

# Design, Implementation, and Outcomes of a School Readiness Program for Diverse Families

*Janette Pelletier and Carl Corter*

## Abstract

This study describes the design, implementation, and outcomes of a school-based readiness program for prekindergarten children (4-year-olds) and their families. The program was designed on the basis of a collaborative model of university-school partnership, and the program itself featured relationship-building between families and schools. The research examined the implementation of the readiness program across sites and examined potential outcomes by following the children into kindergarten. Results on implementation showed that parents' goals differed according to whether families spoke English as a first or second language and that teachers' goals evolved over time to emphasize partnership rather than direct instruction. Results also suggested that directly assessed outcomes were tied to the quality of interactions among teachers, parents, and children, as well as to other aspects of program quality that varied across sites. Direct outcome measures also revealed differences between child participants and a comparison group who did not participate in the school-based readiness program and between families who spoke English as a first or second language. The interpretation of the findings on implementation and outcomes is discussed from the standpoint of methodological alternatives to randomized, control experiments. A case is made for examining multiple measures that tap context and process variables that may mediate and moderate connections between programs and outcomes.

Keywords: readiness, parent involvement, early childhood, kindergarten

## Introduction

The period of early childhood has received unprecedented public and political attention over the last decade, with particular interest in how readiness for school can be fostered during the preschool period (e.g., Pelletier & Corter, in press; Pianta, Kraft-Sayre, Rimm-Kaufman, Gercke, & Hiffins, 2001). At the same time, parent partnerships and involvement in early childhood programs and in schools have shared the spotlight (e.g., Corter & Pelletier, 2005; Epstein & Sanders, 2002). There are some research examples of how targeted efforts during the preschool program can engage parents to boost children's readiness in literacy and self-management (e.g., Lonigan & Whitehurst, 1998; Webster-Stratton, Reid, & Hammond, 2001) but fewer studies that assess more general approaches to bringing children, parents, and schools into partnerships that involve mutual learning as children enter school. This study sought to examine the design, implementation, and impact of a general approach to bringing preschoolers and parents into schools to work directly with kindergarten teachers. The research employed elements of design research (e.g., Cobb, Confrey, DiSessa, Lehrer, & Schauble, 2003) with multiple measures over time to assess the implementation and later impacts, and to provide feedback to the teachers and school district. Particular attention was paid to possible mediating processes between program and outcome as well as to contextual variables. "Process" is often overlooked in evaluations of interventions and programs, even when these evaluations meet RCT (randomized control trial) or quasi-experimental standards (e.g., Chatterji, 2004). Since programs may need to be adapted to fit local contexts, monitoring processes that have been linked to positive outcomes is one way to ensure better results.

There are many empirical demonstrations that naturally-occurring differences in involvement among parents are correlated with variations in their children's school readiness or achievement, but it is harder to find evidence that programmatic efforts to increase parent involvement have the effect of increasing student achievement. For example, in a meta-review of 34 studies evaluating parent involvement programs, Mattingly, Prislun, McKenzie, Rodriguez, and Kayzar (2002) found little hard evidence that the programs had impact on student achievement. Many more studies had too little information to evaluate; for example, outcomes were limited to parent or teacher satisfaction with no student outcomes. There have been other meta-reviews with similar conclusions of "weak to moderate effects" of parent involvement on student achievement or children's development in preschool programs (Wang, Haertel, & Walberg, 1995; White, Taylor, & Moss, 1992). On the other hand, meta-reviews with more positive conclusions on the effects of parent involvement have appeared (Graue, Weinstein, & Walberg, 1983; Jeynes, 2003).

Positive results have been found for programs that simultaneously modify preschool children's environments in both home and school, such as interventions in which parents and teachers are simultaneously trained in the same approaches to interacting with children. In one example, Webster-Stratton, Reid, and Hammond (2001) trained Head Start teachers and parents of 4-year-olds in a preventative child management approach. Later observations showed that children whose parents and teachers were trained in the program were less likely than control children to have behavior problems at home and at school. Observations of teachers and parents pointed to the processes that may have led to these effects. Mothers who had been in the program became more positive in their parenting styles, and teachers became more effective in managing the classroom. Interestingly, parents and teachers felt more "bonded" with each other following the intervention. Continuity in home and school programming has also been shown to support children's early literacy development as well. Lonigan and Whitehurst (1998) compared different combinations of parents and/or teachers reading to children after being trained in an interactive approach to book reading. In settings where teachers complied with the program, the combination of home and school programming had more positive effects on some aspects of language development than programming in school alone or home alone.

The mixed results on the effectiveness of engaging parents point to the need to consider process in particular contexts. To be effective, parent involvement promotion through practice and policy needs to go beyond whether parents are involved; it needs to focus on how they are involved and what happens as a result. What does the parent do differently, and what does the teacher do differently? How do the child's interactions and environment change as a result? How do these changes affect the child's attitudes, emotions, and thinking that contribute to academic gains or more general developmental gains? How does the child learn directly as a result of these interactions and experiences? In short, what is parent involvement and what are the processes that might link it to children's outcomes? There is surprisingly little research examining how different forms of parent involvement change children's environments and their learning or motivation, and almost no research that shows how context may alter these links.

The project in this study was intended to build long-lasting collaboration among schools, families, and communities (cf., Pianta et al., 2001). The research approach addressed Reynolds' (2004) points about the need for "confirmatory" evidence on early childhood interventions in which evidence is linked to causal mechanisms of change. Specifically, it examines the implementation and outcome conceptualizations of 14 parenting and readiness centers

for prekindergarten children (4-year-olds) and their parents in one school district. It is ecologically driven in that it examines the realities of who participates in these programs and what results in the child and parent environments. The employment of multiple measures of teacher and parent goals, program quality, and child readiness are in keeping with recommendations for reliable and robust sources of information about readiness (Bredekamp, 2000) and on program process and context, as well as outcomes (Cobb, et al., 2003). Measures of child readiness include direct assessment measures, interviews with children, parent ratings, and teacher ratings using a broad-based developmental measure (Offord & Janus, 1999). The methodology also includes a design experiment or action research approach to the sharing of information among parents, teachers, and researchers, including goals for children and goals for parents.

The program model grew out of a local effort in a school board in the Greater Toronto Area. In order to connect to all parents and support school readiness, a visionary principal had cooperated with community partners to create a parent-child drop-in center as part of the school. His goal was to involve more parents who were recent immigrants learning English as a second language (ESL) by bringing them into the school before their child actually began kindergarten. The center became a hub for preschool readiness and community service programs to provide an integrated curriculum for young children and parents. Readiness was fostered and examined at many levels, including the child, the family, and the community. The success of the center, as reported by parent and professional participants documented in a university-led case study evaluation (Corter, 2001), propelled the school board to create 14 new centers for 4-year-olds, their parents, and younger siblings. The research on the programs was intended to provide rich descriptions of the processes by which such an intervention makes an impact on children's readiness and to examine the myriad demographic and programmatic factors that are tied to those outcomes. Thus the research questions were as follows:

- How was the program designed and implemented? What did the centers look like, and how did the program environments differ across centers?
- What were teachers' goals in setting up and implementing their programs? Did the goals change over time regarding the focus on curriculum goals for children versus goals to support parents in teaching their child?
- What were parents' goals in participating in the programs with their children? Did the parents' goals differ for the diverse linguistic and cultural groups; that is, did parents who spoke English as a second language (ESL) have goals that differed from English-speaking parents? What did parents perceive as the most beneficial aspects of the programs?

- Were there any “readiness” effects on children’s outcomes the following year in kindergarten (5-year-olds), after their participation with their parent in the prekindergarten readiness program? Did variations across program environments (i.e., quality) predict children’s outcomes the following year? Was there a difference for ESL and English-speaking children in regard to the impact of the program?

The first three sets of questions, on program design/implementation and goals of parents and teachers, were answered with data collected from 14 readiness centers over a two-year implementation period. The outcome effects in kindergarten question was answered by collecting data on children from 10 of the readiness centers in the year following their center participation.

## Methods

### Participants

#### *Readiness Centers*

The program was designed to be universal, but in many of the implementation sites there were significant demographic risk factors. Overall, more than half of the families in the study sample were recent immigrants and spoke a language other than English. The data on programs, teachers, and parents were collected over two years. There were 10 Readiness Center (RC) teachers in Year 1 and 14 teachers in Year 2, including the original 10. All teachers were female and were experienced at the kindergarten level. Participants also included 313 parents and their 4-year-olds; 89% of parents were mothers, 7% were fathers, and the remaining 4% were grandparents or caregivers. Ninety parents brought younger siblings to the Readiness Center along with their 4-year-old child. More than 50% of the parents spoke a language other than English: 70 spoke an East Indian language including Hindi, Punjabi, Gujarati, and Urdu; 29 spoke Tamil; 13 spoke Chinese; 8 spoke Vietnamese; 47 spoke another language that was only represented once in the sample. Each parent-child dyad participated for one 12-week session.

#### *Kindergarten*

Participants in the kindergarten follow-up included 17 kindergarten teachers from the 10 schools where the initial 10 RCs were located. All were female and had more than two years teaching experience. Teachers participated by providing ratings of children’s readiness. There were also 186 kindergarten children and their parents. Parents participated by rating their children’s readiness.

Children ranged in age from 48 months to 71 months with a mean age of 64.4 months; 85 were girls and 101 were boys. About 50% of the kindergarten children spoke English as a second language but were competent enough in English to participate in the study. The second language groups of the children included 36 East Indian and Pakistani (Hindi, Punjabi, Gujarati, and Urdu), 22 Tamil, 13 Chinese, 7 Vietnamese, 7 Eastern European, 5 Arabic, and 3 Western European. Of the children who participated, one group had attended the Readiness Center in the school the preceding year (n=43); one group had not attended the Readiness Center but had some other form of preschool program experience (n=81); and the third group had no preschool or Readiness Center experience (n=62).

Efforts were made to collect family demographic data including parents' occupation and type and level of education and/or level of training. However, many parents did not return the demographic forms. Analyses were carried out with the subsample from whom demographic forms were returned (n=30) to examine whether there were sociodemographic differences between the Readiness Center and No Readiness Center families. For the subsample, there were no demographic differences between the groups. In addition, this subsample matched the demographic profile of families with children of this age in the school catchment areas as described by data from the 1996 Canadian census, suggesting that the outreach efforts by the Readiness Center schools were successful in attracting a representative range of families to the centers. Outreach efforts included translated flyers in grocery stores and residential mailboxes, personal invitation by the principal via an older sibling or cousin, and storybook reading by teachers to mothers and their preschoolers in the laundry rooms of local apartment buildings. Such efforts helped these diverse families feel welcome, and gradually they began bringing their children to the school.

## Procedures

Readiness Center data collection took place throughout the first and second years of the project. Readiness Center programs were generally 12 weeks in duration; families participated in registered programs two half-days per week and could participate in a drop-in program once a week. Most families participated three half-days per week. During each 12-week session, parents were interviewed by researchers who were on site. Translators were available when necessary (often parent volunteers), although most ESL parents were able to understand and communicate in the one-on-one interview. Readiness Center teachers initially participated in weekly telephone interviews as they were setting up their programs; once the programs were established, teachers

completed a brief open-ended questionnaire at the end of each 12-week session. Field notes were maintained by researchers throughout the two years in the Readiness Centers; these notes included general observations and conversations with teachers and parents, as well as observations on the weekly meetings of Readiness Center teachers and one or two researchers.

In addition to the ongoing parent and teacher data collection, each Readiness Center was visited by a team of two researchers on one day for the purpose of collecting information about the early childhood learning environments using the ECERS-R and running records for describing the use of time, space, people, and materials in the programs.

Kindergarten data collection took place at all schools with Readiness Centers in the fall term of Year 2. All parents of kindergarten children in participating classes received information letters and consent forms. The return rate was approximately 60%. Parents of participating children completed a one-page questionnaire about their child's school readiness in six areas: physical development, printing, knowledge of letters, knowledge of numbers, getting along with adults, and getting along with other children. Kindergarten teachers in all schools except one agreed to complete the Early Developmental Inventory (EDI, version 5a, Offord & Janus, 1999) in the fall term of Year 2. The EDI is a widely-used Canadian school readiness measure. It is based on teacher ratings of children's development in five areas (see Measures section). All participating kindergarten children were also given a battery of developmental readiness tasks, which took approximately 40 minutes to administer.

## Measures

### *Readiness Center Environment Rating*

The ECERS-R (Harmes, Clifford, & Cryer, 1998) provides subscale scores in each of seven areas: space and furnishings (space), personal care routines (routines), language-reasoning (language), activities, interaction, program structure (program), and parents and staff (adults). (Words in parentheses are those used in the analyses here.) A total score was also derived.

### *Readiness Center Teacher Interview/Questionnaire*

The teacher interviews were carried out by telephone once each week during Year 1. In Year 2 teacher data were collected at the end of each Readiness Center session using a questionnaire. Categories of questions covered reflections on the previous week, goals for the coming week, challenges and celebrations, and strategies to be used in working with parents and their children. (A copy of the questionnaire is available from the first author.)

### *Readiness Center Parent Interview*

The parent interviews were carried out once with each parent who agreed to participate. The interview took place during the Readiness Center program while the children were engaged in activities. Categories of questions covered parents' goals for themselves and their child in participating in the program, aspects of the program they enjoyed, strategies for teaching that they learned from the teacher, and feelings about being their child's "first teacher." (A copy of the interview protocol is available from the first author.)

## **Kindergarten Outcome Measures**

### *Direct Child Outcome Measures*

Each participating child was given a battery of readiness tests and activities. Individual children were tested in a familiar room close to the classroom.

1. Vocabulary. The Vocabulary Subtest of the Stanford-Binet Intelligence Test-Revised (Thorndike, Hagen, & Sattler, 1986). The first part of the vocabulary test asked children to look at a drawing and to tell what it was. The second part of the test asked children to define a word, for example, "envelope." Raw scores ranged from 2-23 ( $M=13.81$ ,  $SD=4.92$ ).

2. Early Reading. The Test of Early Reading Ability (TERA-2; Reid, Hresko, & Hammill, 1989). The TERA-2 measures three areas of children's beginning reading development: knowledge of letters and sounds, knowledge of environmental print, and knowledge of print conventions, for example, where to begin and end reading. Raw scores ranged from 2-33 ( $M=13.57$ ,  $SD=6.47$ ).

3. Early Number Sense. A number sense task (Case, 2000) that measures children's development in the understanding of number across three cognitive developmental levels: predimensional, unidimensional, and bidimensional. Items included counting poker chips, sorting and counting chips by color, knowing which piles have more and less, understanding what number comes before, after, two before, two after, etc. Raw scores ranged from 1-26 ( $M=12.37$ ,  $SD=4.51$ ). (A copy of this measure is available from the first author.)

4. Printing. Children were asked to copy 18 alphabet letters on a standard form. This was a shortened version of the Printing Performance School Readiness Test (Simner, 1989). Scoring was carried out according to standardized procedures. Scores ranged from 0-18 ( $M=13.20$ ,  $SD=4.50$ ).

5. School “Scripts:” Puppet Interviews. In order to include the views of kindergarten children in assessing readiness as some have advocated (e.g., Dockett & Perry, 1999, 2001; Ramey, Lanzi, Phillips, & Ramey, 1998), large puppets were used to interview each child about his or her understanding of kindergarten. For example, the puppet said, “I am a new kid at school. Tell me about kindergarten from the time you get to school until you go home.” Children’s “scripts” (Nelson, 1986; Fivush, 1984; Pelletier, 1999) were analyzed for content (what they mentioned) and for complexity (how many events were reported). Scores ranged from 0-33 reported events ( $M=7.13$ ,  $SD=4.94$ ).

### *Kindergarten Teacher Ratings—Early Development Instrument (EDI)*

Kindergarten teachers at 9 of the 10 initial schools where the Readiness Center programs were housed in Year 1 agreed to complete the EDI (Early Development Instrument) for each participating child in the class. The EDI is widely used in many jurisdictions in Canada to provide community-based information about children’s school readiness (Janus & Offord, 2000). It is a teacher rating scale that provides subscale readiness scores in each of five areas: physical health and well-being, emotional maturity, social competence, language and cognition, and communication and general knowledge. Although this measure was developed as an aggregate measure of readiness for community populations of children, the test developers consented to its use as an individual measure since it is a teacher rating scale completed for individual children.

### *Parent Rating Scale*

Parents of participating children completed a detailed one-page questionnaire about their child’s readiness for school in six areas: physical development, printing, knowledge of letters, knowledge of numbers, getting along with adults, and getting along with other children. Each parent rated these dimensions on a 3-point scale: less ready than other children, about the same as other children, or more ready than other children. In addition, parents completed a demographic information form that included children’s preschool experiences or Readiness Center experiences, if any.

## **Coding and Analysis**

### *Readiness Center Data*

The ECERS-R was administered and scored according to standardized procedures. Scores were calculated for each of seven areas: space, routines,

language development, activities, interaction, program features, and attention to adults. These seven scores were means calculated on the basis of the number of items scored in each area. Finally, a total score was calculated for each Readiness Center by adding the mean scores across all seven dimensions.

Information from parent interviews and from teacher questionnaires and interviews was coded to elucidate goals. Parent goals were categorized as academic learning, social development, learning routines, and learning English. Teacher goals were coded as literacy, numeracy, and parent education. Interrater reliability for scoring the categories listed above was carried out by two independent raters. Agreement was 100% for both the parent and teacher goals.

*Kindergarten Data*

Children’s outcome measures in vocabulary, early mathematical understanding, early reading, metacognitive understanding, and school scripts (number of events) were coded as total raw scores. A total Child Outcome score was also computed as the sum of these scores (range 12-94,  $M=49.78$ ,  $SD=15.8$ ). Children’s scores on the Early Developmental Instrument (EDI) were calculated by the instrument developers, who were given the raw data from the rating scales. Children’s scores on the EDI were calculated as five separate scores, one for each area of the EDI. There was a maximum of 10 points for each subscale, for a possible total of 50 points. The five areas were: physical health and well-being, emotional maturity, social competence, language and cognition, and communication and general knowledge. See Table 1 for range, means, and standard deviations on EDI subscale and total scores.

Table 1. Range, Means, and Standard Deviations for EDI Subscale and Total Scores

	N	Min.	Max.	Mean	SD
Physical well-being	149	5.42	10.00	8.33	1.1278
Social competence	149	3.65	10.00	8.12	1.6559
Emotional maturity	148	3.93	10.00	7.85	1.4183
Language and cog devt	149	1.15	10.00	7.21	2.1486
Communication and general knowledge	149	1.11	10.00	6.61	2.3334
Total EDI	149	17.20	49.64	38.09	6.9626

Parents' ratings of their children's readiness were completed in six areas on a 3-point scale: less ready than other children, about the same as other children, or more ready than other children. The six areas were: physical development, knowledge of numbers, knowledge of letters and sounds, printing, gets along with adults, and gets along with other children. Total scores ranged from 6.0 to 18.0 ( $M=13.48$ ,  $SD=2.33$ ).

## Results

**Research Question 1: How was the program designed and implemented? What did the centers look like and how did the program environments differ across centers?**

The prekindergarten Readiness Centers (RCs) were registered programs, typically of 12 weeks in duration, housed in the school. The programs were taught by qualified teachers who had experience at the kindergarten level. The curriculum was based on the Ontario standard kindergarten program, specifically on the literacy and numeracy learning expectations. The rooms were large kindergarten classes with the addition of spaces, furniture, and learning materials for adults, for example, parenting information and community service contact information, comfortable sofas and chairs, and access to coffee and tea. The centers included specific programs for parents, for example, *Nobody's Perfect* (Vanderplatt, 1988), the community library, health care programs, and recreation contacts and services. All children in the program were accompanied by a parent or caregiver.

Classes ranged in size across centers, depending on attendance. Generally there were about 10-12 child-parent dyads; often a number of younger siblings were brought along to take part. Thus the range of class size for parents and children together was approximately 20-30. Parents generally participated in the daily "lesson" or circle time along with their children and then accompanied their children to the various activity centers for follow-up or free-play activities.

Teachers explained the concepts to be taught, why the methodology was appropriate for the age of the children, and how to extend these concepts into the home. During activity time, teachers spent time in individual or small group interaction in order to extend learning, model teaching strategies for parents, or read stories to children while parents participated in parent-only activities. In the parent-only activities, community-service representatives provided specific programs based on the requests and needs of the parents in each center; thus each center varied in the degree to which particular community agencies were

represented and, as recommended by Pianta et al. (2001), they did not follow a “one-size fits all” model. Most centers had 2- or 3-day/week programs; thus one center might have a Monday/Wednesday morning, a Tuesday/Thursday morning, a Monday/Wednesday afternoon, and a Tuesday/Thursday afternoon session. This allowed four different groups of parents and children to attend each week. In addition, some centers included a drop-in half-day program on Fridays. Parents and children in previous or upcoming sessions could attend these additional Friday classes. In cases where capacity was reached, the drop-in program operated on a first-come, first-served basis.

In order to capture another perspective on programs, the Early Childhood Environment Rating Scale—Revised (ECERS-R; Harms, et al., 1998) was administered. This measure provides a quantitative “quality” score in each of seven subscales: Space and Furnishings, Personal Care Routines, Language-Reasoning, Activities, Interaction, Program Structure, and Parents and Staff/Attention to Adults. Table 2 provides a breakdown of scores for each center.

Table 2. ECERS-R Subscale and Total Scores Across Schools

School	Space	Routines	Language	Activities	Interaction	Program	Adults	Total
1	6.63	5.75	6.5	4.67	6.2	4.67	5.5	5.7
2	6.25	5	5.25	3.78	6	6	6	5.32
3	6	4.8	5.5	5.1	6	6.67	5.25	5.54
4	6.25	5.4	5.75	4.4	5	4.33	4.75	5.15
5	5.14	3.8	4.25	3.6	5.25	3	5	4.27
6	5.13	4.6	4.5	4.4	6	3.33	4.25	4.69
7	5.13	3.2	5	4.33	5.2	3	4.5	4.45
8	5.75	4.4	5	3.33	5.6	6.33	5.67	4.98
9	6	5.2	5.25	4	5.8	6.33	5.25	5.26
10	5.5	5.75	5.5	4.56	5.4	5.33	4.5	5.16

*Environment Ratings Across Centers*

The total ECERS-R means ranged from 4.27 to 5.70 across the 14 Readiness Centers. When Readiness Centers were compared on the individual subscales, wide variation was found across Centers (see Table 2 for subscale and total scores across Centers).

**Research Question 2: What were teachers’ goals in setting up and implementing their programs? Did the goals change over time regarding the focus on curriculum goals for children versus goals to support parents in teaching their child?**

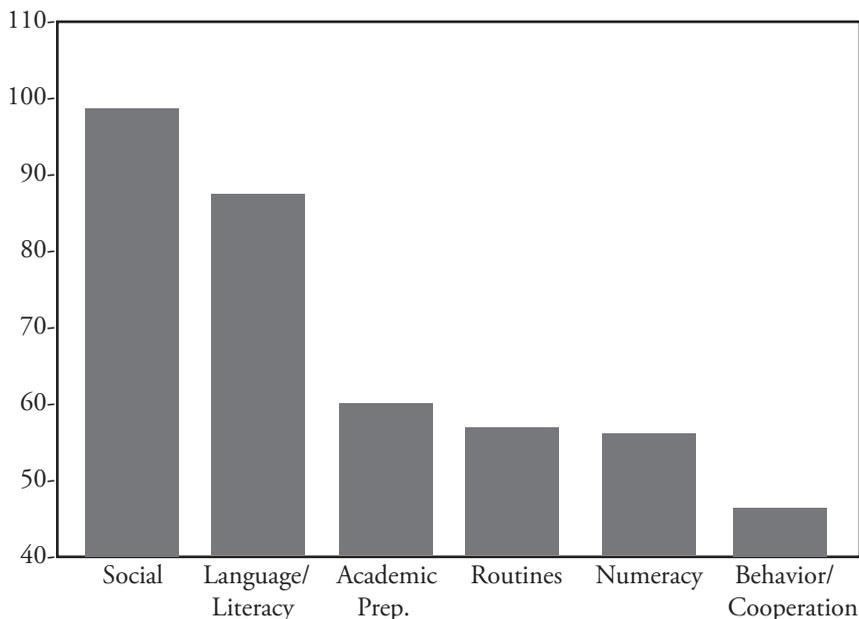
*Teacher Reports on Program*

Researchers and teachers met regularly at the school district head office to share progress, record goals, and to make plans for the next month. Field notes were taken at meetings to record teachers' group planning, and individual teachers were interviewed weekly about their goals for the next week. Teachers were also asked weekly in Year 1 and after each session in Year 2 to describe their upcoming short-term goals for the program. Teachers reported the following goals in order of frequency: children's language and literacy, children's numeracy, children's socialization, parenting programs, planning for parents, more parent drop-ins, parent language and literacy, parent numeracy, professional development, outreach to hard-to-reach families, and more craft ideas for families. Early on in the program, curriculum goals for children were reported much more often than goals for parents. Teachers initially were concerned about "getting the curriculum covered," but this concern lessened over time as more attention was given to parents in the program. Teachers reported that by teaching and modeling "how to teach" parents, the parents were in turn more able to help their child understand the curriculum content. Thus teachers' goals became increasingly parent- and family-focused, and workshops for parents were geared to their specific interests and needs based on the teachers' growing understanding.

**Research Question 3: What were parents' goals in participating in the programs with their children? Did the parents' goals differ for the diverse linguistic and cultural groups; that is, did parents who spoke English as a second language (ESL) have goals that differed from English-speaking parents? What did parents perceive as most beneficial and enjoyable in the programs?**

Parents were interviewed about their goals for their children and for themselves in attending the Readiness Center programs. Their responses were categorized into the following areas: socialization for child; learning routines; academic preparation for kindergarten; language/literacy; numeracy; general learning; behavior and cooperation. Across all families, "socialization" and "language and literacy" were reported as the most important goals for children (see Figure 1).

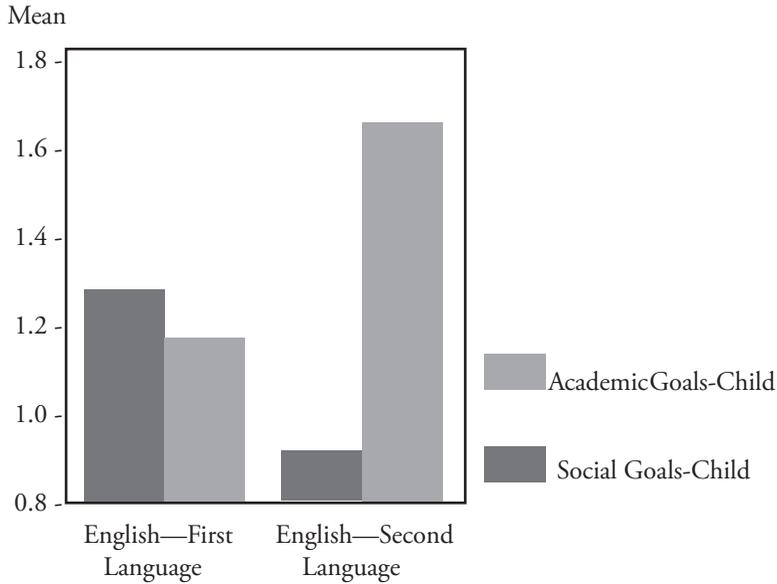
Figure 1. Parents' Goals for Children at the Readiness Centers



English-speaking and ESL parents were compared on academic and social goals. A total score for academic goals was computed, summing goals for academic preparation, language/literacy, numeracy, and general learning. A total score for social goals was computed by summing goals for child’s socialization and behavior/cooperation. It was found that English-speaking parents reported significantly more social goals ( $M_{\text{English}} = 1.26, SD = .86, M_{\text{ESL}} = .904, SD = .81, F = 8.47, p < .005$ ) and that ESL parents reported significantly more academic goals ( $M_{\text{ESL}} = 1.64, SD = .95, M_{\text{English}} = 1.16, SD = .84, F = 13.36, p < .001$ ) (see Figure 2).

Parents were asked to report what they valued most about coming to the Readiness Centers. Across all parents, the relationship with the teacher was reported as being the best part of the Readiness Center program. Other aspects that parents valued were the activities, socialization with other parents, learning, making their child happy, the toys, and the “break.” When English-speaking and ESL parents were compared, there were significant differences between the groups. English-speaking parents more often reported that they enjoyed “socializing” and ESL parents more often reported that they enjoyed “learning” ( $p < .05$ ).

Figure 2. Comparison of English First and Second Language Goals for Children



**Research Question 4: Were there any readiness effects on children the following year in kindergarten (5-year-olds), after their participation with their parent in the prekindergarten readiness program? Was there an effect of variations among program environments (i.e., quality) on children’s outcomes the following year? Was there a difference for ESL and English-speaking children in regard to the impact of the program?**

Child outcomes in kindergarten in the year following the intervention were assessed directly by assessment of children’s performance, indirectly by teacher ratings on the Early Developmental Instrument (EDI), and by parent ratings. Each of these three sources of outcome information included multiple dimensions and multiple scores (for areas such as language, social skill, numeracy, etc.). A first step in the analysis was to sum the scores from each source creating total scores for: (1) Observed Child Outcomes, (2) Teacher Rating—EDI, and (3) Parent Rating.

### Environment Ratings and Child Outcomes

A question concerning the Readiness Center experience and outcomes was whether variations in quality across the Readiness Centers, as indexed by the ECERS-R, would relate to differences in outcomes the following year among children with Readiness Center experience. When ECERS-R total and sub-scale scores in Year 1 were correlated with Total Direct Child Outcome scores

in Year 2, positive correlations were found with Interaction and Program (see Table 3). Interaction involved the quality of the teacher-child relationship, and Program involved the quality of the academic program. No significant correlations were found between any ECERS-R measures and either Total EDI Teacher Ratings or Total Parent Ratings.

Table 3. Correlations Among Total Child Outcome Score and ECERS-R Subscale Ratings\*

	Child Outcomes	Space	Routines	Language	Activity	Interaction	Program	Adults
Child Outcomes	1.000	.030	.032	-.015	-.056	.342 *	.309 *	.180
Space		1.000	.706 **	.807 **	-.002	.022	.653 **	.610 **
Routines			1.000	.658 **	.263	.101	.445 **	.164
Language				1.000	.408 **	-.307 *	.428 **	.157
Activity					1.000	-.064	-.141	-.589 **
Interaction						1.000	.507 **	.426 **
Program							1.000	.798 **
Adults								1.000

\*Correlation is significant at the 0.05 level (2-tailed).

\*\* Correlation is significant at the 0.01 level (2-tailed).

### Participation in Readiness Centers and Language Status as Factors in Overall Outcomes

A major question in this study was whether Readiness Center experience might improve outcomes for children who otherwise would not have had preschool experience. Thus, the following analyses focus on comparisons between children whose only preschool experience had been attending a Readiness Center program with their parent the preceding year (n=43) and children who had no preschool experience of any type (n=62). This comparison was designed as the clearest test of the possible effects of the Readiness Center intervention, since Readiness Center children who had no other preschool were compared with other children who had no other preschool. The remaining 81 children in the study had some other form of preschool experience (e.g., licensed group care, nursery school), including 13 children with Readiness Center experience plus other preschool; this group is included in a separate analysis. ESL was included as a factor in most of the analyses since the effectiveness of any intervention may vary for different cultural groups.

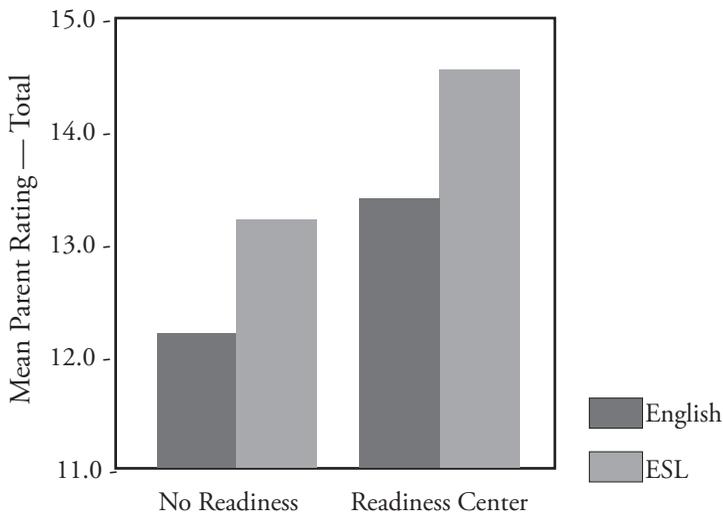
In the following analyses, 2 x 2 ANOVAs were conducted on the various outcome measures, with the factors of Readiness Center experience (RC experience only versus no preschool) and ESL status (ESL versus English-speaking). On Total Direct Child Outcomes, there were significant effects of both RC experience and ESL (respectively,  $F=4.89$ ,  $p<.05$  and  $F=8.90$ ,  $p<.005$ ). Children who had RC experience had higher mean scores compared to those with no preschool experience, and ESL children had lower mean scores than non-ESL children. Although the effect of RC experience appeared to be greater among ESL children, the interaction between the RC and ESL factors did not reach statistical significance ( $F=2.94$ ,  $p=.090$ ) in this or most subsequently reported ANOVAs. A limiting factor in finding statistically significant interactions may have been the unequal distribution of participant numbers across groups in these analyses ( $n = 13$  for no RC/English-speaking; 20 for RC/English-speaking; 49 for no RC/ESL; and 21 for RC/ESL).

#### *Indirect Measures of Child Outcome*

Total EDI Teacher Ratings and Total Parent Ratings provided less clear evidence on effects of the RC and ESL factors. Total EDI scores did reveal a marginal effect of ESL status ( $F=3.40$ ,  $p=.068$ ), with somewhat lower scores among ESL children, but no effects of RC experience. In contrast, Total Parent Ratings did show a clear effect of RC experience ( $F=4.54$ ,  $p<.05$ ). Interestingly, the parent ratings also showed a marginal effect of ESL status ( $F=3.17$ ,  $p=.080$ ), but in the opposite direction to both the teacher EDI ratings and the Direct Child Outcomes. Mean ratings by ESL parents were somewhat higher than mean ratings by English-speaking parents (see Figure 3).

Given that the three sources of outcome information differ somewhat in the dimensions that were included, it is not surprising that total scores for the sources revealed somewhat different patterns for effects of readiness center experience and language background.

Figure 3. Comparison of English First and Second Language Parents' Ratings of Child Readiness



*Other Preschool Experience and Child Outcomes*

A set of analyses was carried out to examine whether children who had another form of preschool experience prior to kindergarten would have similar outcome scores in the direct assessments and in the EDI as children who had the Readiness Center experience for only 12 weeks the previous year. Some children had multiple forms of other preschool experience such as center childcare, nursery school, and home care. In this report, univariate ANOVAs examined the factors of Other Preschool and Readiness Center on Total Direct Child Outcomes. It was found that children with Other Preschool were similar to children with RC-only experience and to those with both RC experience and other preschool (Other Preschool  $M=55.1$ ,  $SD=15.8$ ; RC-only  $M=53.0$ ,  $SD=14.1$ ; both RC and Other  $M= 53.2$ ,  $SD=12.2$ ). In contrast, children with No Readiness experience had significantly lower scores ( $M=42.3$ ,  $SD=14.3$ ;  $F=11.8$ ,  $p<.001$ ).

Similar analyses examined preschool experience on total EDI scores. Again, there was no difference among children with Other Preschool experience and Readiness Center Only children (Other Preschool  $M=37.3$ ,  $SD=8.1$ ; RC-only  $M=39.7$ ,  $SD=6.2$ ). Although children with No Readiness experience had lower scores on the EDI ( $M=36.8$ ,  $SD=7.5$ ) as compared to children with Other Preschool, this difference only approached significance ( $p<.08$ ).

When the factor of ESL was considered in the No Readiness, Other Preschool, and Readiness Center Only analyses with Total Direct Child Outcomes and with Total EDI, an interaction effect was found for Direct Child Outcomes, but not for EDI. ESL children with No Readiness had lower scores than all other groups ( $M=39.4$ ,  $SD=14.4$ ,  $n=49$ ). Mean scores for other groups were: 53.2 ( $SD=7.4$ ,  $n=13$ ) for English-speaking/No Preschool children; 54.3 ( $SD=19.2$ ,  $n=12$ ) for ESL/RC-only children, and 53.1 ( $SD=8.3$ ,  $n=14$ ) for English-speaking/RC-only. ESL children in general scored significantly lower than English-speaking children ( $F=7.5$ ,  $p<.01$ ), and ESL children who had Readiness Center experience but no other preschool scored significantly higher than other ESL children ( $F=4.9$ ,  $p<.05$ ). Taken together, the results show that ESL children with No Readiness/No Preschool experience are the least ready, as measured by Direct Child Outcomes.

## Discussion

This two-year longitudinal study capitalized on and contributed to a pilot initiative in one school board by examining the effects of an innovative classroom-based preschool program for 4-year-olds and their families on school readiness. The research approach and findings are consistent with Reynold's theory-driven methodology for Confirmatory Program Evaluation (CPE; Reynolds, 2004). The theory in this case emphasizes the ecology of family-school partnerships and relationships in helping children make the transition to school. Reynold's (2004) criteria for interpreting findings according to a CPE framework involve: (1) consistency, (2) specificity, (3) gradient (dosage-response), and (4) coherence.

### Consistency Criterion

Beginning with Reynold's notion of "consistency," the findings of more positive kindergarten outcomes for children with Readiness Center experience, compared to those with No Readiness experience, suggests a consistent story line in which the enhanced quality of interactions led to cascading effects seen the following year in kindergarten. The multiple sources of data collected from the programs, teachers, and parents suggest a number of potential mediators for positive outcomes seen among children who attended Readiness Centers with their parents. Going beyond program and potential outcomes to explore process was a major aim of this study. The program included direct learning activities for the child and opportunities for parent learning that may have supported further child learning. Parents had opportunities to learn

about the prescribed curriculum and to see good teaching modeled by experienced kindergarten teachers. Parents' views were also heard by teachers who adapted their programs to connect to parents' goals and to cultural differences. By understanding what parents want through an informal needs assessment, this program may have been particularly successful for these culturally diverse families. As Garcia and Hasson (2004) advocate, having a picture of what participants want, employing welcoming recruitment strategies, and using culturally sensitive practices with meaningful activities are key to a successful program. The interactions and respectful relationships between the teachers and parents may have also been key to benefits for children. A study of parent efficacy and involvement showed that participation in a parent readiness program actually increased parents' feelings of self-efficacy and their involvement in their child's learning both at school and at home (Pelletier & Brent, 2002). Given the literature connecting parent feelings of efficacy to child outcomes, this is an important mechanism through which the relatively brief Readiness Center program may have had cascading effects leading to higher child outcomes. Similarly, the establishment of positive relationships between teachers and parents may be another important mechanism, as discussed below.

### **Gradient Criterion**

Reynold's (2004) point about "gradient" was evidenced in the environment ratings in each of the centers. ECERS-R scores revealed that each center had strengths in areas suitable to that community. For example, centers located in neighborhoods where there were many recent immigrants to Canada had higher ECERS-R scores in the "Meeting Diversity" factor than did centers where there was comparatively low recent immigration. Centers with smaller space scored equally well in program components and interaction subscales; thus there was no "ideal space," although, not unexpectedly, teachers expressed wishes for more space. Correlations between environmental features and child outcomes the following year at the same schools revealed that the two most important preschool environment components for child success were interaction between teacher and child and quality of the academic program. The finding that quality of teacher-child interaction was related to child outcomes the following year is not surprising. Studies have pointed to interaction quality as key, including an exemplary kindergarten practice study, which reported that teacher-child interaction is the single most important dimension of what parents and educators regard as exemplary practice (Corter & Park, 1993). Although teachers in the present study were experienced, committed educators, there was enough variability in the ECERS-R dimensions to reveal some association with child outcomes the following year.

### Specificity Criterion

Reynold's (2004) criterion of "specificity" was evidenced in specific findings for specific language groups. This kind of specificity is another way of elucidating the ecology of context for programs and exploring how group memberships may moderate the effect of interventions. For example, parents' goals for themselves and for their children were examined in relation to ESL status. There were significant differences between ESL and English-speaking parents' goals for participation in the programs, the most obvious being ESL parents' wishes to learn English themselves, along with their children. Other differences were parents' goals for academic preparation versus socialization. Although both groups reported having academic and social goals for their children, ESL parents reported significantly more often that academic preparation for schooling was their primary goal for their child, and English-speaking parents reported significantly more often that socialization was their primary goal for their child. This is additional evidence that goals for schooling and concerns about readiness are perceived differently for different language and cultural groups, a finding that others have reported as well (de Carvallo, 2001; Diamond, Reagan, & Bandyk, 2000; Greenfield, Quiroz, & Raeff, 2000; Lopez, Sanchez, & Hamilton 2000).

### Coherence Criterion

The study in general tells a story that in Reynold's (2004) model is "coherent." In addition to the breadth and depth of converging evidence from parents and children, teachers also increasingly mentioned over the first year of the program that the most effective way to help prepare children for school was to work in partnership with the parents. Their program strategies included making explicit invitations to parents in class to do an activity with their child, providing one-on-one activities for parents and children, exchanging goals, creating a culturally-diverse environment, providing positive feedback to parents for their involvement, modeling effective teaching, and making time to talk with parents about child development and learning. Teachers constructed their own parent education curriculum to complement and support the provincially prescribed curriculum. They did so both individually and as part of the work taking place in the weekly meetings with the design team of colleagues and researchers. In fact, the conversations with teachers suggested a teacher development progression which went well beyond the view found in a previous study (Corter, Harris & Pelletier, 1998) among some kindergarten teachers—that readiness or lack of same was the responsibility of parents. In

this study teachers initially saw part of their responsibility as educating parents to support child readiness. As the intervention progressed, supporting parents became a shared mission of helping children make the transition to school. Reports of feelings of partnership and valuing of the teacher-parent relationship came from both sides, as seen in parents' reports that the teachers were the "best" part of the programs. Some of the teachers reported feeling "honored" and "humbled" by the experience of having parents in their class. Others reported that this was the most important work they felt they had ever done. These expressions of positive collaboration and deepening relationships have been attributed to the success of other transition-to-kindergarten programs (e.g., Pianta et al, 2001). Teachers unanimously reported that their kindergarten teacher colleagues observed that children who had attended a Readiness Center program were noticeably "more ready" in kindergarten the following year. These perceptions suggest that the transition across grade levels and between teachers, as well as the home-to-school transition, may be helped by the Readiness Center experience.

Coherence is further shown in the children's actual readiness scores the following year. Children's outcomes in kindergarten were obtained in several ways, through direct assessment that included vocabulary, number sense, early reading, and child interviews. Parents completed ratings of their child's readiness in six areas: physical development, letter knowledge, number knowledge, printing, socialization with other children, and socialization with adults. Finally, kindergarten teachers completed the Early Developmental Instrument (Janus & Offord, 2000), a readiness tool employed in many Canadian provinces as an aggregate index of kindergarten readiness. Results of the direct assessments revealed significant differences between Readiness and No Readiness groups in vocabulary, early reading, and number sense; that is, children who had attended a Readiness Center with their parent the preceding year were significantly more ready in these areas in kindergarten.

## Limitations

### *English Second Language Factors*

Some of the findings and non-findings of the study may reflect methodological limitations. For example, the higher ratings on some readiness items by ESL parents may reflect how the questions were understood or translated, rather than a true difference. As another example, the lack of significant statistical interaction effects between ESL status and Readiness experience was surprising given a number of cases in which the pattern of means suggested that the ESL children might have benefited more. In this case, a limitation in

uncovering differential effects was the factor of unequal cell sizes; that is, there were relatively few English-speaking children in the No Readiness group.

### *Effects of Beliefs*

Although Piotrkowski, Botsko, and Matthews (2000) found strong agreement between parents' and teachers' beliefs about what children should know for kindergarten, they nevertheless found differences for lower-income parents, who had inappropriately high expectations regarding children's readiness. The results of the present study suggest that kindergarten teachers may not understand parents' views about or involvement in their child's education, and parents may not understand teachers' views (Baker, Kessler-Sklar, Piotrkowski, & Parker, 1999; Bernhard, Lefebvre, Kilbride, Chud, & Lange, 1998). We know, for example, that transitions to school are understood differently by parents and teachers (Early, Pianta, Taylor, & Cox, 2001). Furthermore, some parents are simply too busy or preoccupied with other life matters to be able to reflect on the same kinds of school readiness factors that are of concern to teachers (Cunningham et al., 2000). Lubeck and De Vries (2000) argue that discourse and social practices in the area of early childhood education are based on the dominant cultural norms, and therefore it may be unrealistic to try to compare different groups with different socially-constructed experiences. Finally, as suggested earlier, parents may simply be using different criteria to evaluate children's progress (Greenfield, et al., 2000).

### *Causality or Ecological Validity?*

By the standards of randomized, experimental design-based research, this study does not demonstrate clear evidence that preschool program participation caused better outcomes in kindergarten. The possibility of selection bias in the quasi-experimental design must be acknowledged, although demographic factors were similar in the program and comparison groups. On the other hand, a pre-designed experimental program with random assignment might fail because there would not be opportunity for collaboration and relationship-building in design, or because there is not sufficient scope for local adaptation across sites. Most parent involvement programs are top-down designs; a meta-review by Mattingly et al. (2002) suggests that this is one of the limiting features leading to weak results (see also Honig, Kahne, & McLaughlin, 2002). Even if an experimental design shows that the independent variable of program or of interaction affects the dependent variable of outcome, the question of intervening variables that carry the effect usually remains unanswered. These intervening variables may be labeled as mediators or moderators or as interactions, and affordances supporting program effects. These variables

or processes are critical for translating research findings into practice. Intermediate processes need to be monitored as programs are implemented, especially when outcomes are expected in a longer term and not simply what a child has learned today in school. Experimental designs may also miss the importance of contextual factors (Cobb et al, 2003) or the limitation of range of circumstances under which the experimental effect operates.

### **Importance of Context and Relationships**

In the study reported here, interactions between teachers and parents appeared to be potential mediators of possible program effects. These relationships were reported by both groups of participants as important to their perceptions of success and satisfaction with the program. The finding of an association between variations in interaction scores on the ECERS-R and degree of program impact adds further weight to interaction quality as an important potential process mediating between program and outcome. Similarly, this study explored the contextual factor of language background as a potential moderator of program, process, and outcome. Goals for participation differed somewhat among parents depending on their language background, as did perceptions of readiness.

### **Relevance of Design Research**

Attention to mediating processes and the ecology of context distinguish design research from more traditional experimental designs. An additional feature of design research is the systematic monitoring of outcomes and iterative feedback into the design and ongoing implementation. This feature worked in the present project through feedback of intermediate processes, for example, in reports on parents' goals. The fact that parents wanted social development for their children as much as academic readiness was one of the forces leading teachers to a more constructivist approach with both children and parents and to the emphasis on interaction noted above. The iterative design of the project did not include working child outcomes back into the design and implementation, but attention to "child-watching" on the part of both teachers and parents was one of the themes presented by the researchers in the weekly design meetings of teachers.

The analysis of the present project in design experiment terms is not meant to defend it as a prototypical example. Instead the argument is meant to draw attention to the study's strengths of coherence in using multiple measures and systematic interactions among teachers, parents, and researchers in designing

innovative and effective parent involvement practices. Thus the important principles for design of preschool child-parent school readiness programs include teacher buy-in and support, adapting programs with parent input and support from evidence (researchers), increasing the “surface area” for interactions between teachers and parents, and attention to program quality and relationships between adults as key dimensions for success.

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Janette Pelletier is on faculty at OISE/UT (Ontario Institute for Studies in Education at the University of Toronto). She teaches graduate preservice teachers at the Institute of Child Study (OISE/UT) and teaches and supervises masters and doctoral students in the Department of Human Development and Applied Psychology (OISE/UT). Her research interests are in early child development and preschool/primary education. Specific projects include school readiness for diverse families, young children's epistemologies related to literacy development in first and second languages, Toronto First Duty—a program of integrated Kindergarten, child care, and parenting supports in schools—and evening family literacy projects. Correspondence concerning this article may be addressed to Janette Pelletier, Institute of Child Study, OISE/UT, 45 Walm-er Road, Toronto, Ontario, Canada, M5R 2X2.

Carl Corter is Professor and Director Emeritus, Institute of Child Study, OISE/UT. He is a developmental psychologist who carries out research applied to early education and care, including the role of parent councils in school-community partnerships. He is Principal Investigator of the Toronto First Duty project and is involved with program and policy development for young children.