CHILD & FAMILY SOCIAL WORK

doi:10.1111/j.1365-2206.2012.00894.x

Two-generation preschool programme: immediate and 7-year-old outcomes for low-income children and their parents

Karen Benzies*, Richelle Mychasiuk*, Jana Kurilova*, Suzanne Tough†, Nancy Edwards‡ and Carlene Donnelly§

*Faculty of Nursing, †Departments of Pediatrics and Community Health Sciences, University of Calgary, Calgary, Alberta, ‡School of Nursing and Department of Epidemiology and Community Medicine, University of Ottawa, Ottawa, Ontario, and §Calgary Urban Project Society (CUPS) Health and Education Centres, Calgary, Alberta, Canada

Correspondence:
Karen M. Benzies,
Faculty of Nursing,
University of Calgary,
2500 University Drive NW,
Calgary, AB,
Canada T2N 1N4
E-mail: benzies@ucalgary.ca

Keywords: children, early intervention, longitudinal studies, parenting, poverty

Accepted for publication: June 2012

This research was supported by the Max Bell Foundation.

ABSTRACT

Preschool children living in low-income families are at increased risk for poor outcomes; early intervention programmes mitigate these risks. While there is considerable evidence of the effectiveness of centre-based programmes in other jurisdictions, there is limited research about Canadian programmes, specifically programmes that include children and parents. The purpose of this study was to evaluate a single-site, two-generation preschool demonstration programme for low-income families in Canada. A single group, pre-test (programme intake) /post-test (programme exit) design with a 7-year-old follow-up was used. Between intake and exit, significant improvements in receptive language and global development were found among the children, and significant improvements in self-esteem, use of community resources, parenting stress and risk for child maltreatment were found among the parents. These positive improvements were sustained until the children were 7 years old. Public investment in two-generation preschool programmes may mitigate risks for suboptimal child development and improve parental psychosocial outcomes.

INTRODUCTION

Numerous risks related to economic disadvantage, such as increased maternal depression, harsh parenting and decreased environmental stimulation, consistently predict poor academic achievement and increased behavioural problems for children (Goodman & Gotlib 1999; Lupien *et al*. 2001; Sanchez *et al*. 2001; Ashman *et al*. 2008). Despite the evidence demonstrating that earlier is better with respect to intervention (Shonkoff & Phillips 2001; McCain *et al*. 2007), public investment in children at risk related to economic disadvantage fails to meet the need. In Canada, one of the most affluent industrialized countries, approximately 11% of children live in low-income families (Statistics Canada 2009). Yet, only 0.2% of the gross domestic product is invested in supporting them through the early years (UNICEF 2008). The chances of a Canadian child having access to early education services, that meet a minimum standard of quality, are much lower than many other affluent nations, and options available for families with low income are substantially lower (UNICEF 2008). Furthermore, evidence clearly indicates that without serious intervention effort, at-risk children are prone to problems throughout childhood, are at greater risk for poor health, are more likely to have behavioural problems, underachieve in school and obtain low paying or no employment at all (Willms 2002; UNICEF 2007). Intervention is necessary as these families do not generally improve without help.

Interventions that include parent and family components operate in conjunction with early education programming to reduce the negative impact of low

income (Berlin *et al.* 2001; Papero 2005; Hutchings *et al.* 2007) and potentiate improvements in child development (St. Pierre *et al.* 1995; Reynolds & Temple 2008). Also known as two-generation programmes, these programmes were created to build upon the deficits identified in single-service programmes, and to address the developmental needs of children within the context of family support (St. Pierre *et al.* 1995). Family support models suggest that increased parental investment, improvements in parenting skills and greater resource supports for parents improve child development and resiliency (Walsh 2003; Reynolds & Temple 2008; Benzies & Mychasiuk 2009). Parental involvement in the Chicago Parent Program was associated with decreased behavioural problems (Gross *et al.* 2009), and in the Head Start programme was associated with increased cognitive and social-emotional school readiness for the child (Henrich & Gadaire 2008).

The relationship between school readiness and family income at entry to kindergarten is nearly linear (Barnett & Ackerman 2006). Children growing up in low-income families are simply less likely to be *ready* for school (Barnett & Ackerman 2006). Learning experiences are cumulative, and children who are unsuccessful in the early years tend to do poorly at higher levels (Karoly *et al.* 2005). It is nearly impossible for children who enter school developmentally behind to achieve levels equal to their normally developing peers; genuine *catch-up* actually requires learning to exceed the normative rate (Ramey & Ramey 1998). Consequently, as adults, children who lack school readiness are more likely to be unemployed, involved in the criminal justice system or suffer from mental illness (Poulton *et al.* 2002; Barnett & Hustedt 2005; Karoly *et al.* 2005; Knudsen *et al.* 2006; Duncan *et al.* 2007).

Early childhood intervention programmes vary widely with respect to quality (Early *et al.* 2005; National Forum on Early Childhood Program Evaluation 2007). In order to capitalize on the small investment available for early childhood intervention, funding should be targeted to programmes with demonstrated effectiveness. Components of effective early intervention programmes identified in other jurisdictions include (i) teachers with at least a college degree, preferably in education of young children (Barnett & Ackerman 2006; Schweinhart 2007), (ii) teacher to child ratios of 1:7 with a maximum of 1:13 (Barnett & Ackerman 2006), (iii) full- rather than half-day services (Ackerman *et al.* 2005), (iv) balanced curricula that produce benefit in both academic and social-emotional domains (Barnett & Ackerman 2006) and (v) the involvement of parents (St. Pierre *et al.* 1995; Karoly *et al.* 2005; Henrich & Gadaire 2008; Mistry *et al.* 2010). These components are present in the two-generation preschool programme evaluated in this study.

THE TWO-GENERATION PRESCHOOL PROGRAMME

This two-generation preschool programme was designed to improve early childhood development and promote school readiness by strengthening multiple interrelated aspects of the child's environment including centre-based early learning and parental psychosocial resources. The programme was a privately funded, single-site demonstration project located in the city centre serving approximately 50 children and their parents each year. The ingenuity of this programme stems from the holistic integration of multiple components at one site, and a high level of support to facilitate children's transition to neighbourhood schools following programme exit. Programme components included (i) centre-based, preschool and kindergarten education, (ii) transportation, (iii) nutritious food, (iv) health and developmental assessments and interventions, (v) parenting and life skills education and (vi) family support and counselling during home visitation. The programme was assessed and approved annually by Alberta Children and Youth Services.

Preschool and kindergarten education

Children attended classes 4 days per week, 5 hours per day from early September until late June. For the preschool children, the curriculum was designed to motivate learning and build on known interests. Graphic arts were integrated as tools for cognitive, linguistic, and social development. Teachers provoked ideas and encouraged problem solving; this facilitated learning and helped generate multiple representations of a single concept. For children in kindergarten, the provincial curriculum was used (Alberta Education 2008).

Daily classroom routine was important to promote consistency and stability in the lives of the children. Parents were encouraged to participate in their child's school activities at the centre and at home. Teacher-to-child ratios were maintained at 1:8. Children identified by developmental screening or teacher observation as at increased risk for developmental

delay were further assessed and assisted by on-site developmental specialists (speech and language pathologists, psychologists and occupational and physical therapists). Teachers visited the child and family at home four times per year. During home visits, teachers shared children's successes and provided strategies to improve learning.

Teachers had formal education (diploma or degree in early childhood education) and prior experience in early childhood education, and all staff participated in professional development. School bus transportation was provided because low-income families were geographically dispersed (Heisz & McLeod 2004). Breakfast, lunch and snacks designed around the Canada Food Guide (Health Canada 2007) were supplied and provided 65% or greater of the child's total daily nutritional requirements (unpublished data). A developmental paediatrician and registered nurse held weekly clinics on site. Dental, hearing and vision screening were conducted off site as field trips with services donated by private practices and college training programmes. The programme was a practicum site for undergraduate students in child studies, social work and nursing.

A transition support worker assisted the children and their families with the move to their neighbourhood schools. This support included transfer of documentation and advocacy to continue supports and services for the child, if required. Children who graduated from the programme will have access to a scholarship for post-secondary education. Comprehensive retention strategies were developed to maintain contact with the children and their families (Mychasiuk & Benzies 2011).

Parenting education and family support

This component included a mandatory 6-week series (5 days/week) of parenting and life skills classes at intake to the programme. Group and one-on-one sessions focused on topics such as positive parenting behaviours and strategies to promote optimal child development. Standardized parenting programmes Nobody's Perfect (Health Canada 2003) and 1, 2, 3, Magic (Phelan 2004) were incorporated into the curriculum and offered by certified facilitators. Topics such as stress management, substance abuse, budgeting, household routine, personal health and well-being, healthy pregnancy, job skills and self-esteem were addressed in the life skills portion of the series. Parents received public transit tickets to facilitate attendance. Additional, optional programming was offered throughout the year and included (i) applying for public transit subsidies, (ii) nutrition on a small budget and (iii) recreational activities. Ongoing home visits helped sustain improvements that were obtained at the mandatory parenting sessions.

A social worker visited all families four times per year; families in need received more intensive support. Home visits complemented parenting education classes and were tailored to the individual needs of each family. Family resiliency strategies included goal setting, counselling, community advocacy and connecting families to other community resources. A parent advisory committee met monthly to provide advice to the programme director.

There is strong evidence demonstrating short- and long-term effects, and cost–benefits of early childhood intervention programmes in the USA (Karoly *et al.* 2005; Belfield *et al.* 2006; Young & Richardson 2007). With a few exceptions that have examined immediate outcomes only (Benzies *et al.* 2009, 2011a,b; Skrypnek & Charchun 2009), two-generation programmes in Canada have not undergone rigorous evaluation. Additionally, these studies failed to examine child and parent outcomes simultaneously over the longer term. The purpose of the current study was to evaluate the ability of the two-generation preschool programme to effectively produce and sustain the desired outcomes. The evaluation was designed to answer the following research questions: (i) what are the effects on children's receptive language and global development associated with participating in a two-generation preschool programme? (ii); what effects on parental self-esteem, community life skills, parenting stress and risk for child maltreatment are associated with participating in a two-generation preschool programme?; and (iii) are the identified effects sustained for the children up to the age of 7 years and their parents?

METHOD

Participants and setting

A single group, pre-test (programme intake)/post-test (programme exit) design was used with follow-up when children were 7 years of age. Preschool children and their parents were recruited to the programme through agencies serving families with low income and by word of mouth. The study was completed in parallel but independent of the programme with separate eligibility criteria for participation in the study and the programme. Target age for child entry to the

Table 1 Socio-demographic characteristics of children and their parents at intake

Variable	*N*	Frequency	%	M	Range	SD
Child						
Age intake (months)	109			46.3	33–67	8.7
Age exit (months)	109			68.4	48–72	5.9
Age 7-year follow-up	60			84.2	81–87	1.4
Gender (% male)	109	58	53.2			
First language (% English)	109	85	78.0			
Time in programme (days)	109			267.3	112–433	95.6
Parent						
Age (years)	67			30.82	18–46	6.3
Completed high school	67	42	62.7			
Partnered	60	27	45.0			

Note: Sample size varies because of missing data.

programme was 36 months. Children and their parents were eligible to attend the *programme* if the child had one or more risks for developmental delay and had low income (as determined by tax documentation indicating family income below the low-income cut-off [LICO]). LICO is the annual income level at which families spend 20% or more than the average family of their before tax income on food, shelter and clothing, or approximately $40 000CDN for a family of four (Statistics Canada 2008). Risks for developmental delay included (i) parent mental illness, (ii) addictions within the family or (iii) social isolation. Criteria to remain in the programme included (i) child attended regularly, (ii) parent attended a 6-week education series and (iii) parent volunteered periodically to supervise children on the school bus. Children in foster care were ineligible, unless an older sibling had attended the programme previously. Children and their parents were eligible to participate in the *study* if they were enrolled in the programme for at least 3 consecutive months. Three months was selected so the child had a minimum exposure to early intervention programming and the parent completed the required education series. While this minimum duration for intervention was not ideal, it represented a realistic expectation when studying at-risk populations. Similar to other studies, it was difficult to retain low-income mothers as they often have transient living arrangements and competing demands for resources and time (Katz *et al.* 2001). Despite this minimum requirement, the average time children spent in the programme was 22.25 months (M = 267 days, range = 112–433 days).

Between December 2002 and September 2008, 132 children and 79 parents were enrolled in the study. Of the 132 children, 109 had intake and exit data. Of these, 95 had reached the age of 7 years and were eligible for follow-up at the time of this publication. We contacted and completed the 7-year follow-up with 65 children (68% retention rate at follow-up); 60 children had data at all three time points (intake, exit and 7-year follow-up). For parents of these children, we collected intake and exit data for 67; 38 parents had data at all three time points. See Table 1 for socio-demographic characteristics of children (34.0% Aboriginal; 31.2% other Canadian; 34.8% recent immigrant) and their parents.

Attrition analysis was conducted using analyses of variance (ANOVAs) to determine whether those who participated in the follow-up study differed from the full sample. No significant differences were found in parental age ($P = 0.55$), education level ($P = 0.06$) or marital status ($P = 0.09$) measured at intake. Culture was correlated with participation in the follow-up study ($P < 0.01$), with recent immigrants participating more often than either Aboriginal or other Canadian families.

Procedures

An institutional review board approved the study. Children's receptive language and global development were tested at the childcare centre (intake and exit) or in the child's home or school (7-year follow-up). Only parents who consented were contacted for follow-up. A research assistant first attempted to contact the participant via telephone, and if this was unsuccessful, a letter was mailed to the last known residence asking the participant to contact the research assistant. If still unable to reach the participant, email contact was initiated, in cases where an email address was provided. Searches for contact information were made through databases such as the White Pages. Programme staff were contacted to determine whether they had current knowledge of the participant. If following these traditional methods, locating the

participant was unsuccessful, the social networking site Facebook was used. For detailed description of retention procedures, see Mychasiuk & Benzies (2011).

Research assistants were trained to administer the developmental screening measures; reliability was monitored at each data collection point. Parents completed questionnaires at the centre (intake) and via mailed questionnaires (exit and 7-year follow-up). Interpreters were provided to parents who were unable to complete the questionnaires on their own. For non-responders, a reminder letter was sent home 2 weeks after distribution of questionnaire packages. If there was no response to the letter at 4 weeks, a phone call was made with an offer to replace lost questionnaires. If there was still no response, no further attempts were made to collect the questionnaires. All participants accepted a gift certificate of $40CDN to recognize their time.

Measurement

Measures were selected by a panel of experienced professionals to capture expected outcomes and to accommodate potentially low English literacy among parents. Child measures, Peabody Picture Vocabulary Test (third edition) and Battelle Developmental Inventory Screening Test (second edition; BDI-ST), used age-normed standardized scores to allow for analysis of programme child development without a control group. Age-normed tests are useful in the absence of a control group because they allow individuals to be compared to age or grade – peers, they have high levels of reliability and validity, and they can be used to assess an individual's progress over time, such as re-administration following an intervention (Ornstein 1993). Standardized scores were used for all analyses. For a detailed description of child and parent measures, see Table 2. Socio-demographic information was collected using an investigator-designed questionnaire.

Data analyses

Prior to analysis, we examined data for patterns of missing values. We managed missing values in accordance with recommendations in the users' manuals for each measure. We used repeated measures ANOVAs for continuous level variables (partial η^2 included) and non-parametric Wilcoxon rank test for analysis of scales with rank level variables (Cramer's V included). We conducted post-hoc analyses for data with three time points. We carried out data analyses in SPSS version 19.0 (SPSS Inc., Chicago, IL, USA). To account for multiple comparisons, significance was set at 0.01.

RESULTS

Comparison of scores at intake and exit for children and parents

The comparison of scores between intake and exit for children and parents are illustrated in Tables 3 and 4, respectively. For example, children demonstrated significant improvements in receptive language between intake and exit, $F(1, 108) = 62.38$, $P < 0.0001$, and this improvement was substantiated by the large effect size, partial $\eta^2 = 0.366$ (Cohen 1977).

Comparison of scores at the 7-year-old follow-up for children and parents

The comparison of scores between intake, exit and at 7 years, for children and parents are illustrated in Tables 5 and 6, respectively. Post-hoc analyses are described in the next sections.

Post-hoc analyses for child scores

Child receptive language scores were significantly improved between intake and exit, $t(59) = 5.74$, $P < 0.001$, 95% CI [–12.65, –6.11] and intake and 7 years, $t(59) = 5.18$, $P < 0.001$, 95% CI [–11.12, –4.92], but there was no significant difference in receptive language scores between exit and 7 years, $t(59) = 1.18$, $P = 0.24$, 95% CI [–0.95, 3.68]. With regard to global development, children who participated in the 7-year-old follow-up showed significant improvements over time in communication, $\chi^2(2, n = 52) = 16.62$, $P < 0.001$ and motor development, $\chi^2(2, n = 52) = 7.14$, $P = 0.03$. Children demonstrated a significant improvement between programme intake and exit in cognitive development, but there was a return to intake levels at 7 years, $\chi^2(2, n = 52) = 17.71$, $P < 0.001$. For the personal-social domain, children demonstrated significant improvement between intake and exit, but there was no change at 7 years. With regard to adaptive behaviour, children demonstrated no significant improvements between intake and exit, or between exit and 7 years of age.

Post-hoc analyses for parent scores

There was a significant increase in parental self-esteem between intake and exit, $t(33) = 2.74$, $P = 0.03$,

Table 2 Description of child and parent measures

Measure	Description
Child	
Peabody Picture Vocabulary Test, 3rd edn (PPVT-III)	Standardized (M = 100; SD = 15) observational measure of receptive vocabulary for individuals over 2.5 years (Dunn & Dunn 1997). Higher scores indicate greater receptive vocabulary. Valid for low-income kindergarten children (Washington & Craig 1999). Cronbach's α ranged from 0.92 to 0.98; test-retest reliabilities over 1 month were greater than $r = 0.90$.
Battelle Developmental Inventory – Screening Test, 2nd edn (BDI-ST)	Standardized, 100-item observational measure of global development for children birth to 7 years in five domains: adaptive, communication, cognitive, motor and personal-social (Newborg 2005). Raw scores are used to assign a *pass*, *borderline* or *fail*. BDI-2 full scale is correlated with the Wechsler Preschool and Primary Scale of Intelligence, 3rd edn, $r = 0.65$ to 0.75 (Wechsler 2002). Test-retest reliabilities ranged from 0.77 to 0.90; Cronbach's α ranged from 0.85 to 0.96 (Newborg 2005). For this study, borderline and fail were collapsed; children were assigned pass or fail.
Parent	
Rosenberg Self-Esteem Scale (RSE)	A 10-item, unidimensional, self-report, paper and pencil measure of global self-esteem (Rosenberg 1965) using a 4-point scale. Higher scores indicate greater self-esteem; below 15 is considered in the clinical range. Two-week test-retest reliability was 0.85. Cronbach's α for this study was 0.83. Cronbach's α ranged from 0.74 to 0.80 in different studies.
Community Life Skills Scale (CLSS)	An adaptation of the 33-item binary (*yes/no*) scale originally developed by Barnard (1991) to measure daily life management skills in negotiating the use of community resources. The total score is the sum of all *yes* responses; higher scores indicate greater ability to use community resources. Cronbach's α for this study was 0.67. Cronbach's α ranged from 0.63 to 0.69 in other studies.
Parenting Stress Index-Short Form (PSI-SF)	A 36-item self-report, paper and pencil measure of parenting stress on three subscales: parental distress, parent–child dysfunctional interaction and difficult child and scored on a 5-point Likert scale (Abidin 1995). Higher scores indicate greater parenting stress; scores above 90 are considered in the clinical range. Cronbach's α for this study were 0.82 for parent–child dysfunctional interaction, 0.85 for difficult child, 0.87 for parental distress and 0.93 for total stress. Cronbach's α for the PSI-SF are 0.80 for parent–child dysfunctional interaction, 0.85 for difficult child, 0.87 for parental distress and 0.91 for total stress in other studies.
Adult-Adolescent Parenting Inventory-2 (AAPI-2)	A 40-item, self-report, paper and pencil measure of parenting attitudes associated with child maltreatment on five subscales: inappropriate expectations of children, parental lack of empathy towards children's needs, strong belief in the use of corporal punishment as a means of discipline, reversing parent–child role responsibilities, and oppressing children's power and independence, scored on a 5-point Likert scale (Bavolek & Keene 2001). Standard scores below 3 indicate risk for child maltreatment. Cronbach's α for all five subscales were above 0.80.

95% CI [–4.35, 0.18], and between intake and the 7-year-old follow-up, $t(33) = 2.71$, $P = 0.03$, 95% CI [–4.03, 0.14], but no significant difference between exit and 7 years. Similarly, there was a significant increase in the use of community resources between intake and exit, $t(30) = 3.70$, $P = 0.003$, 95% CI [–4.46, 0.83], and between intake and 7 years, $t(30) = 3.45$, $P = 0.005$, 95% CI [–4.59, –0.70]. However, there was no change in the use of community resources between exit and 7 years. In contrast to the previous pattern of outcomes for parents, there was no significant decrease in parental distress between intake and exit, $t(38) = 2.25$, $P = 0.09$, 95% CI [–0.27, 5.04], but there was a significant decrease in parental distress between intake and 7 years, $t(38) = 3.31$, $P = 0.006$, 95% CI [1.09, 7.84]. Again, there was no significant difference in parental distress between exit and 7 years. For parenting stress related to parent–child dysfunctional interaction or perceiving the child as difficult, there were no significant differences between intake and exit, or between exit and the 7-year-old follow-up. For risk of child maltreatment, post-hoc analysis showed that there was a significant improvement in parental understanding of parent and child roles between intake and exit, $t(37) = 3.32$, $P = 0.006$, 95% CI [–1.53, –0.21], and between intake and 7 years $t(37) = 3.97$, $P = 0.001$, 95% CI [–1.85, –0.42], but there was no difference between exit and the 7-year-old follow-up. Similar to the pattern of change with parental distress, there was a significant improvement between intake and 7 years on parental attitudes towards corporal punishment; $t(36) = 3.01$, $P = 0.01$, 95% CI [–1.74, –0.16], and empathy; $t(37) = 3.83$, $P = 0.001$, 95% CI [–1.66, –0.35]. There were no significant differences between intake and exit or between exit and the 7-year-old follow-up on attitudes

Table 3 Comparison of scores on the PPVT-III and BDI-ST at intake and exit

		Intake		Exit			
Variable	*N**	M	SD	M	SD	*P*	Partial η^2
PPVT-III	109	89.40	18.42	99.6	12.56	<0.01	0.37†
BDI-ST		Frequency	%	Frequency	%	*P*	Cramer's V
Adaptive (% pass)	88	66	75.0	73	83.0	0.18	0.00
Communication (% pass)	88	41	46.6	69	78.4	<0.01	0.18§
Cognitive (% pass)	88	36	40.9	65	73.9	<0.01	0.22§
Motor (% pass)	88	64	72.7	78	88.6	0.02	0.35‡
Personal social (% pass)	88	57	64.7	69	78.4	0.02	0.29‡

Note: PPVT-III, Peabody Picture Vocabulary Test – 3rd edn.; BDI-ST, Battelle Developmental Inventory Screening Test – 2nd edn.
*Sample size varies because of missing data.
†Large effect.
‡Medium effect.
§Small effect.
(η^2; large effect 0.14, medium effect 0.06, small effect 0.01, Cramer's V; large effect 0.50, medium effect 0.30, small effect 0.10. Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences*, 2nd edn. Academic Press: New York, NY).

Table 4 Comparison of scores on RSE, CLSS, PSI-SF and AAPI at intake and exit

		Intake		Exit			
Variable	*N**	M	SD	M	SD	*P*	Partial η^2
RSE	67	20.04	5.45	21.76	4.82	<0.01	0.13†
CLSS	60	23.23	4.94	26.05	4.08	<0.01	0.33†
PSI-SF							
Parent child dysfunction	66	21.46	6.52	21.47	5.99	0.99	0.00
Difficult child	67	28.42	8.09	27.51	8.78	0.34	0.01§
Parental distress	67	29.87	7.84	27.03	7.91	<0.01	0.14†
Total	65	78.43	20.17	76.69	19.89	0.39	0.01§
AAPI-2							
Corporal punishment	67	5.30	2.15	5.77	1.79	0.03	0.07‡
Empathy	67	4.48	2.55	4.80	2.44	0.11	0.04§
Expectations	67	5.81	2.02	6.13	2.02	0.09	0.04§
Power independence	67	5.70	2.47	5.49	2.32	0.44	0.00
Role reversal	66	4.81	2.53	5.49	2.85	<0.01	0.16†

Note: RSE, Rosenberg Self-Esteem Scale; CLSS, Community Life Skills Scale; PSI-SF, Parenting Stress Index-Short Form; AAPI-2, Adult Adolescent Parenting Inventory – 2nd edn.
*Sample size varies because of missing data.
†Large effect.
‡Medium effect.
§Small effect.
(η^2; large effect 0.14, medium effect 0.06, small effect 0.01, Cramer's V; large effect 0.50, medium effect 0.30, small effect 0.10. Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences*, 2nd edn. Academic Press: New York, NY).
RSE, CLSS, & AAPI-2: Higher scores indicate better achievement. PSI-SF: Lower scores indicate positive change.

Table 5 Comparison of scores on PPVT-III and BDI-ST at intake, exit and 7-year-old follow-up

		Intake		Exit		7 years		
Variable	*N**	M	SD	M	SD	M	*SD*	*P*
PPVT-III	60	88.08	16.71	97.47	12.25	96.10	13.41	<0.01
BDI-ST	*N*	Frequency	%	Frequency	%	Frequency	%	*P*
Adaptive (% pass)	52	43	82.7	44	84.6	43	82.7	0.86
Communication (% pass)	52	24	46.2	40	76.9	36	69.2	<0.01
Cognitive (% pass)	52	20	38.5	39	75.0	23	44.2	<0.01
Motor (% pass)	52	38	73.1	48	92.3	43	82.7	0.03
Personal social (% pass)	52	34	65.4	41	78.8	43	82.7	0.08

Note: PPVT-III, Peabody Picture Vocabulary Test-3rd edn; BDI-ST, Battelle Developmental Inventory Screening Test.
*Sample size varies because of missing data.

Table 6 Comparison of scores on RSE, CLSS, PSI-SF and AAPI-2 at intake, exit and 7-year-old follow-up

		Programme intake		Programme exit		7 years		
Variable	*N**	M	SD	M	SD	M	SD	*P*
RSE	34	18.97	4.62	21.24	4.46	21.06	4.32	<0.01
CLSS	31	23.45	3.84	26.10	3.80	26.10	3.45	<0.01
PSI-SF								
Parent child dysfunction	38	22.82	6.62	21.87	6.04	20.53	6.51	0.14
Difficult child	39	29.03	8.01	27.64	7.92	26.82	7.83	0.16
Parental distress	39	29.69	5.46	27.31	7.57	25.23	8.23	<0.01
Total	38	81.03	16.77	77.00	18.99	72.61	19.53	0.01
AAPI-2								
Corporal punishment	37	4.86	2.06	5.43	1.76	5.81	1.56	<0.01
Empathy	38	3.71	2.35	4.26	2.24	4.71	2.49	<0.01
Expectations	38	5.50	1.81	5.92	1.76	6.08	1.96	0.08
Power independence	38	5.40	2.74	5.03	2.53	5.40	2.66	0.45
Role reversal	38	4.11	2.53	4.97	2.92	5.24	3.10	<0.01

Note: RSE, Rosenberg Self-Esteem scale; CLSS, Community Life Skills Scale; PSI-SF, Parenting Stress Index-Short Form; AAPI-2, Adult Adolescent Parenting Inventory – 2nd edn.
*Sample size varies because of missing data.
RSE, CLSS, & AAPI-2: Higher scores indicate better achievement. PSI-SF: Lower scores indicate positive change.

towards corporal punishment and empathy. For parental attitudes towards child independence and expectations of the child, there were no significant differences across any of the time points.

DISCUSSION

The two-generation preschool programme reported here was designed to optimize early development for children living in low-income families, and to promote school readiness by strengthening multiple aspects of the child's environment. The holistic integration of multiple programme components at one site, and a high level of support to facilitate children's transition to neighbourhood schools following programme exit contribute to its innovation. Evaluation of the programme demonstrated that children experienced improvements in receptive language and global development. Parents of these children demonstrated improvements in self-esteem, use of community resources, parenting stress

and risk for child maltreatment, stabilizing the home environment and increasing parental psychosocial resources. Many of these improvements were sustained at the 7-year-old follow-up.

Preschool children in this culturally diverse programme demonstrated an increase in their receptive language scores of 10 points or 2/3 of a standard deviation, and these improvements were substantiated with a large effect size (Cohen 1977). This level of improvement was equivalent to that found in an intensive literacy intervention programme implemented with Head Start children in the USA (Wasik *et al.* 2006). It is consistent with other preschool programmes that have identified medium to large effects on language and cognitive development (Karoly *et al.* 2005; Wasik *et al.* 2006; Reynolds & Temple 2008). Receptive language has been used as a proxy for school readiness (Human Resources and Social Development Canada & Statistics Canada 1996; Kohen *et al.* 2002). Children entered this two-generation with receptive language scores nearly one standard deviation below the average child, and exited the programme with a score close to the average child. This suggests that the programme may be achieving its goal of improving school readiness by helping children begin school on a level playing field (Ramey & Ramey 1998).

In the past, there was a general belief that screening tests were ineffective to capture change (Elbaum *et al.* 2010). That is, screening tests were considered appropriate to determine specific intervention pathways or to categorize individuals into different groups, but not to measure individual changes over time. Recent research has determined that certain screening tests, including the BDI-ST, can provide sufficient information to measure changes over time (Elbaum *et al.* 2010). Using results from the BDI-ST, children participating in this two-generation preschool programme demonstrated improvements in global development. There was a significant reduction in the number of children who failed to meet normal developmental milestones on the communication, cognitive, motor and personal-social subscales between programme entry and exit. The programme had a small to medium (Cohen 1977) positive influence on these four domains. This effect size is consistent with the medium effects commonly reported in the literature for social-emotional development (Barnett & Ackerman 2006; Reynolds & Temple 2008). Furthermore, these effects were sustained until age 7 years for communication, motor and personal-social domains. Cognitive and social-emotional functioning are believed to affect school readiness and evidence indicates that these domains can be modified early in life with effective intervention (Hertzman & Wiens 1996). Early improvements in these areas help produce long-term gains by smoothing the transition to school, increasing positive attitudes towards school by making learning more efficient and reducing the need for special education classes (Hertzman & Wiens 1996; Heckman 2006). Consistent with other research (Lally 1988), the social-emotional effects stemming from this intervention programme appear to be more durable and long lasting than the gains in the cognitive domain of the BDI-ST. This gain in not trivial however, as social-emotional functioning is a significant predictor of school readiness and life-long achievement (Shonkoff & Phillips 2001; Heckman 2006).

There has been very little research on parental outcomes associated with interventions for low-income families and even less evidence exists with respect to programme effects on parental traits (Friend *et al.* 2009). Findings from this study can contribute useful information with respect to programme effects and the sustainability of these changes once families leave the programme. For parents, positive differences were found in self-esteem, use of community resources, parental distress and parenting attitudes related to corporal punishment and appropriate parent–child roles. The medium and large effect sizes (Cohen 1977) identified for these psychosocial resources for parenting substantiated our belief that a two-generation preschool programme could be associated with positive outcomes for parents living with low income. In addition, parental distress continued to decrease after families left the programme, at least up to the 7-year follow-up. These longer-term improvements may be associated with increased use of community resources and more developed social support networks. Early family environments are major predictors of child cognitive and non-cognitive abilities (Heckman 2006). Improvements in parenting skill appear to be a key mechanism for changing child behaviour (Gardner *et al.* 2006), and parenting practices have been shown to moderate the effects of child development in low-income families (Mistry *et al.* 2002, 2010; Yeung *et al.* 2002). Thus, the improvements in parental psychosocial coping resources identified in this study may contribute to healthy child development in the short and longer term. Improvements in self-esteem, better use of community resources, more positive attitudes towards discipline and greater understanding of appropriate roles, along with decreased parental distress may be mediating factors in promoting sustained developmental outcomes in children that require further study.

Strengths and limitations of the study

The key strength of the study was that child developmental outcomes were observed in multiple domains by an independent evaluator. This provided a rigorous evaluation of important childhood milestones believed to predict school readiness. An additional strength was the 7-year-old follow-up assessment of the children and their parents. While programme effectiveness (change in outcomes between intake and exit) is critical, sustainability of outcomes should be the goal of any early intervention programme. In this study, a large, representative proportion of the original sample was assessed several years after children and their parents left the programme, and positive outcomes were sustained.

This study provides a significant contribution to understanding of the effects of an innovative Canadian two-generation preschool programme on child and parent outcomes, but with limitations. First, given the known effectiveness of early intervention for children living in low-income families, it was considered unethical to create a no-intervention control group. Similarly, it was unethical to create a delayed-entry control group. The programme attempted to accommodate all at-risk families, and on the rare occasion a family could not be accommodated, families with the lowest risk were referred elsewhere. It was also not possible to create a comparison group of families that selected a different means of childcare because we would not have been able to control for the effects of the childcare programme. The lack of comparison group permits a correlational claim regarding the programme and outcomes. However, we have utilized methods that permit validation of the data without a comparison group, and believe the findings demonstrate actual benefits for children and their families associated with the programme. A final limitation to the study was the use of self-report measures for analysis of parental psychosocial coping resources. Self-report measures are subject to response bias and future studies should consider using researcher observations to complement parent report measures. For example, an observational measure of parent–child interaction should be considered for future studies.

Implications for policy and practice

The study findings have important implications for policy-makers who invest in early intervention services for children and families living with low income. Given that the results obtained for the two-generation preschool programme reported here and an intensive literacy programme (Wasik *et al*. 2006) were similar, it may be more beneficial to invest in a two-generation preschool programme with greater outreach than intensive literacy programmes. This may reduce the high rate of referrals for speech and language delays and subsequent costs for intervention. Given that the programme was successful at improving developmental outcomes for programme children with diverse backgrounds, the programme could be implemented in culturally diverse communities. This study also illustrated that carefully designed components for parents have the ability to strengthen their psychosocial coping resources. Strengthening parenting knowledge and skills may be the reason that we failed to see the typical fade-out effects associated with child language and global development improvements in other programmes (Anderson *et al*. 2004).

CONCLUSIONS

In summary, this study demonstrated that improvements in multiple domains of child development and parental psychosocial resources were associated with participation in an innovative two-generation preschool programme. The benefits from this programme were sustained at least until follow-up at age 7 years, suggesting that there may be enduring effects. Given that cost–benefit analyses have indicated that investment in the early years has substantial societal return, especially when the intervention is highly effective (Barnett & Ackerman 2006; Heckman 2006; Knudsen *et al*. 2006), efforts should be made to have thoroughly evaluated programmes, such as this one, more accessible and available to Canadian preschool children living in low-income families.

REFERENCES

Abidin, R.R. (1995) *Parenting Stress Index: Professional Manual*, 3rd edn. Psychological Assessment Resources, Odessa, FL.

Ackerman, D.J., Barnett, W. & Robin, K. (2005) *Making the Most of Kindergarten: Present Trends and Future Issues in the Provision of Full-day Programs*. National Institute for Early Education Research: New Brunswick, NJ.

Alberta Education (2008) *Kindergarten Program Statement*. Available at: http://education.alberta.ca/media/312892/kindergarten.pdf (accessed June 2011).

Anderson, K., Foster, J. & Frisvold, D. (2004) *Investing in Health: The Long-term Impact of Head Start*. Vanderbilt University: Nashville, TN.

Ashman, S., Dawson, G. & Panagiotides, H. (2008) Trajectories of maternal depression over 7 years: relations with child

psychophysiology and behavior and role of contextual risks. *Development and Psychopathology*, **20** (1), 55–77.

Barnard, K. (1991) *Community Life Skills Scale*. NCAST Publications: Seattle, WA.

Barnett, W. & Hustedt, J. (2005) Head Start's lasting benefits. *Infants and Young Children*, **18** (1), 16–24.

Barnett, W.S. & Ackerman, D.J. (2006) Costs, benefits, and long-term effects of early care and education programs: recommendations and cautions for community developers. *Community Development: Journal of the Community Development Society*, **37** (2), 86–100.

Bavolek, S.J. & Keene, R.G. (2001) *Adult-adolescent Parenting Inventory (AAPI-2): Administration and Development Handbook*, 3rd edn. Family Development Resources Inc, Asheville, NC.

Belfield, C.R., Nores, M., Barnett, S. & Schweinhart, L. (2006) The High/Scope Perry Preschool Program: cost-benefit analysis using data from the age-40 follow-up. *The Journal of Human Resources*, **41** (1), 162–190.

Benzies, K. & Mychasiuk, R. (2009) Fostering family resiliency: a review of the key protective factors. *Child & Family Social Work*, **14,** 103–114.

Benzies, K., Tough, S., Edwards, N., Nagan, K., Nowicki, B., Mychasiuk, R. *et al*. (2009) Effects of a two-generation Canadian preschool program on parenting stress, self-esteem, and life skills. *Early Childhood Services*, **3** (1), 19–32.

Benzies, K., Edwards, N., Tough, S., Nagan, K., Mychasiuk, R., Keown, L.A. *et al*. (2011a) Effects of a two-generation preschool programme on receptive language skill in low-income Canadian children. *Early Child Development and Care*, **181,** 397–412.

Benzies, K., Tough, S., Edwards, N., Mychasiuk, R. & Donnelly, C. (2011b) Aboriginal children and their caregivers living with low income: outcomes from a two-generation preschool program. *Journal of Child and Family Studies*, **20,** 311–318.

Berlin, L.J., Brooks-Gunn, J. & Aber, J.L. (2001) Promoting early childhood development through comprehensive community initiatives. *Children's Services: Social Policy, Research & Practice*, **4** (1), 1–24.

Cohen, J. (1977) *Statistical Power for the Behavioral Sciences*. Academic Press, New York.

Duncan, G.J., Dowsett, C., Claessens, A., Magnuson, K.A., Huston, A.C., Klebanov, P.K. *et al*. (2007) School readiness and later achievement. *Developmental Psychology*, **43** (6), 1428–1446.

Dunn, L.M. & Dunn, L.M. (1997) *Peabody Picture Vocabulary Test – Third Edition Manual*. American Guidance Services, Circle Pines, MN.

Early, D., Barbarin, O., Bryant, D., Burchinal, M., Chang, F., Clifford, R. *et al*. (2005) *Pre-Kindergarten in Eleven States: NCEDL's Multi-state Study of Pre-kindergarten and Study of State-wide Early Education Programs (SWEEP)* (NECDL Working Paper). FPG Child Development Institute: Chapel Hill, NC.

Elbaum, B., Gattamorta, K. & Penfield, R. (2010) Evaluation of the Battelle Developmental Inventory, 2nd edition, screening test for use in states' child outcomes measurement systems under the individuals with disabilities education act. *Journal of Early Intervention*, **32** (4), 255–273.

Friend, A., Summers, J.A. & Turnbull, A. (2009) Impacts of family support in early childhood intervention research. *Education and Training in Developmental Disabilities*, **44** (4), 453–470.

Gardner, F., Burton, J. & Klimes, I. (2006) Randomized controlled trial of a parenting intervention in the voluntary sector for reducing child conduct problems: outcomes and mechanisms of change. *Journal of Child Psychology & Psychiatry, and allied disciplines*, **47** (11), 1123–1132.

Goodman, S. & Gotlib, I. (1999) Risk for psychopathology in the children of depressed mothers: a developmental model for understanding mechanisms of transmission. *Psychological Review*, **106** (3), 459–490.

Gross, D., Garvey, C., Julion, W., Fogg, L., Tucker, S. & Mokros, H. (2009) Efficacy of the Chicago Parent Program with low-income African-American and Latino parents of young children. *Prevention Science*, **10,** 54–65.

Health Canada (2003) *Working with Nobody's Perfect: A Facilitator's Guide*, 3rd edn. Canadian Government Publishing, Ottawa, ON.

Health Canada (2007) *Eating Well with Canada's Food Guide (No. Cat: H164-38/1-2007E)*. Minister of Health: Ottawa, ON.

Heckman, J.J. (2006) Skill formation and the economics of investing in disadvantaged children. *Science*, **312** (5782), 1900–1902.

Heisz, A. & McLeod, L. (2004) *Low-income in Census Metropolitan Areas, 1980–2000*. Statistics Canada, Ottawa, ON.

Henrich, C. & Gadaire, D. (2008) Head Start and parent involvement. *Infants and Young Children*, **21** (1), 56–69.

Hertzman, C. & Wiens, M. (1996) Child development and long-term outcomes: a population health perspective and summary of successful interventions. *Social Science and Medicine*, **43** (7), 1083–1095.

Human Resources and Social Development Canada & Statistics Canada (1996) *Growing up in Canada: National Longitudinal Survey of Children and Youth*. Statistics Canada, Ottawa, ON.

Hutchings, J., Gardner, F., Bywater, T., Daley, D., Whitaker, C., Jones, K. *et al*. (2007) Parenting intervention in Sure Start services for children at risk of developing conduct disorder: pragmatic randomised controlled trial. *BMJ (Clinical Research Ed.)*, **334** (7595), 678–684.

Karoly, L.A., Kilburn, M.R. & Cannon, J.S. (2005) *Early Childhood Interventions: Proven Results, Future Promise*. RAND Corporation, Santa Monica, CA.

Katz, K., El-Mohandes, A., McNeely Johnson, D., Jarrett, M., Rose, A. & Cober, M. (2001) Retention of low-income mothers in a parenting intervention study. *Journal of Community Health*, **26** (3), 203–218.

Knudsen, E., Heckman, J., Cameron, J. & Shonkoff, J.P. (2006) Economic, neurobiological and behavioural perspectives on building America's future workforce. *Proceedings of the National Academy of Sciences of the United States of America*, **103** (27), 10155–10162.

Kohen, D.E., Brooks-Gunn, J., Leventhal, T. & Hertzman, C. (2002) Neighborhood income and physical and social disorder in Canada: associations with young children's competencies. *Child Development*, **73** (6), 1844–1860.

Lally, R.J. (1988) More pride, less delinquency: findings from the ten year follow-up study of the Syracuse University Family Development research program. *Zero to Three*, **8,** 13–18.

Lupien, S., King, S., Meaney, M. & McEwen, B. (2001) Can poverty get under your skin? Basal cortisol levels and cognitive function in children from low and high socioeconomic status. *Development and Psychopathology*, **13** (3), 653–676.

McCain, M.N., Mustard, F.J. & Shanker, S. (2007) *Early Years Study 2: Putting Science into Action*. Council for Early Child Development: Toronto, Ontario.

Mistry, R., Benner, A., Biesanz, J., Clark, S. & Howes, C. (2010) Family and social risk, and parental investments during the early childhood years as predictors of low-income children's school readiness outcomes. *Early Childhood Research Quarterly*, **25,** 432–449.

Mistry, R.S., Vandewater, E.A., Huston, A.C. & McLoyd, V.C. (2002) Economic well-being and children's social adjustment: the role of family process in an ethnically diverse low-income sample. *Child Development*, **73** (3), 935–951.

Mychasiuk, R. & Benzies, K. (2011) Facebook: an effective tool for participant retention in longitudinal research. *Child: Care, Health and Development*. Online 1 September 2011. doi: 10.1111/j.1365-2214.2011.01326.x

National Forum on Early Childhood Program Evaluation (2007) *Early Childhood Program Evaluations: A Decision-maker's Guide*. Centre on the Developing Child, Harvard University: Boston, MA.

Newborg, J. (2005) *Battelle Developmental Inventory*, 2nd edn. Riverside Publishing, Itasca, IL.

Ornstein, A. (1993) Norm-referenced and criterion-referenced tests: an overview. *NASSP Bulletin*, **77** (28), 28–39.

Papero, A.L. (2005) Is early, high-quality daycare an asset for the children of low-income, depressed mothers? *Developmental Review*, **25** (2), 181–211.

Phelan, T. (2004) *1-2-3 Magic: Effective Discipline for Children 2–12*. Parentmagic, Glen Ellyn, IL.

Poulton, R., Caspi, A., Milne, B.J., Thomson, W.M., Taylor, A., Sears, M.R. *et al*. (2002) Association between children's experience of socioeconomic disadvantage and adult health: a life-course study. *Lancet*, **360** (9346), 1640–1645.

Ramey, C.T. & Ramey, S.L. (1998) Prevention of intellectual disabilities: early intervention to improve cognitive development. *Preventive Medicine*, **27,** 224–232.

Reynolds, A. & Temple, J. (2008) Cost-effective early childhood development programs from preschool to third grade. *Annual Review of Clinical Psychology*, **4,** 109–139.

Rosenberg, M. (1965) *Society and the Adolescent Self-image*. Princeton University Press, Princeton, NJ.

Sanchez, M., Ladd, C. & Plotsky, P. (2001) Early adverse experience as a developmental risk factor for later psychopathology: evidence from rodent and primate models. *Development and Psychopathology*, **13** (3), 419–449.

Schweinhart, L. (2007) Outcomes of the High/Scope Perry Preschool study and Michigan School Readiness program. In: *Early Child Development: From Measurement to Action* (eds M. Eming Young & L.M. Richardson), pp. 87–102. The World Bank, Washington, DC.

Shonkoff, J.P. & Phillips, D.A. (2001) From neurons to neighborhoods: the science of early childhood development – an introduction. *Zero to Three*, **5,** 4–7.

Skrypnek, B.J. & Charchun, J. (2009) *An Evaluation of the Nobody's Perfect Parenting Program: Final Report*. Canadian Association of Family Resource Programs: Ottawa, Canada.

St. Pierre, R.G., Layzer, J.I. & Barnes, H.V. (1995) Two-generation programs: design, cost, and short-term effectiveness. *The Future of Children*, **5** (3), 76–93.

Statistics Canada (2008) *Low Income Cut-offs for 2007 and Low Income Measures for 2006*. Available at: http://www.statcan.gc.ca/pub/75f0002m/2012002/lico-sfr-eng.htm (accessed July 2012).

Statistics Canada (2009) *School-age Population Living in Low-income circumstances*. Available at: http://www.statcan.gc.ca/pub/81-599-x/81-599-x2009004-eng.htm (accessed July 2012).

UNICEF (2007) *Child Poverty in Perspective: An Overview of Child-wellbeing in Rich Countries (Innocenti Report Card 7)*. UNICEF Innocenti Research Centre, Florence.

UNICEF (2008) *The Child Care Transition, Innocenti Report Card 8*. The United Nations Children's Fund, Florence, Italy.

Walsh, F. (2003) Family resilience: a framework for clinical practice. *Family Process*, **42** (1), 1–18.

Washington, J. & Craig, H. (1999) Performances of at-risk, African-American preschoolers on the Peabody Picture Vocabulary Test-III. *Language, Speech, and Hearing Services in Schools*, **30,** 75–82.

Wasik, B., Bond, M. & Hindman, A. (2006) The effects of a language and literacy intervention on Head Start children and teachers. *Journal of Educational Psychology*, **98** (1), 63–74.

Wechsler, D. (2002) *Wechsler Intelligence Scale for Children – Third Edition (WPPSI-III)*. Psychological Corporation, San Antonio, TX.

Willms, J.D. (2002) *Vulnerable Children: Findings from Canada's National Longitudinal Survey of Children and Youth*. The University of Alberta Press, Edmonton, AB.

Yeung, W.J., Linver, M.R. & Brooks-Gunn, J. (2002) How money matters for young children's development: parental investment and family processes. *Child Development*, **73** (6), 1861–1879.

Young, M.E. & Richardson, L.M. (2007) *Early Child Development: From Measurement to Action – A Priority for Growth and Equity*. The World Bank, Washington, DC.