Development and psychometric properties of the Early Development Instrument (EDI):

A measure of children's school readiness

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Abstract

The Early Development Instrument (EDI), a teacher-completed measure of children's school

readiness at entry to grade 1 was designed to provide communities with an informative,

inexpensive and psychometrically sound tool to assess outcomes of early development as

reflected in children's school readiness. Its psychometric properties at individual level were

evaluated in two studies. Five a priori domains: physical health and well-being, social

competence, emotional maturity, language and communication, and cognitive development and

general knowledge, were tested in a factor analysis of data on over 16,000 kindergarten children.

The factor analyses upheld the first three domains, but revealed the need to develop two new

ones, resulting in the final version of the EDI consisting of: physical health and well-being,

social competence, emotional maturity, language and cognitive development, communication

skills and general knowledge domains. These final domains showed good levels, comparable

with other instruments. A separate study (N=82) demonstrated consistent agreements in parent-

teacher, inter-rater reliabilities, concurrent validity and convergent validity). These results

establish the EDI as a psychometrically adequate indicator of child well-being at school entry.

For many decades, the average percentage of children with impairing cognitive and behaviour problems in elementary school remained constant at about 25% (Achenbach, 1991; Offord & Lipman, 1996). This is happening despite an increased awareness of the importance of the early years and more widely available intervention programs for young children. Although children's problems at school entry may generally occur at a level which would not necessarily require clinical treatment, there is evidence that as much as, or perhaps even more than 25% of children experience some difficulties that prevent them from taking full advantage of the education offered by schools (e.g., Frank Porter Graham Child Development Center, 1999; Rimm-Kaufman, Pianta & Cox, 2000). Differences in children's first years of school have long-term sequelae for their school career and later life (Alexander & Entwisle, 1988) since even minor differences in academic achievement at grade 1 tend to intensify over the years rather than converge. A population-based model of health suggests that low-risk, small deficiencies in large populations contribute to the burden of ill health more than severe problems in a minority of patients (Rose, 1994). Seen in this context, children's school readiness is a health-relevant, measurable outcome that has long-term consequences for population health.

Because early child development is heavily influenced by the quality of stimulation, support and nurturance in the environments where children grow up, school readiness can be broadly understood as an outcome of the early years. It is a useful construct because it acknowledges the importance of the early years for children's future development (Shore, 1997; Schonkoff & Phillips, 2000). The developmental outcomes, which could be operationalised as school achievement, behaviour and cognitive outcomes, or school drop-out rates, depend on the combination of the individual and collective factors. While the individual variation routinely contributes a larger proportion of variance than neighbourhood factors (Boyle & Lipman, 2002),

there is nevertheless a growing body of evidence suggesting that the neighbourhood and societal

factors also matter, especially, though not only, within the context of poverty (Brooks-Gunn,

Guo & Furstenberg, 1993; Chase-Lansdale, Gordon, Brooks-Gunn,& Klebanov, 1997). Data

from the National Longitudinal Study of Children and Youth in Canada (NLSCY) allow us to

identify factors having an impact on children's outcomes beyond children's individual

characteristics in three broad areas (C. Hertzman, personal communication, 2005):family

(including income, education, parenting style); neighbourhood (including safety and cohesion,

socio-demographic mix); and society (including support for parenting, e.g., access to high quality

care arrangements). Even small changes in any of these three areas can dramatically contribute

to the social processes behind the well-being of all children, and change the distribution of risk at

a given level (Offord et al., 1999). To paraphrase Rose (1994) and Offord, Kraemer, Kazdin,

Jensen, & Harrington, (1998), a large number of children at a small risk for school failure may

generate a much greater burden of suffering than a small number of children with a high risk.

Yet, in the current climate, school or pre-school interventions are implemented based on

individual diagnostics usually only with serious, clinical cases, providing help to the few whose

impairments are severe. Broad assessments of children's development in all relevant areas, such

that could provide an overall evaluation of the range of developmental outcomes in a community

are rarely used. However, only such assessments can provide background to broadly cast

interventions, called "universal" (Offord et al., 1998), which would have the advantage of

helping all children, and thus raising the population level of school readiness.

    In the last decade the issue of children's readiness for school finally reached the forefront

of interest not just among academics and educators, but also communities and even politicians.

In Canada, the 1997 Speech from the Throne contained the commitment to "measure and report

on the readiness to learn of Canadian children so that we can assess our progress in providing our

children with the best possible start". This goal was picked up by a score of communities across

the country, making its way into programs and coalitions (Janus & Offord, 2000; McCain &

Mustard, 1999). More recently, one of the political parties in Canada embraced a set of

principles summarised as "QUAD" (Liberal Party of Canada, 2005), to be used within the early

child care and learning system, thus ensuring the relevance of developmental outcomes for social

programs. QUAD stands for quality, universality, accessibility, and developmental outcomes and

represents a promising opportunity to improve the early years' experiences for children.

A great deal of debate has been waged over the theoretical basis of school readiness and

consequent methods of measurement: when should it be measured, who should be the informant,

what should be included (Love, Aber, & Brooks-Gunn, 1994). Readiness for school and its

measurement have received their share of attention in the developmental and educational

literature, and several reviews have been produced to highlight the difference in approaches over

time (Meisels, 1998; Meisels, 1999; Phillips & Love, 1995; Wenner, 1995).

In the first half of the 20th century, assessment of school readiness was virtually

synonymous with decision-making for kindergarten entry or delay. The tests used focused on

reading and writing, and were intended to identify children who should not start regular

kindergarten classes. These trends can be traced to the history of the definition of school

readiness. In the early formulations it was an ability to perform indicated, usually cognitive,

language, or motor tasks on demand (e.g., Gesell test, Ilg, Ames, Haines, & Gillespie, 1978).

Meisels (1998) classifies these types of definitions as "idealist/nativist" or

"empiricist/environmentalist" perspectives. In the idealist/nativist view, readiness can be seen as

a within-the-child phenomenon, whereby a child's readiness for school is achieved through a

maturational process, with little or no impact from the environment (including parents, experiences, etc.). The child's development proceeds through predictable stages and cannot be altered by external influences. Developmental tests were designed to measure this concept of readiness; however, by adhering too strictly to specific goals, they tended to misclassify too many children as not ready. The empiricist/environmentalist perspective claims that readiness is a set of particular behaviours, skills and personality traits that are basic precursors to school achievements and are easily measured. Therefore, testing should focus on external evidence of what the child can do. This conceptualization of readiness provided a theoretical basis for a number of assessments, which tended to be curriculum-based or specific-tasks-oriented. Unfortunately, similarly to strict developmental tasks, such tests often resulted in inappropriate classification of many children.

Currently, kindergarten readiness or school readiness screening measures are often still utilized to provide a basis for decision-making on retention, tracking, and services (Meisels, 1998), or to be held as performance standards for schools' accountability (La Paro & Pianta, 2000). The measures could be skill-oriented, tapping into the degree of mastery of specific skills, or developmentally-oriented, assessing child's developmental age (Costenbader, Rohrer & DiFonzo, 2000). Over and above those, school districts use locally constructed tests, or informal observations. New York State school districts, for example, use the four types of kindergarten screening in almost equal proportions (May & Kundert, 1992).

In view of the purposes for which they are commonly used, kindergarten and school readiness measures are usually reviewed and validated from the perspective of their accuracy in identifying children at risk for school failure (e.g., Costenbader et al., 2000), rather than their adequacy of reflecting the concept of school readiness (Meisels, 1998). Seven of the many well

known and widely used measures will be briefly described below. We will review their major

domains, psychometric properties, and the training needs for assessment.

One of the earliest measures of school readiness is the Gesell School Readiness Test

(GSRT), an assessment of skills that are purportedly achieved solely through a maturational

process (Ilg et al., 1978). It is administered individually to children as an interview by a trained

examiner, who needs to consider the content and manner of the child's response. The tasks

include writing, drawing, visual and motor coordination, and the child's verbal expressions.

Currently, the GSRT is described as an observational, qualitative tool, with results being

interpreted clinically (Lichtenstein, 1990). It has often been used to determine children's

readiness for kindergarten, and followed up with placement decisions (Graue & Shepard, 1989).

In Graue and Shepard's study, the developmental age measure on GSRT in kindergarten

correlated with the grade 1 report card only at 0.23. About 60% of children identified as not

ready were misdiagnosed based on grade 1 data. Similarly, no differences were detected

between children classified as ready and unready by the GSRT before kindergarten entry in later

measures of grade 1 remedial placement, or academic scores in grade two and three (Buntaine &

Costenbader, 1997). Lichtenstein (1990) reports an inter-rater agreement of placement

recommendation of 78%, based on 46 cases. Few other psychometric properties of the Gesell

are available in literature.

Among some of the most frequently used skill-oriented measures are such readiness tests

as the Developmental Indicators for the Assessment of Learning (DIAL-R) (Mardell-

Czudnowski & Goldberg, 1998), and the Brigance Diagnostic Inventory of Early Development

(Brigance, 1992; Glascoe, 1995). Both of these measures require a trained professional to

administer the assessment to children. The assessments include motor, cognitive/conceptual and

language areas in three (DIAL-R) or up to 13 subtests (Brigance). Each of the two tests offers a parent-completed questionnaire to assess social skills and development. DIAL-R is reported to have high inter-rater and test-retest reliabilities (0.90 and 0.86, respectively), and both sensitivity and specificity around 85% (Mardell-Czudnowski & Goldenberg, 1998). A positive predictive value of only 0.53, demonstrated in one study (Jacob, Snider, & Wilson, 1988), suggests that if used for identifying children at risk for future academic difficulties, it carries a high "false-positive" rate. The Brigance is a criterion-referenced inventory of skills, with psychometric data similar to those reported for the DIAL-R. One study of 95 middle-class white 4-5-year-old children (Wenner, 1995) found that referrals to special problems and nonpromotion were correctly predicted with the Brigance scores for 67% of children in the sample.

Yet another school readiness assessment, the Lollipop Test (Chew & Lang, 1990) includes four subtests covering recognition and identification of shapes, colours, pictures, letters and numbers, administered by trained examiners. Chew & Lang (1990) and Chew & Morris (1989) showed that Lollipop Test's domains mapped closely to those tested on DIAL-R and Metropolitan Readiness Test (MRT, Swanson, Payne, & Jackson, 1981) yet required a shorter testing time. Neither the Lollipop nor the MRT have specific "readiness levels" used to classify children as ready or not; their main purpose is to predict first grade academic success from a kindergarten testing. The ability of both MRT and the Lollipop to predict grades, and standardised achievement test results in grades 1, 3 and 4 are similar and moderate to high in magnitude (Chew & Morris, 1989).

The Phelps Kindergarten Readiness Scale (Augustyniak, Cook-Cottone & Calabrese, 2004; Duncan & Rafter, 2005), a newer addition to the spectrum of measures, was developed explicitly to measure "academic" readiness of children before entry to kindergarten. It contains six major

domains: verbal processing, perceptual processing, and auditory processing, evaluating children's language competence, ability to compare and reproduce shapes, and memory. Test-retest reliabilities vary from 0.61 to 0.87 for individual domains. Concurrent validity, established in the fall of the kindergarten year with the Woodcock-Johnson III Test of Achievement (Woodcock, McGrew, & Mather, 2001), is 0.59. Predictive validity values for the Phelps' total readiness score are available for an 8-month period with the Woodcock-Johnson and vary from 0.39 (reading subtest) to 0.53 (math subtest). In addition, a recent study demonstrated correlations of .47 and .51 between the Phelps' kindergarten score and New York State fourth-grade assessments in language and mathematics tests, respectively (Augustyniak et al., 2005).

The Peabody Picture Vocabulary Test (PPVT, Dunn & Dunn 1981), a test of receptive vocabulary, has also occasionally been mentioned as measure of school readiness (e.g., Kohen, Brooks-Gunn, Leventhal, & Hertzman, 2002; Zill et al., 2001), however, it is rarely used as a sole screening method (Costenbader et al., 2000). Within its limited skill testing range, the PPVT has adequate psychometric properties for screening purposes (Dunn & Dunn, 1981), and is easy and quick to administer.

Of the seven assessments briefly reviewed above, only two offer an optional measure of children's socio-emotional development, a parent-completed questionnaire (Brigance and DIAL-R). None of them allows for a school-based evidence of children's relationships with peers or social competence with adults other than parents. Most assessments provide some measure of children's motor coordination, confined to fine motor skills (e.g., drawing, writing letters or numbers, copying shapes). None account for children's gross motor skills (e.g. running, jumping) or physical independence. Few studies provided information on inter-rater reliability,

however, it is probably implicit in the fact that the assessments have to be administered by

professionals trained in the specific instrument. The need for an external examiner to administer

the tool, rather than reliance on a report by an adult familiar with the child explains why an

examiner would not be informed well enough to rate the child's social behaviour. From the

implementation point of view, need for examiners trained in specific tools increases costs of

assessments.

It is important to note that only three of the tools mentioned above, the DIAL-R, Brigance,

and Phelps were purportedly validated specifically to screen children who were not ready.

Nevertheless, Costenbader et al. (2000) and Duncan & Rafter (2005) suggest that even these

three be used in conjunction with other, more detailed psychoeducational evaluation of readiness.

Together with high implementation costs and lack of information on children's social and

emotional development, this indicates low cost-effectiveness of these measures.

Any of the assessment tools reviewed above could be used to provide information for

groups of children, or even population-level data. Population-level community reporting

theoretically can be achieved by aggregating any measurement available for all individuals in the

community, or a representative sample, similarly to the way census reporting is carried out

(Statistics Canada, 2005). However, most available school readiness assessments provide

information only on the cognitive and language aspects of child development. Also, since all of

them are implemented through a direct assessment with an individual child, it would be

extremely costly to include all kindergarten children in such testing. At this point in time, direct

cognitive assessments are rarely done for whole populations of young children; rather, schools

have resources for assessments of children identified as at risk by teachers (Love et al. 1994).

There appears to be a consensus among educational and developmental experts that school readiness should be understood as not merely cognitive skills, but rather as a holistic concept involving several developmental areas such as cognitive, socio-emotional and physical (Meisels, 1999; Jimerson, Egeland, & Teo, 1999; Love et al., 1994). Competence in all these areas will ensure that children are ready to benefit from educational activities offered in the school environment (Janus & Offord, 2000). Therefore, assessment of children's cognitive status only is no longer adequate. Furthermore, making costly measures available for populations of children (as opposed to targeted sub-groups) would require far greater investments than is currently feasible.

Meisels (1999) describes yet another perspective on the measurement of school readiness, following Love et al. (1994): a "social constructivist" approach, where the school readiness is defined with reference to how children's behaviour and development are supported and what the children should be ready for. This approach requires a community-level measurement strategy, where assessment of children's abilities is only one of the components, and has to be put in the context of the children's past few years and the realities of where they will be educated. Moreover, this strategy explicitly involves the community's willingness for action based on the results. By providing a strategy, and including a context, the social constructivist view is the most comprehensive approach to the measurement of children's school readiness.

This article reports on the development of a new school readiness measurement tool. The holistic framework of children's outcomes at school entry was adopted to provide communities with benchmarks useful for planning of intervention and prevention. By emphasizing the population-level of data interpretation, this tool overcomes the barrier of seeing the assessment of school readiness as an individual process labelling a child with a deficit. Because it comes at

the cusp between early development and school entry, such an assessment has a potential to mobilize communities into providing opportunities accessible for all children.

The driving force behind the design of the current measure was the desire to provide communities with a feasible, acceptable and psychometrically reliable instrument that could be used for whole populations of children to monitor community efforts to improve early years' outcomes over time (Janus & Offord., 2000). The Early Development Instrument (EDI) is a relatively short, easy to administer tool in the format of a teacher-completed checklist, whose results can be aggregated to various levels (for example, groups like girls or boys, children living in a neighbourhood, children attending regular or immersion program, as well as all children) and therefore easily lends itself to linkages with other population and community data (Janus, Walsh, Viveiros, & Offord, 2002). Within the theoretical framework of approaches to the measurement of school readiness, the EDI is positioned in the context of the "social constructivist" approach, by providing the "child" component necessary to complete the whole picture of community-based school readiness.

The focus of the current tool is on children's readiness to enter grade one, rather than on their ability to start attending school at a kindergarten level. This follows conceptually the distinction made by Kagan between the "readiness to learn", and "school readiness" (Kagan, 1992; Kagan & Neuman, 1997). The first refers broadly to the child's neurosystem being ready from birth to process information it is being exposed to and develop accordingly; the second is a narrower view reflecting the specific domains of development relevant to school-based learning as they mature around the age of 4 to 5 years. Kindergarten attendance is still optional in many districts, yet it provides children with an undisputed advantage in first-grade outcomes (Entwisle & Alexander, 1999). Moreover, the structure of teaching in kindergarten classes is very different

from grade one. Kindergarten provides the transition between the play-based preschool and home environment to the academically-based environment of grade school, and ensures that children have the opportunity to consolidate skills relevant to grade-school learning. A school readiness measure taken at the beginning of the kindergarten year would fall back on the mistaken assumption of a common core of learning happening before school (Meisels, 1999). However, children who do poorly at school readiness measures taken prior to or at the beginning of kindergarten, often do well on similar measures of achievement by the end of the year (Meisels, 1987). Even comprehensive screening of children before school entry rarely provide highly reliable results (Pianta & McCoy, 1997). Readiness is a process occurring over time, and cannot simply be completed by the first day of kindergarten. As Meisels puts it "… [since] readiness is a process and schools are by necessity a major contributor to this process, then a period of common schooling needs to occur in which this process can take place" (Meisels, 1999, p.62). Therefore, an assessment of children's school readiness for grade one should ideally be carried out well into the kindergarten year, yet with the sufficient time period before the end of the year to allow the use of the collected data for grade-one programming.

The EDI combines several areas that have been identified as relevant to children's school readiness (Doherty, 1997; Kagan, 1992): physical health and well-being, social competence, approaches to learning, emotional maturity, language development, cognitive development, communication skills, and general knowledge. This paper describes the development, factorial structure, and initial psychometric properties of the Early Development Instrument (EDI): A Population-Based Measure for Communities.

Instrument Development

Conceptual Framework

Kagan (1992) and Doherty (1997) outlined the five areas of school readiness as pertaining

to: physical well-being and appropriate motor development; emotional health and a positive

approach to new experiences; age-appropriate social knowledge and competence; age-

appropriate language skills; and age-appropriate general knowledge and cognitive skills. There

is adequate evidence in literature to indicate that each of them has an important impact on

children's adjustment to school and short- or long-term school achievement (Doherty 1997, Love

et al. 1992; Jimerson et al. 1999). This view was confirmed in a discussion held with educators

and early childhood experts, who requested that each domain be represented in the new

instrument to provide a comprehensive assessment of children's school readiness.

Item Selection

The items for the EDI were derived from existing instruments, key informant interviews,

and focus groups, as suggested by Streiner and Norman (1995). A review of some commonly

used teacher and parent-completed tools was carried out and items for the instrument were

chosen to fit specific areas. An initial base of 128 questions was created, over 60% of which

were modified from the items in the Canadian National Longitudinal Study of Children and

Youth (NLSCY). The NLSCY is a federally-funded study of a representative sample of

Canadian children. The items relevant to child behaviour and language and cognitive areas in

the NLSCY were based on a number of standardised instruments and consultations with experts

(NLSC Project Team, 1995). Because it was apparent at the time that the NLSCY did not

adequately cover all the areas relevant to school readiness (Morongello, 1997), new questions

were constructed by the authors for the missing areas, based on Doherty (1997), and field-tested

with teachers and researchers. The first draft of the EDI was reviewed by a group of educators, early years' professionals, and academics with expertise in the field. Changes were made to draft, and subsequently four focus groups with kindergarten teachers were conducted. For several questions wording was changed; others were dropped and some added, based on teachers' recommendations. Table 1 contains examples of questions in each domain. In addition, some answer/scoring options were modified in response to feedback from teachers. In particular, items referring to specific skills were provided with only yes/no options, rather than along the continuum. Teachers indicated to us that these were a better reflection of children's school readiness. Conversely, answer options to several questions on children's overall skills were expanded to five, as these were perceived to be more variable. An EDI Guide, accompanying the instrument, was developed to provide brief explanations and anchors for the items.

Instrument Description

The first page of the instrument requests information on child demographic variables (gender, date of birth, language), as well as on selected variables related to the child's school-based designations (e.g., English as a second language, special needs, type of class), and the completion date.

Pages 2 to 7 of the EDI contain questions relevant to the five domains of school readiness: physical health and well-being, social competence, emotional maturity, language and cognitive development, and communication skills and general knowledge. Most of these are "core" questions, which means that they directly contribute to one of the five domains. There are also questions related to children's special skills and special problems. Finally, the last page of the instrument contains questions about children's pre-kindergarten experience (early intervention,

child-care, preschool, etc.). Only questions in the five core domains are used to score children's

school readiness.

The questionnaire takes between 7 to 20 minutes to complete. It is recommended that it be

completed in the second half of the kindergarten year, to give teachers the opportunity to get to

know children in their class.

The descriptions below refer to the domains in the finalised instrument. The total number

of core questions in the final version of the instrument is 103 (full version of the instrument is

available from authors upon request, or at the website).

All core questions are scored from 0 (lowest score) to 10 (highest score). The domain

score is calculated as a mean score of all the valid answers. Thus, scores for each domain have

the same minimum and maximum values, even though there are different numbers of items. As

the feedback from focus groups indicated, this way of scoring and presenting the results proved

to be easier to communicate with audiences with little or no research background.

No more than 30% of missing answers are allowed per domain. If more than one domain

is missing, the questionnaire is not considered complete and is discarded from analyses. On

average, this occurs in no more than 3% of cases. There is no total score on the EDI.

Physical Health and Well-being

This domain contains 13 items and refers to children's physical preparedness for the school

day, fine and gross motor skills, energy level throughout the day, and physical independence

(examples are in Table 1). Ten questions are answered on a 5-point scale (from never to always,

or excellent to very poor), scored from 10 (best) to 0 (worst) in 2.5 point intervals: 10, 7.5, 5, 2.5,

and 0. Three questions, about child's washroom independence, hand preference, and level of

coordination, are answered in a yes/no format. "Yes" is scored as 10, and "No" as 0.

Social Competence

This domain contains 26 items, and covers the following areas: competence and

cooperation in working together with others, ability to remember and follow rules, curiosity and

eagerness, approaches to learning and problem-solving. (See Table 1 for example questions.)

All answers are scored on a 3-point scale: often or very true (10), sometimes or somewhat true

(5), and never or not true (0).

Emotional Maturity

This domain contains 28 items[1], and covers prosocial behaviour, aggression, inattention

and hyperactivity, and anxious behaviours. All answers are scored on a 3-point scale: often or

very true (10), sometimes or somewhat true (5), and never or not true (0).

Language and Cognitive Development

This domain contains 26 items, and refers to the child's ability to use language correctly

and covers cognitive aspects of language and numeracy, in several areas: basic literacy and

numeracy skills, interest and memory, and more complex literacy. All answers are scored on a

2- point scale: "yes" (10) if a child possesses a skill, and "no" (0) if s/he does not.

Communication Skills and General Knowledge

This domain has 8 questions, and covers the child's ability to clearly communicate one's

own needs and thoughts in a way that is understandable to both adults and other children, the

ability to understand others, clear articulation, as well as aspects of general knowledge. In

contrast to the previous domain, this one is about effective communication regardless of the

grammatical correctness. Seven answers are scored on a 5-point scale from very poor (0), to

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[1] Two additional items were added to this domain in the subsequent year, thus bringing the total number of items to 30. This addition did not change the factor structure of the instrument.

excellent (10), in 2.5 increments (0, 2.5, 5, 7.5, 10). One answer is scored on a 3-point scale

(often, 10, sometimes, 5, and never, 0).

Additional questions

The three additional sections of the EDI cover children's special skills, special problems,

and aspects of the pre-kindergarten history. Seven general areas in which young children could

demonstrate special skills are listed: numeracy, literacy, arts, music, athletics/dance, problem-

solving, and other. They are simply scored as "yes" (1) and "no" (0), and summed up, so for

each child there is a total score indicating the number of special skills they demonstrate. Nine

special problem areas are listed: physical, visual, hearing, speech, learning, emotional,

behavioural, home environment, and other. These are scored in the same way as special skills.

For the pre-kindergarten history, questions about the following areas are asked: child attendance

at any early intervention program, pre-school, language or religion classes, Junior Kindergarten

level, and participation in non-parental care. The pre-kindergarten history items are stand-alone

questions.

<div align="center">Study 1</div>

Method

Participants. The EDI was implemented in 6 sites and completed for 16,583 students. Of

those, 16,074 or 97% of questionnaires were complete (had no more than 1 domain and no more

than 30 answers in total missing). The sites comprised three large urban (N=15,319) and three

smaller rural ones (N=755). Thus, the rural sites contributed 5% of the sample, while the urban

sites contributed 95%. Statistics Canada (2005) reports the distribution of the Canadian

population to be 80% urban and 20% rural. All schools within the school boards were involved

with an exception of one site where only about 25% of schools participated. As indicated in

Table 2, there were approximately equal proportions of boys and girls in the sample, and for

about 30% of children, English was not their first language. No other demographic data were

available on the children.

Although information on the individual socioeconomic status of the families of the

children in the sample was not available, the neighbourhood SES indicators (average income,

unemployment rate, and high school education) were established for the enumeration areas in

which participating schools were located, based on the 1996 Canadian Census data, accessed

through the DMTI Spatial Inc. Digital Data. Enumeration areas were the smallest geographical

areas for which Census data were available. The mean SES indicators were computed for each

site, and are presented in Table 3, alongside Canadian national averages from the 1996 Census.

For three of the sites, the SES indicators were better than Canadian averages, and for the

remaining three, they were lower.

Part of the data were collected in Ontario, Canada, where in many sites children can start

kindergarten at a younger age level, called "Junior Kindergarten". These children turn four years

old in the calendar year they enter school. The majority of children in Canada, however, start

school at the five-year-old level, called "Senior Kindergarten". Since the sample included

children at both kindergarten levels, the reporting will be split, where appropriate, into the Junior

(JK) and Senior levels (SK).

Analyses. The data were analyzed using several techniques to confirm the a priori

domain/factor structure. A confirmatory factor analysis was computed on the full sample using

principal axis factoring extraction method with promax rotation, allowing factors extracted to be

correlated. Because of the natural clustering of the data by classroom, the within- and between-

classroom factor structure was explored. A multi-level confirmatory factor analyses, developed

by Muthen (1994), which involves a simultaneous analysis of both the within- and between-

group factor structure using the Mplus software (Muthen & Muthen, 2004) was employed to

assess the factor structure for each domain. In order to assess the need for further multilevel

analyses, the proportion of variance between teachers or the intraclass correlation coefficients

(ICC) obtained in the above procedure were examined. Finally, the average teacher reliability

(indicating consistency levels) for each domain was assessed using the unconditional multilevel

models with the hierarchical linear modelling (HLM) methodology. Software used included

SPSS and Mplus.

In addition, the internal consistency indicators (Cronbach alpha) for the EDI domains were

computed, and the convergent validity analyses on age and gender relationship with the EDI

scores were carried out.

Results

Factor structure

The principal axis factoring analysis revealed 14 factors, with eigenvalues greater than 1.

This was expected, since some of the broad domains covered more than one distinct factor, and

forcing the distribution into only five would have been counterproductive (Gorsuch, 1983). The

fourteen factors were aggregated into the five domains based on the conceptual framework

(Table 4). For all but three items the highest loading belonged to a factor within the predicted

domain. However, even for these three, the second highest loading belonged to the predicted

domain. Seven items were retained despite loading less than 0.3 on a factor, due to perceived

importance by teachers participating in the focus groups (three of those were the ones that did

not separate as expected). These items were: independent in washroom, well-coordinated, sucks

a finger, knows how to handle a book, interested in books, interested in reading, remembers things easily. All remaining items loaded 0.3 or higher on the factors.[2]

The 14-factor solution accounted for 63.1% of the variance. The factors contributed to the five domains in the following way: Physical Health and Well-being, factors 7, 10 and 14 (and one item from 5), 4.8% of variance; Social Competence, factors 1, 9, and 12, 32.9% of variance; Emotional Maturity, factors 4, 5, 6 & 11, 10.5% of variance; Language and Cognitive Development, factors 2, 8 and 13 (and one items each from 9 and 12), 10.7% of variance; Communications Skills and General Knowledge, factor 3, 4.2% of variance (Table 4).

The Muthen procedure for exploring between- and within-group factor variance confirmed the factor structure. Table 5 shows the fit indices for each domain. The values for "between" and "within" comparisons are very close, regardless of the models employed (between or within). This indicates that the factor structure within classrooms is similar to the structure between classrooms.

Teacher reliability

Intraclass correlations for the five domains are in Table 6. The ICCs for all the items varied from the minimum of 0.017 to the maximum of 0.400, with 57% of items at 0.2 and less, indicating low levels of variability between classrooms or teachers. In the case of all items and domain scores, the majority of variance came from children (0.6 to 0.983).

Average teacher consistency in each domain, estimated with the HLM reliabilities, varied from 0.76 to 0.84 (Table 6).

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[2] The actual loadings are available from the first author.

Internal consistency

The internal consistency of the specified domains was explored using Cronbach's alpha. All five domains showed satisfactory internal consistency levels: Physical Health and Well-being 0.84; Social Competence 0.96; Emotional Maturity 0.92; Language and Cognitive Development 0.93; and Communications Skills and General Knowledge 0.95.

Relationship to age, gender and English as a Second Language status

The EDI was intended to be an instrument based on child's developmental status and not achievement in relation to specific curriculum objectives. Therefore, it was imperative that it should be sensitive to the child's age and gender. One-way analysis of variance (ANOVA) was used to compare the five domains scores for girls and boys. Table 7 shows the means and standard deviations, separately for the cohort of 4-year-olds and 5-year-olds. Girls were rated on average significantly higher than boys in all five domains.

Correlations of the EDI domains with age were also all statistically significant (Table 7; both cohorts analysed together), and fairly low, with exception of the Language and Cognitive domain, where the correlation reached a moderate range, as was expected. These results demonstrate the EDI's expected sensitivity to age and gender.

Differences between children with and without ESL status were also explored with an ANOVA (the gender distributions did not differ significantly between the groups either for JK or SK level). As expected, the EDI scores were lower for children for whom English was a second language, both at the 4-year and 5-year-old level. The largest discrepancies between the two groups were in the Communication Skills and General Knowledge domain (Table 8).

Discussion

The factor solution replicated the domains of school readiness found in literature (e.g., Phillips et al. 1995) and accounted for 63% of variance. However, two domains, covering the language, communication and cognitive abilities, did not emerge as the a priori hypothesized categories (language with communication, and cognitive development separately). Considering the range of abilities that are supposed to contribute to each domain in the theoretical models, it was to be expected that the factor analyses would reveal more than five factors. This multi-factorial structure of the domains needs to be explored further. It was crucial, however, that most, if not all items, showed clear contributions to the set of factors belonging to a particular domain. In fact, all but three of the items loaded on the expected factors. Factor analysis experts suggest removing lowest-loading items (Gorsuch, 1983); however, we made the decision to keep the seven items that loaded the lowest on the finalized version of the EDI. This decision was dictated by the need to preserve the relevance of the questionnaire and its coverage to the community of teachers and educators.

If the data are correlated and clustered, as they are in the present study, the factor analyses of between-classroom data and within-classroom data could show different results. While the factor analyses methodology used accounted for the correlated factors, it did not account for clustering. The four-step Muthen procedure (Muthen, 1994) enables us to detect differences between the two factor structures, if there are any. The finding that there was very little difference between the fit coefficients in the two models allows us to say that for each domain, the EDI factor structure between classrooms is similar to the factor structure within classrooms. Because the clustering within classroom is an unavoidable natural phenomenon that is replicated when the EDI is used in the communities, it is important to assess the differences between levels of analyses. Muthen's multilevel confirmatory factor analyses methodology is suggested as the

most adequate to test whether the structure of a construct differs across levels of analyses (Dyer, Hanges & Hall, 2005). We chose this method of testing the impact of clustering, rather than a random selection of a student per classroom, or averaging results per classroom, because 1) neither of the other two would account for the variability occurring within students, 2) there are arguments in literature suggesting that factor-analysis of means can produce misleading results (Dyer et al.).

The consistency of teachers' ratings was explored with the ICCs. The low ICCs indicated that the majority of variance among the item and domain scores was due to the variability of children within classrooms rather than between classrooms. The high average teacher reliability for each domain indicated that despite the fact that one teacher contributed the scores for children in the class, their ratings for individual children were sufficiently different to warrant the claim that the data were reliable at the individual level.

The internal consistency of finalised scales was acceptable. Convergent validity, as shown by associations of EDI scores with age and gender, was acceptable, though it requires further investigation with another sample to allow for inclusion of socioeconomic variables.

The magnitude of differences between boys and girls was especially large in the social and emotional domains, where five-year-old boys (SK group) scored on average lower than four-year-old girls (JK group). This appears to be a consistent difference between boys and girls, also found in other populations (e.g., Zill, 1999). This gap has been shown to persist into later years of school (Sheehan, Cryan, Wiechel, & Bandy, 1991; Herbert & Stipek, 2005). Clearly, it is an important educational issue, and as such it is receiving attention of practitioners (e.g., Spence, 2005). Age also has an impact on the EDI scores: in four domains, for a year increase in age, the scores increased on average by 0.5 point. In Language and Cognitive Development, the scores

increased by almost 2 points between 4- and 5-year-olds. Children with an ESL status had lower

scores than children for whom English was the first language. As the school's instruction

language is English, it is not suprising that children with worse command of English have

difficulties (Schwartz & Stiefel 2006). ESL learners routinely struggle with acquiring the

competence in the language of instruction (Roessingh & Kover 2003). Combined with gender

and age differences, these suggest that the composition of kindergarten classes is an important

factor to be considered in planning of educational activities.

Study 2

Method

Participants. Teachers in 10 schools in two large urban settings sent a letter describing the

study to all parents of Senior Kindergarten children (that is, children who have their fifth

birthday in the year of entry to school). Of the 117 letters sent out, 100 were returned (85%)

with parental agreement to participate. Unfortunately, due to circumstances beyond the control

of the research team, only 85 of the 100 could be contacted. For 82 families complete data were

collected from both parent and teacher. Fifty-three children in seven schools attended

kindergarten at school (half-time), and a kindergarten-age program at a child-care centre (half-

time).

Measures. The EDI was completed by school teachers and parents for all 82 children, and

by child-care teachers for 53 children. Children's receptive vocabulary was directly assessed

with the Peabody Picture Vocabulary Test (Dunn & Dunn, 1981). The PPVT was administered

to children within less than two weeks from the teacher completing the EDI.

Parents were interviewed to provide family background information, including parent

education and marital status. They also answered additional questions about child's health and

behaviour. These were used to establish the external validity of the teacher-completed EDI. The

questions, answer options and coding, and their relevance to EDI domains are listed in Table 9.

Results

Inter-rater reliability

In order to investigate the level of agreement between two independent observers

completing the EDI, the EDI ratings were compared between school kindergarten teachers and

early childhood educators (ECE), and between school teachers and parents.

The correlations between teachers and ECE ranged from 0.53 to 0.8 (Table 10), and all

were statistically significant. Correlations between parent and teacher ratings ranged from 0.36

to 0.64 (average of 0.45) and all were statistically significant (Table 10). The lowest agreement

between parents and teachers occurred in Physical Health and Well-being and Emotional

Maturity; the highest (0.64) in the domain of Language and Cognitive Development.

Concurrent test-criterion relationship

Correlations of the EDI language-related domains, Language and Cognitive Development

scale and the Communication Skills, with PPVT scores were statistically significant, though low

to moderate (0.31 and 0.47, respectively, Table 10). These associations provide the evidence for

test-criterion validity for the two domains (Joint Committee on Standards for Educational and

Psychological Testing, 1999), that is, that these two different measures, purportedly measuring

the same concept, indeed do so. PPVT scores were not correlated with the remaining three EDI

domains.

Association with parent interviews

Parent-rated aspects of child health and behaviour (listed in Table 9) were correlated with teacher ratings on relevant EDI domains.

Of the four parent-based variables relevant to the Physical Health and Well-being (items 1-4 in Table 9), only the correlation of the parent rating of child's overall health was statistically significant (r=0.34, p<0.05).

Six of the seven parent-based variables relevant to Social Competence and Emotional Maturity domains were statistically significantly correlated with teacher ratings on the EDI (Table 11).

Teacher ratings of the child in Language and Communication domains of the EDI were significantly correlated with three out of four parent-based items: interest in books, writing and frequency of reading with adult; while Communications Skills score was significantly correlated with one out of four: the age at which child was first being read to (Table 12). All correlations, however, were in the expected direction.

It is also important to note that there were only three statistically significant correlations between a parent-based variable and EDI domain not directly relevant to this variable. These were: Language and Cognitive Development with frequency of seeing other children, r=0.26, p=0.002, and liking school; r=0.30, p=0.009, and Communication Skills and General Knowledge with the ability to think and solve problems, r=0.33, p=0.003. None of the parent-based items not relevant to either Physical Health and Well-being, or Social Competence, or Emotional Maturity were correlated with teacher ratings in these domains.

Discussion

Inter-rater agreements on the EDI domains were moderate to high for the two teacher

ratings, and low to moderate for parent-teacher ratings. Agreement between multiple

respondents on children's behaviour is notoriously low (e.g., Winsler & Wallace, 2002; Boyle et

al., 1996; Verhulst & Akkerhuis, 1989; Culp, Howell, Culp, & Blankemeyer, 2001). In

particular, teachers and parents appear to have low agreement rates, although there is a fairly

high rate of agreement between parents (Grietens et al., 2004). It has been argued that

respondents hold differing thresholds and standards (Grietens et al.), resulting in low agreement.

Low concordance could also be attributed to unique variance contributing to the ratings (Dishion,

French, & Patterson, 1995): schools may elicit different behaviour patterns in children than do

home settings. Moreover, some behaviours, especially problem behaviours, have low frequency,

or low visibility (Campbell, 2002; Deng, Liu, & Roosa, 2004) which makes them hard to notice

reliably. All of these possibilities are likely reflected in the inter-rater agreements on particular

domains of the EDI. First, agreements between the two teachers are higher than between the

teacher and parent. This suggests that 1) children behave similarly in educational settings, but

differently at home, in particular in terms of their emotional expressions, and 2) school teachers

and teachers of early childhood educational settings have similar perspective in assessing

children's behaviour. This second finding is especially important since the results of the EDI are

frequently aggregated across different teachers and this basic trust in teachers' reliability is

crucial. Also, these similarities indicate that the concepts captured by the EDI are clear and

easily assessed by trained educators. Second, low parent-teacher agreement (r=0.36) in the

Emotional Maturity domain may well reflect the low – and variable – frequency of problem

behaviours, especially internalizing ones like anxiety (Cambell, 2002), which are part of that

domain. Similar results were found in research on the reliability of the Strength and Difficulties

Questionnaire (SDQ, Goodman, 2001). Two scales of the SDQ, Emotional Symptoms and

Prosocial Behaviour, which are conceptually close to the Emotional Maturity domain of the EDI,

had the lowest parent-teacher agreement rates (0.27 and 0.25, respectively) in a community

sample of over 7,000 children.

A fairly high parent-teacher agreement was achieved for Language and Cognitive

Development domain, which includes letter knowledge, number knowledge, memory, and basic

reading and writing skills. This agreement is higher than expected based on the evidence from

largely behaviour-based scales (see above). However, parent ratings have not been commonly

used to evaluate children's cognitive ability, in particular for school-age children. There is some

evidence that parents tend to overestimate their children's development (Glascoe & Sandler,

1995; Deimann, 2005). Maternal predictions of their 4-year-olds' performance on 96 test items

were highly correlated with the children's actual performance, yet the "errors" in judgement

were mostly overestimates (Hunt & Paraskevopoulos, 1980). A study of kindergarten-age

children with developmental disabilities demonstrated that parent and teacher ratings of

children's language development were positively and significantly correlated (Sigafoos &

Pennell, 1995), in particular in the area of expressive language. Moreover, maternal education

contributes to the accuracy in assessment of their children's abilities (Hunt & Paraskevopoulos,

1980). Almost 80% of mothers in our study were well educated, which most likely contributed

to their knowledge about their children's cognitive abilities.

The language-related EDI domains were significantly associated with directly-tested

children's receptive vocabulary. Since receptive vocabulary is a part of the larger assessment of

children's IQ and correlates well with composite IQ measures (Dunn & Dunn, 1981), PPVT

scores are often taken as a proxy of child's intelligence. Significant correlations with the appropriate EDI domains indicate good criterion validity on these domains. Nevertheless, further evidence is needed to ascertain that other areas of child cognitive development (number concepts, problem-solving, expression, memory) are accurately reflected in EDI scores. At the same time, the lack of correlations between PPVT and the three remaining EDI domains clearly provides evidence of the discriminant validity of the EDI domains.

The patterns of correlations between parent-based variables and relevant teacher-reported EDI domains further indicate that the domains discriminate among the aspects of school readiness. Although the magnitude of correlations was, at best, moderate (0.24-0.48), they were all in the expected direction. Unlike the correlations between parent ratings on the EDI and teacher ratings on the EDI, where the same questions were asked of different observers, these parent variables are based on interview questions in general areas relevant to the specific EDI domains. The correlations suggest that there is a certain small (0.06-0.23) amount of shared variance among the variables. Because most parent interview variables were based on much narrower concepts than the EDI domains, the low-level associations are not surprising.

A case in the above point is provided by parents' judgement of their children getting along with school friends which was the only explored aspect of the socio-emotional skills not significantly correlated with teacher EDI (rs=0.11 and 0.14). Social Competence and Emotional Maturity domains each cover a spectrum of related concepts, not only the "getting along" or "prosocial" behaviours. It is possible that the lack of power was caused by associating a single aspect of a spectrum with an EDI domain combining many components. Moreover, as argued by Dishion et al. (1995), school context influences child behaviours, which may differ from those observed at home. Parents rarely have a chance to observe their child in an environment with

twenty peers, rather than just one or two, and therefore their perception may not be the same as that of the teacher.

General Discussion

The Early Development Instrument was designed to fill the gap in the population-level measurement of children's school readiness with a tool that is feasible and quick to complete, informative, and psychometrically adequate, while at the same time lending itself well to aggregation for social reporting.   The analyses in this paper suggest that the EDI's psychometric properties are acceptable and comparable with other instruments measuring children's behaviour (e.g., CBCL, Achenbach, 1991) and academic skills (e.g., PKRT, Duncan & Rafter, 2005).

Internal consistency of the EDI scales ranged from 0.84 to 0.96; the fourteen-factor solution replicated the domains of school readiness suggested in literature (Phillips et al., 1995), and accounted for 63% of variance.   The inter-rater reliability correlations were moderate (0.53) to high (0.80). While not reported here (Duku & Janus, 2004), the test-retest correlations were also high (0.82-0.94).   Validity investigations encompassed several analyses. Parent-teacher agreements on the EDI were moderate (0.36-0.64). Concurrent test-criterion validity of the EDI, as explored in comparisons with direct language test and parent interview about children's behaviour demonstrated low to moderate, yet consistent relationships.

The age and gender difference patterns demonstrated in other large sample of kindergarten children were also replicated by the EDI results. Zill (1999) found that boys and children with birthdays late in the year were more likely to have problems in kindergarten; male gender, and younger age at school entry significantly contributed to "school unreadiness" in Farkas & Hibel's (2005) analysis of the ECLS-K data in the US (Farkas & Hibel, 2005). Interestingly,

among kindergarten children in the sample analyzed by Farkas & Hibel, boys were significantly

older at entry than girls, a finding interpreted by the authors as a possible "strategizing" effort by

parents. In jurisdictions where rules about the age of school entry are less uniformly observed,

the EDI scores need to be groups by actual age intervals rather than "grade level". This

procedure is currently being used in Australia (Goldfeld, Brinkman, Sayers, Liddelow, Daws, &

Coutts et al., 2006). The EDI scores were consistently lower for children with the ESL status.

Lack of proficiency in the language of instruction frequently contributes to children's lower

achievement in school (Fontaine, Torre & Grafwallner 2006). There is evidence, however, that

foreign-born ESL children have better academic achievement than native-born children

(Schwartz & Stiefel 2006). Moreover, as Bialystok points out, the quality of home environment

and its promotion of reading and learning, will have an impact on the school achievement of

children with the ESL status (Bialystok 2001). Unfortunately, in our study we were not able to

control for either of these factors, and therefore this issue has to be explored further.

Associations with various other measures were usually only statistically significant where

there was a strong theoretical basis for them to be so. For example, direct language tests were

not significantly correlated with the non-cognitive EDI domains; parent ratings of child getting

along with friends at school was not significantly correlated to social and emotional competence

rated by the teacher on the EDI, and the cognitively-oriented EDI domains were not, as a rule,

correlated significantly with parent ratings of children's social competence. These findings

emphasize the discriminatory character of the instrument, and underline our view of reporting on

each domain separately, rather than producing a composite total score, which could obscure real

differences.

Unlike the many existing assessments of school readiness, the EDI has not been validated

for the screening at an individual, or diagnostic, level. In contrast to an instrument like Child

Behaviour Checklist (CBCL, Achenbach, 1991), for example, which has set thresholds

indicating clinical diagnoses, an EDI score in a certain range cannot be taken as indicative of a

clinical problem. However, even the CBCL author warns of equating the CBCL scores with

particular disorders, and instead recommends integrating the CBCL "descriptions of the child"

with other types of data on the child and family in order to arrive at a diagnosis (Achenbach).

Measurement experts suggest that a test used for decision-making at an individual level needs to

be more reliable than one used for group-level analysis and research (Streiner & Norman, 1995).

Establishing a diagnostic use for the EDI would considerably increase its costs, and thus the

availability for the population-level use. With the exception of clinical identification, the EDI

psychometric properties described here are at similar levels as those of other teacher

questionnaires used for assessment of behaviour of preschool and early school-age children (e.g.,

(Lutz, Fantuzzo, & McDermott, 2002; Bulotsky-Shearer & Fantuzzo, 2004; Goodman, 2001).

Together with a moderate predictive validity of the EDI from kindergarten to third grade

(Gaskin, Duku & Janus, 2005), also comparable with other measures (LaParo & Pianta, 2000),

these properties suggest that the EDI could be a useful addition to the spectrum of measures

available to students of children's behaviour and school adjustment in the preschool and early

school years.

The major advantage of the EDI is its combination of several domains of child

development into one comprehensive instrument which sets it apart from the other available

measures of school readiness. Questions are based on behaviours and skills easily observable in

a school setting, and responses are rated based on observed frequency of behaviours or presence

of skills, rather than on the child's performance in relation to a specific group (e.g., "top half of the class"). These properties make teachers experts in providing the information on children without the necessity of additional training. On the other hand, teacher ratings could be subject to individual bias, due to characteristics of teacher, child, school or interactions of those three (Pianta, Steinberg, & Rollins, 1995). Although it is impossible to fully address the question of teacher bias with the data from studies reported in this paper, two findings raise the confidence in teachers' fairly uniform standards of answers: inter-rater reliabilities, with both other teachers and parents, and the high teacher consistencies. Elsewhere, teacher ratings of overall summary skills were reported to have only moderate association with later outcomes (Meisels, Bickel, Nicholson, Xue, & Atkins-Burnett, 2001; Mashburn & Henry, 2004). Nevertheless, a recent study suggests that the population context should be taken into account in assessing the appropriateness of the methodology used: teacher ratings, while not specific enough to warrant early identification, are valid enough to suggest intervention models (Crooks & Peters, 2005). The teacher measures used in the cited studies all contained less than 20 items of varying generality. It appears that although the EDI is longer, it may be a compromise between multiple costly standardized assessments and brief rating scales, as it provides anchored teacher ratings of detailed competencies.

Several limitations have to be noted here. One of the studies had a small and moderately variable sample. In particular, very few of the children were non-English speakers. Although parent country of birth does not have a significant impact on children EDI scores (Janus, Offord, & Walsh, 2001; Janus & Duku, in prep.), children for whom language of instruction is a second language face obvious disadvantages entering the school system. Second, only limited data on families' socioeconomic status were available. Unfortunately, in this respect the validation of

the EDI in this study is very similar to validation of other instruments, which often have been

criticised for small samples. These limitations are addressed in the next study (Janus & Duku,

submitted). Moreover, as the EDI is currently used in many communities, local researchers are

encouraged to include some validation components in their projects.

Throughout the process of the EDI development the engagement of representatives of the

communities of stakeholders: teachers, early childhood educators, child health professionals, and

parents, was highly valued. Their engagement helped to achieve an instrument relevant to the

community. On the other hand, the emphasis that we put on ensuring this participation may have

somewhat impeded the achievement of psychometric elegance, for example in keeping some

items due to their highly perceived importance by teachers despite their low factor loading, or

having an inconsistent number of answer options in domains. Although it may be questioned,

we believed that this approach was crucial for communities' perceived ownership of the

measure. Assuming that it is partly responsible for the continued widespread interest in

measurement and improvement of children's school readiness in many communities in Canada,

developing the EDI with the stakeholders' input appears to have been a sound decision.

In conclusion, while clearly some of the analyses have to be repeated with larger or

different samples, the EDI's psychometric properties have proven to be acceptable. The EDI's

simplicity, ease of use, and low cost all lend themselves easily to community-wide

implementations. Data collected for whole populations of children have the advantage of giving

the community the true picture and, especially in conjunction with other locally-relevant data,

allow for making useful recommendations (Janus et al., 2002) and provide a baseline for future

assessments of progress. It is, however, important to point out that while the EDI already has a

demonstrated ability to distinguish among communities (Janus et al., 2002), and is related to

neighbourhood collective efficacy (Seward & Loomis, 2005) its sensitivity to changes in communities due to reform still remains to be investigated.

The only types of individual measurements that have been commonly aggregated to represent population-level results are school-based achievement tests (e.g., Willms & Jacobsen, 1990). This is usually done for later grades, and rarely, if ever, to provide communities with a useful overview for implementing action. Yet, the population-level analyses allow to identify inequalities related to characteristics which may be remediable by appropriate policies (Starfield, 2002). The EDI is the first tool for which community aggregation is feasible due to its low cost, relevance in covering the five developmental domains, and proven psychometric properties.

Reference List

Achenbach, T.M. (1991). Manual for the Child Behavior Checklist/4-18 and 1991 Profile. Burlington: University of Vermont.

Alexander, K.L., & Entwisle,D.R. (1988). Achievement in the first 2 years of school: Patterns and processes. Monographs of the Society for Research in Child Development, 53(2), 1-157.

Augustyniak, K. M., Cook-Cottone, C. P., & Calabrese, N. (2004). The predictive validity of the Phelps Kindergarten Readiness Scale. Psychology in the Schools, 41, 509-516.

Bialystok, E. (2001). Bilingualism in Development: Language, Literacy, and Cognition. New York, Cambridge University Press.

Boyle, M.H., & Lipman, E.L. (2002). Do places matter? Socioeconomic disadvantage and behavioral problems of children in Canada. Journal of Consulting and Clinical Psychology, 70(2), 378-389.

Boyle, M.H., Offord, D.R., Racine,Y.A., Szatmari, P., Sanford, M., & Fleming, J.E. (1996). Interviews Versus Checklists: Adequacy For Classifying Childhood Psychiatric Disorder Based On Adolescent Reports. International Journal of Methods in Psychiatric Research, 6, 309-319.

Brigance, A. (1992). Brigance Diagnostic Inventory of Early Development-Revised. North Billerica, MA: Curriculum Associates.

Brooks-Gunn,G.J., Guo, G., & Furstenberg, F.F. (1993). Who drops out and who continues beyond high school? A twenty-year follow-up of black urban youth. Journal of Adolescence, 3, 271-294.

Bulotsky-Shearer, R., & Fantuzzo, J. (2004). Adjustment scales for preschool intervention: Extending validity and relevance across multiple perspectives. Psychology in the Schools, 4(7), 725-735.

Butaine, R., & Costenbader, V. (1997). The effectiveness of a transitional prekindergarten program on later academic achievement. Psychology in the Schools, 34(1), 41-50.

Campbell, S.B. (2002). Behavior Problems in Preschool Children: Clinical and Developmental Issues. New York, NY: Guilford Press.

Chase-Lansdale, P.L., Gordon, R.A., Brooks-Gunn, J., & Klebanov, P.K. (1997). Neighborhood and family influences on the intellectrual and behavioral competence of presechool and early school-age children. In G. J. Brooks-Gunn & J. L. Duncan (Eds.), Neighborhood Poverty. (pp. 79-118). New York: Russell Sage Foundation.

Chew, A.L., Lang,W.S. (1990). Predicting academic achievement in kindergarten and first grade from prekindergarten scores on the Lollipop Test and Dial. Educational and Psychological Measurement, 50, 431-437.

Chew, A.L., Morris, J.D. (1989). Predicting later academic achievement from kindergarten scores on the Metropolitan Readiness Tests and the Lollipop Test. Educational and Psychological Measurement, 49, 461-465.

Costenbader,V., Rohrer, A.M., & DiFonzo, N. (2000). Kindergarten screening: A survey of current practice. Psychology in the Schools, 37(4), 323-332.

Crooks, C.V., & Peters, R.D. (2005). Predicting academic difficulties: Does a complex, multidimensional model outperform a unidimensional teacher rating scale? Canadian Journal of Behavioural Science, 37(3), 170-180.

Culp, R.E., Howell, C.S., Culp, A.M., & Blankemeyer, M. (2001). Maltreated children's emotional and behavioral problems: do teachers and parents see the same things? Journal of Child and Family Studies, 10(1), 39-50.

Deimann, P. (2005). Mothers' evaluation of their kindergarten children's developmental status. Zeitschrift fur Entwicklungspsychologie und Padagogische Psychologie, 37, 122-134.

Deng, S., Liu, X., & Roosa, M.W. (2004). Agreement between parent and teacher reports on behavioral problems among Chinese children. Developmental and Behavioral Pediatrics, 25(6), 407-413.

Dishion, T.J., French, D.C., & Patterson, G.R. (1995). The development and ecology of antisocial behavior. In D. Cicchetti & D. J. Cohen (Eds.), Developmental psychopathology. (pp. 421-471). New York: Wiley.

Doherty, G. (1997). Zero to Six: The basis for school readiness. Human Resources Development Canada. Ottawa: R-97-8E.

Duku, E.,& Janus, M. (2004). Stability and reliability of the early development instrument: A population-based measure for communities (EDI). Poster presentation, 16th

Annual Research Day, Department of Psychiatry and Behavioural Neurosciences, McMaster University, Hamilton, April 2004.

Duncan, J. & Rafter, E. M. (2005). Concurrent and predictive validity of the Phelps Kindergarten Readiness Scale-II. Psychology in the Schools, 42, 355-359.

Dunn, L.M., & Dunn, L.M. (1981). Peabody Picture Vocabulary Test-Revised. Manual for Forms L and M. Circle Pines, Minnesota: American Guidance Service.

Dyer, N.G., Hanges, P.J., & Hall,R.J. (2005). Applying multilevel confirmatory factor analysis techniques to the study of leadership. The Leadership Quarterly, 16, 149-167.

Entwisle, D.R., & Alexander, K.L. (1999). Early schooling and social stratification. In R. C. Pianta & M. J. Cox (Eds.), The Transition to Kindergarten. (pp. 13-39). Baltimore: Paul H. Brookes.

Fonatine, N.S., Torre, D.L., Grafwallner,R. (2006). Effects of qulity early care on school readiness skills of children at risk. Early Child Development and Care, 176:1, 99-109.

Farkas, G. & Hibel, J. (2005). Being unready for school: Factors affecting risk and resilience. Paper presented at the National Symposium on Family Issues, Pennsylvania State University, October 2005.

Gaskin, A., Janus, M. & Duku, E. (2005). Concurrent and predictive validity of the Early Development Instrument (EDI). Poster presentation, 17th Annual Research Day, Department of Psychiatry & Behavioural Neurosciences, McMaster University, Hamilton, Ontario.

Glascoe, F.P., & Sandler, H. (1995). Value of parents' estimates of children's developmental ages. The Journal of Pediatrics, 127, 831-835.

Goldfeld, S., Brinkman, S., Sayers, M.; Liddelow,T., Daws, A., & Coutts, M., et al. (2006). A national approach to measuring child development in Australia: Process challenges and policy implications. Paper presented at the Measuring Early Child Development Conference, April 26-28, 2006, Vaudreuil, Québec.

Goodman, R. (2001). Psychometric properties of the strengths and difficulties questionnaire. Journal of American Academy of Child and Adolescent Psychiatry, 40(11), 1337-1345.

Gorsuch, R.L. (1983). Factor Analysis. Hillsdale,NJ: Erlbaum.

Graue, M.E., & Shepard, L.A. (1989). Predictive validity of the Gesell School Readiness Tests. Early Childhood Research Quarterly, 4, 303-315.

Grietens, H., Onghena, P., Prinzie, P., Gadeyne, E., VanAssche, V., Ghesquiere, P., & Hellinckx,W. (2004). Comparison of mothers', fathers', and teachers' reports on problem behavior in 5- to 6-year-old children. Journal of Psychopathology and Behavioral Assessment, 26(2), 137-145.

Herbert, J., & Stipek, D. (2005). The emergence of gender differences in children's perceptions of their academic competence. Journal of Applied Developmental Psychology, 26(3), 276-295.

Hunt, J.M., & Paraskevopoulos, J. (1980). Children's psychological development as a function of the inaccuracy of their mothers' knowledge of their abilities. <u>Journal of Genetic Psychology</u>, 136(2), 285-298.

Ilg, F., Ames, L., Haines, J., & Gillespie, C. (1978). <u>Gesell School Readiness Test</u>. New York: Harper & Row.

Jacob, S., Snider, K., & Wilson, J. (1988). Validity of the DIAL-R fro identifying children with special education needs and predicting early reading achievement. <u>Journal of Psychoeducational Assessment</u>, 6, 289-297.

Janus, M., & Duku, E. (submitted). <u>School readiness among five-year-olds: an indicator of developmental health at school entry</u>.

Janus, M., & Offord, D. (2000). Readiness to learn at school. <u>ISUMA</u>, 1(2), 71-75.

Janus, M., Offord, D., & Walsh, C.L. (2001) Population-level assessment of readiness to learn at school in 5-year-olds: Relationship to child and parent measures. Proceedings of the 2001 Biennial Meeting, Society for Research in Child Development (SRCD), Minneapolis.

Janus, M., Walsh, C., Viveiros, H., & Offord, D.R. (2002). Community, neighbourhood and 5-year-olds' readiness to learn at school. Poster Session presented at the Head Start 6th National Conference, Washington, DC.

Jimerson, S., Egeland, B., & Teo, A. (1999). A longitudinal study of achievement trajectories: Factors associated with change. <u>Journal of Educational Psychology</u>, 91(1), 116-126.

Joint Committee on Standards for Educational and Psychological Testing. (1999).

Standards for Educational and Psychological Testing. Washington, DC: American Educational

Research Association.

Kagan, S.L. (1992). Readiness past, present, and future: Shaping the agenda. Young

Children, 48(1), 48-53.

Kagan, S.L., & Neuman, M.J. (1997). Defining and implementing school readiness:

Challenges for families, early care and education, and schools. In R. P. Weissberg, T. P. Gullotta,

R. L. Hampton, B. A. Ryan, & G. R. Adams (Eds.), Establishing Preventive Services. (pp. 61-

96). Thousand Oaks, CA: Sage Publications.

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.

La Paro, K.M. & Pianta, R.C. (2000). Predicting children's competence in the early

school years : A meta-analytic review. Review of Educational Research, 70, 443-484.

Liberal Party of Canada. (2005) Supporting Canadian Families.

Lichtenstein, R. (1990). Psychometric characteristics and appropriate use of the Gesell

School Readiness Screening Test. Early Childhood Research Quarterly, 5, 359

378.

Love, J.M., Aber, J.L., & Brooks-Gunn, J. (1994). Strategies for Assessing Community Progress Toward Achieving the First National Educational Goal. Princeton, NJ: Mathematica Policy Research,Inc.

Lutz, M.N., Fantuzzo, J., & McDermott, P. (2002). Multidimensional assessment of emotional and behavioral edjustment problems of low-income preschool children: Development and initial validation. Early Childhood Research Quarterly, 17(3), 338-355.

Mardell-Czudnowski, C., & Goldberg, D.S. (1998). Developmental Indicators for Assessment of Learning (DIAL-3). (3rd ed.). Circle Pines, MN: American Guidance Service.

Mashburn, A.J., & Henry, G.T. (2004). Assessing school readiness:validity and bias in preschool and kindergarten teachers' ratings. Educational Measurement: Issues and Practice, (winter), 16-30.

May, D.C., & Kundert, D.K. (1992). Kindergarten screening in New York State: Tests, purposes and recommendations. Psychology in the Schools, 29, 35-41.

McCain, M.N., & Mustard, J.F. (1999). Report on the Early Years Study. Toronto, ON. Children's Secretariat, ISBN 0-7778-8583-2.

Meisels, S.J. (1987). Uses and abuses of developmental screening and school readiness testing. Young Children, 42(4), 6-68.

Meisels, S.J. (1988). Assessing readiness. Ann Arbor, Michigan: Center for the Improvement of Early Reading Achievement. Ciera Report #3-002.

Meisels, S.J. (1999). Assessing Readiness. In R. C. Pianta & M. J. Cox (Eds.), <u>The Transition to Kindergarten</u>. (pp. 39-66). Baltimore, MD: Paul H. Brookes Publishing Co.

Meisels, S.J., Bickel, D.D., Nicholson, J., Xue, Y., & Atkins-Burnett, S. (2001). Trusting teachers' judgments: A validity study of a curriculum-embedded performance assessment in kindergarten to Grade 3. <u>American Educational Research Journal</u>, 38(1), 73-95.

Morongello, B. (1997). <u>Tapping School Readiness in the NLSCY: Measurement Issues and Solutions</u>. Ottawa: Applied Research Branch, Strategic Policy, Human Resources Development Canada. T-98-1E.

Muthen, B.O., & Muthen, L.K. (2004). <u>Mplus version 3.0</u>. Los Angeles: Muthen & Muthen.

Muthen, B.O. (1994). Multilevel covariance structure analysis. <u>Sociological Methods and Research</u>, 22, 376-398.

NLSC Project Team. (1995). <u>National Longitudinal Survey of Children: Overview of Survey Instruments for 1994-95 Data Collection Cycle 1</u>. Ottawa: Statistics Canada Human Resources Development Canada, 95-102.

Offord, D.R., Kraemer, H.C., Kazdin, A.E., Jensen, P.S., & Harrington, R. (1998). Lowering the burden of suffering from child psychiatric disorder: Trade-offs among clinical, targeted, and universal interventions. <u>Journal of American Academy of Child and Adolescent Psychiatry</u>, 37, 686-94.

Offord, D.R., Kraemer, H.C., Kazdin, A.E., Jensen, P.S., Harrington, R., & Gardner, J.S. (1999). Lowering the burden of suffering: Monitoring the benefits of clinical, targeted, and universal approaches. In D. Keating & C. Hertzman (Eds.), Developmental Health and the Wealth of Nations. (pp. 293-310). New York: The Guilford Press.

Offord, D.R., & Lipman, E.L. (1996). Emotional and behavioural problems. In Anonymous, Growing up in Canada: National Longitudinal Survey of Children and Youth. (pp. 119-126). Ottawa: Human Resources Development Canada.

Phillips, D., & Love, J. (1995). Indicators for school readiness, schooling, and child care in early to middle childhood. Washington, D.C.: Institute for Research on Poverty. Special Report No. 60b, May 1995.

Pianta, R.C., & McCoy, S.J. (1997). The first day of school: The predictive validity of early school screening. Journal of Applied Developmental Psychology, 18, 1-22.

Pianta, R.C., Steinberg, M.S., & Rollins, K.B. (1995). The first two years of school: Teacher-child relationships and deflections in children's classroom adjustment. Development and Psychopathology, 7, 295-312.

Rimm-Kaufman, S.E., Pianta, R.C., Cox, M.J. (2000). Teachers' judgments of problems in the transition to kindergarten. Early Childhood Research Quarterly, 15, 147-165.

Roessingh, H.., Kover, P. (2003). Variability of learners' acquisition of cognitive academic language proficiency: What can we learn from achievement measures? <u>TESL Canada Journal</u>, 21:1, 1-21.

Rose, G. (1994). <u>The Strategy of Preventive Medicine</u>. Oxford: Oxford University Press.

Schonkoff, J.P., & Phillips, D.A. (2000). <u>From Neurons to Neighborhoods</u>. Washington,D.C.: National Academy Press.

Schwartz, A.E., Stiefel, L. (2006) Is there a nativity gap? New evidence on the academic performance of immigrant students. <u>Education Finance and Policy</u>, 17-49.

Seward, C.L., & Loomis, C. (2005) <u>Rural neighbourhood collective efficacy influences children's readiness to learn</u>. Poster session, Biennial Meeting, SRCD Meeting, Atlanta, GA.

Sheehan, R., Cryan, J.R., Wiechel, J., & Bandy, I.G. (1991). Factors contributing to success in elementary schools: Research findings for early childhood educators. <u>Journal of Research in Childhood Education</u>, 6(1), 66-74.

Shore, R. (1997). <u>Rethinking the Brain: New Insights into Early Development</u>. New York: Families and Work Institute.

Sigafoos, J., & Pennell, D. (1995). Parent and teacher assessment of receptive and expressive language in preschool children with developmental disabilities. <u>Education and Training in Mental Retardation and Developmental Disabilities</u>, 30(4), 329-335.

Spence, C.M. (2005). Creating a Literacy environment for Boys: Ideas for Teachers, Administrators, and Parents. Toronto, ON: Thomson Nelson.

Starfield, B. (2002). Forward to: Improving children's health: How population-based research can inform policy - The Manitoba Experience. Canadian Journal of Public Health, 93, S7.

Statistics Canada (2005). Canada at a Glance 2005. Catalogue number [12-581-XPE]. Ottawa, Statistics, Canada, Communications Division.

Streiner, D.L., & Norman, G.R. (1995). Health Measurement Scales: A Practical Guide to Their Development and Use. (2 ed.). New York: Oxford University Press.

Swanson, B., Payne, D., & Jackson, B. (1981). A predictive validity study of the Metropolitan Readiness Tests and Meeting Street School Test against first grade Metropolitan Achievement Test scores. Educational and Psychological Measurement, 41, 575-578.

Verhulst, F.C., & Akkerhuis, G.W. (1989). Agreement between parents' and teachers' ratings of behavioral/emotional problems of children aged 4-12. Journal of Child Psychology & Psychiatry & Allied Disciplines, 30(1), 123-136.

Wenner, G. (1995). Kindergarten screens as tools for the early identification of children at risk for remediation or grade retention. Psychology in the Schools, 32, 249-254.

Willms, J.D., & Jacobsen, S. (1990). Growth in mathematics skills during the intermediate years: Sex differences and school effects. International Journal of Educational Research, 14, 157-174.

Winsler, A., & Wallace, G.L. (2002). Behavior problems and social skills in preschool children: Parent-teacher agreement and relations with classroom observations. Early Education and Development, 13(1), 41-58.

Woodcock, R.W., McGrew, K.S., & Mather, N. (2001). Woodcock-JohnsonIII Tests of Achievement. Itasca, IL: Riverside.

Zill, N., Resnick, G., Kim, K., Hubbel McKey, R., Clark, C., Pai-Samant, S., & et al. (2001). Head Start FACES: Longitudinal finding on program performance, third progress report. Washington, DC: Research, Demonstration, and Evaluation Branch & Head Start Bureau, Administration on Children, Youth and Families, U.S. Department of Health and Human Service.

Zill, N. (1999). Promoting educational equity and excellence in kindergarten. In R.C. Pianta, M.J. Cox (Eds.), The transition to kindergarten. Baltimore, MD: Paul H. Brookes.

Table 1

Sample of questions from the EDI

Physical Health and Well-being	Social Competence	Emotional Maturity	Language and Cognitive Development	Communication Skills and General Knowledge
How often has the child arrived to school too tired to do school work?	How would you rate this child's ability to get along with peers?	Would you say that this child will try to help someone who has been hurt?	Would you say that this child is generally interested in books?	How would you rate this child's ability to communicate own needs in an understandable way?
How would you rate this child's ability to manipulate objects?	Would you say that this child accepts responsibility for actions?	Would you say that this child gets into physical fights?	Would you say that this child is showing awareness of rhyming words?	How would you rate this child's ability to tell a story?

Physical Health and Well-being	Social Competence	Emotional Maturity	Language and Cognitive Development	Communication Skills and General Knowledge
How would you rate this child's level of energy throughout the school day?	Would you say that this child is able to solve day-to-day problems by himself?	Would you say that this child can't sit still, is restless	Would you say that this child is interested in games involving numbers?	How would you rate this child's ability to take part in imaginative play?

Table 2

Description of sample in each of the studies

Study	Valid N	Age (in years)	% Girls	% with English as a second language (ESL)	% Mothers with more than high school education	% Living with married biological parents
2	82	5.6±0.36	50.0	6.9	79.3	83.3
1	Total:16,074				N/a	N/a
	JK 4934	4.9±0.28	50.2	31.9		
	SK 11140	5.9±0.30	48.4	27.7		

Table 3

Average sociodemographic characteristics for school areas participating in Study 1

Site	Average 1996 family income ($)	Unemployment rate	% No high school diploma
1	75291	8.5	16.0
2	70331	9.4	16.4
3	66343	10.9	19.7
4	37901	14.1	26.6
5	45348	13.2	31.3
6	24193	15.4	43.7
Canada 1996	54583	10.10	22.7

Table 4

Summary of the factor analysis (principal axis factoring)

Factor	Physical Health and Well-being N of items, Mean loading (range)	Social Competence N of items, Mean loading (range)	Emotional Maturity N of items, Mean loading (range)	Language and Cognitive Development N of items, Mean loading (range)	Communication Skills and General Knowledge N of items, Mean loading (range)
1		17, 0.641 (0.411-0.938)			
2				16, 0.557 (0.204-0.961)	
3					8, 0.861 (0.426-1.061)
4			8, 0.836 (0.769-0.962)		
5	1, 0.119		8, 0.627 (0.448-0.876)		

6		7, 0.691 (0.500-0.833)	
7	5, 0.787 (0.704-0.858)		
8			6, 0.633 (0.310-0.924)
9		4, 0.835 (0.515-1.050)	1, 0.211
10	4, 0.611 (0.504-0.702)		
11		5, 0.511 (0.302-0.697)	
12		5, 0.570 (0.333-0.819)	1, 0.265

13				2, 0.894	
				(0.876-0.913)	
14	3, 0.310				
	(0.271-0.387)				
Total	13, 0.572	26, 0.647	28, 0.682	26, 0.576	8, 0.861
Cumulative % variance explained	4.8	37.7	48.2	58.9	63.1

Table 5

Indices of fit for multilevel models

Domain	Between-teacher			Within-teacher			Difference in CFI
	CFI	RMSEA	SRMR	CFI	RMSEA	SRMR	
Physical Health and Well-being	0.699	0.248	0.190	0.739	0.140	0.085	0.105
Social Competence	0.414	0.224	0.202	0.502	0.151	0.141	0.065
Emotional Maturity	0.657	0.200	0.092	0.724	0.130	0.091	0.001
Language and Cognitive Development	0.626	0.157	0.091	0.739	0.098	0.073	0.018
Communication Skills and General Knowledge	0.955	0.170	0.015	0.972	0.101	0.019	0.004

CFI - comparative fit index

RMSEA - root mean square error approximation

SRMR - standardized root mean residual

Table 6

Results of the multilevel confirmatory analyses

	Intraclass coefficients (ICC)	Teacher reliability estimates
Physical Health and Well-being	0.305	0.843
Social Competence	0.196	0.759
Emotional Maturity	0.206	0.770
Language and Cognitive Development	0.245	0.804
Communication Skills and General Knowledge	0.258	0.813

Table 7

Gender and age in the EDI scores

		N	Mean	Standard Deviation	F ratio[a]	N	Mean	Standard Deviation	F ratio[a]	Correlation with age[a]
		SK (5-year-olds)				JK (4-year-olds)				
Physical health	Boys	5628	8.39	1.15	172.00	2448	7.87	1.25	107.12	
										.231
and well-being	Girls	5267	8.66	1.03		2470	8.23	1.16		
Social	Boys	5278	7.80	1.94	438.17	2210	7.23	2.09	207.13	
										.170
competence	Girls	4965	8.54	1.62		2220	8.07	1.78		
Emotional	Boys	5590	7.41	1.65	717.49	2434	6.93	1.69	278.65	
										.162

maturity	Girls	5253	8.20	1.38		2457	7.68	1.44	
Language and	Boys	5634	7.69	2.10	187.42	2449	5.93	2.37	102.22
									.377
cognitive devt	Girls	5275	8.21	1.90		2471	6.60	2.25	
Communication	Boys	5609	6.85	2.20	125.63	2449	6.20	2.35	52.29	.192
and general	Girls	5247	7.31	2.12		2470	6.69	2.32	
knowledge									

[a]All statistically significant at p<.0001.

Table 8

EDI Domains By ESL and JK/SK

				JK					SK		
EDI Domain	ESL Status	N	Mean	Standard Deviation	F-stat	p-value	N	Mean	Standard Deviation	F-stat	p-value
Physical	No ESL	3096	8.18	1.19	111.92	<0.001	7625	8.56	1.11	48.45	<0.001
	ESL	1448	7.78	1.22			2928	8.39	1.08		
Social	No ESL	2814	7.86	1.93	107.26	<0.001	7228	8.21	1.83	22.59	<0.001
	ESL	1275	7.18	1.98			2745	8.01	1.79		
Emotional	No ESL	3077	7.45	1.64	107.17	<0.001	7593	7.82	1.61	20.59	<0.001
	ESL	1440	6.93	1.46			2914	7.67	1.45		
Language/ Cognitive	No ESL	3098	6.68	2.21	359.03	<0.001	7637	8.10	1.94	165.09	<0.001
	ESL	1448	5.33	2.30			2930	7.54	2.20		
Comunication/ General Knowledge	No ESL	3097	7.47	1.80	3279.51	<0.001	7587	7.76	1.83	4189.20	<0.001
	ESL	1448	4.19	1.79			2927	5.17	1.87		

Table 9

Parent interview questions and their relevance to the EDI domains

Question	Responses	Association with EDI domains
How many times has your family consulted or visited a health professional within the past year?	Number	Physical Health and Well-being
In general, would you say that your child's health is:	1-poor, 2-fair, 3-good, 4-very good, 5-excellent	Physical Health and Well-being
In your opinion, how physically active is your child compared to other children the same age and sex?	1-not active at all, 2-a bit active, 3-average, 4-active, 5-very active	Physical Health and Well-being
Would you describe your child as being usually:	1-happy and interested in life, 2-somewhat happy, 3-somewhat unhappy, 4-unhappy with little interest in life, 5-so unhappy that life is not worthwhile	Physical Health and Well-being Social Competence Emotional Maturity

How would you describe his/her usual ability to think and solve day-to-day problems? Is s/he:	1-able to think clearly and solve problems, 2-having a little difficulty, 3-having some difficulty, 4-having a great deal of difficulty, 5-unable to think or solve problems	Social Competence Emotional Maturity
Apart from school, about how many days a week does s/he do things with other children?	1-never, 2-1 day/wk, 3-2 to 3 days/wk, 4-4 to 5 days/wk, 5-6 to 7 days/wk,	Social Competence Emotional Maturity
During the past 6 months, how well has your child been getting along with other children such as friends or classmates (excluding siblings)?	1-very well, no problems, 2-quite well, hardly any problems, 3-pretty well, occasional problems, 4-not well at all, constant problems	Social Competence Emotional Maturity
Since starting school in the fall, how well has s/he been getting along with his/her teachers?	As above	Social Competence Emotional Maturity

During the past 6 months, how well has s/he been getting along with his/her parents?	As above	Social Competence Emotional Maturity
With regard to how s/he feels about school, how often does s/he look forward to going to school?	1-almost never, 2-rarely, 3-sometimes, 4-often, 5-almost always	Social Competence Emotional Maturity
How often does your child look at books, comics, magazines, etc. on his/her own?	1-rarely, 2-less than once a month, 3-once a month, 4-a few times a months, 5-once a week, 6-a few times a week, 7-daily, 8-many times each day	Laguage and Cognitive Development Communication Skills and General Knowledge
How often does s/he play with markers or pencils doing real or pretend writing?	As above	Laguage and Cognitive Development Communication Skills and General Knowledge

Currently, how often do you or another adult read aloud to him/her or listen to him/her read or attempt to read aloud?	As above	Laguage and Cognitive Development Communication Skills and General Knowledge
How old was s/he when you started (to the nearest month of age)?	Age in months	Laguage and Cognitive Development Communication Skills and General Knowledge

Table 10

Reliability and validity data on the EDI (Pearson correlations)

	Physical Health & Well-being	Social Competence	Emotional Maturity	Language & Cognitive Development	Communication and General Knowledge
School-child care teacher correlations (N=53)	.69	.80	.77	.72	.53
P	.00	.00	.00	.00	.00
Parent-teacher correlations (N=82)	.36	.50	.36	.64	.41
P	.00	.00	.00	.00	.00
Correlations with PPVT language assessment (N=82)	.05	.01	.13	.31	.47
P	NS	NS	NS	.00	.00

Table 11

Associations between teacher EDI ratings on Social Competence and Emotional Maturity

and parent ratings related to child socio-emotional competence (N=82)

		Happiness	Thinking/ Problem solving	Frequency of playing with children	Getting along with children at school	Getting along teacher school	Getting along parents	Looking forward to school
Social competence	Pearson r	.36	.31	.39	.11	.48	.33	.31
	P	.00	.01	.00	.35	.00	.00	.01
Emotional maturity	Pearson r	.25	.30	.27	.14	.42	.21	.24
	P	.03	.01	.01	.20	.00	.06	.03

Table 12

Associations between teacher EDI ratings on Language and Cognitive Development and Communication Skills and General

Knowledge and parent ratings related to child cognitive competence (N=82)

		Interest in books	Interest in writing	Frequency of reading with child	Age started being read to
Language and	Pearson r	.24	.22	.25	.20
cognitive devt	P	.03	.05	.02	.08
Communication	Pearson r	.16	.21	.16	.26
and general	P	.15	.07	.14	.02
knowledge					