the obstacles present, and the available resources), and timely (i.e., implemented at the right time in the lives of the children and their entourage) (Aldgate et al. 2006).

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