

**Early Development Instrument: An indicator of developmental health
at school entry**

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Introduction: Brain development and children's outcomes

The paths of early development are dependent on the interplay between genes and the environment. Advances in scientific discovery have allowed to reconceptualise the old debate of nature versus nurture into the exploration of how nature shapes the development through nurture (Schonkoff & Phillips, 2000). While foundations are laid genetically, the specific neuropathways in the brain and maturing nervous system develop or disappear, depending on experience. Some of the most illuminating examples are provided by the work of Kuhl and her colleagues in the area of language development. They showed that young babies have no preference for sounds of any specific language; however, by the age of 10 months they react preferentially to sounds present in the language they are being brought up in, thus suggesting that certain pathways have solidified in their brains due to exposure. Animal studies indicate that not only the environment but specific maternal behaviour can modify expression of genes, which then has long-term consequences for the offspring (Meaney, 2001).

Genetic susceptibility for a development of certain behavioural disorders is yet another example of the interaction between genes and environment. There is evidence that people with a hereditary predisposition are more likely to develop psychopathology than those without the predisposition, especially when exposed to a disadvantageous environment (Rutter, 1999).

Neuroscientists characterise the early brain development as fast, plastic, complex, and flexible (Shore, 1997). Speed of early development exceeds any other period in life. It proceeds in waves: different areas of brain become active at different times and at

varying intensity. Babies and children reach milestones sometimes suddenly, sometimes after a prolonged practice. Plasticity allows the brain to recover from a trauma, and in some cases to develop a compensatory mechanism to deal with a deficit. On the other hand, if a child is not exposed to the experience she needs, the particular connection may not develop early enough – or not at all. This could be simply physiological: a child who was born deaf will not be able to develop speech in the same way a typical child would. Moreover, this also means that there are times when exposure to negative stimuli – or even lack of appropriate stimulation – may have long-term consequences. In some cases, these windows in development are very specific in relation to the skill. This is true, for example, for things like vision and hearing. It is more difficult, however, to establish whether similar windows occur for more broadly based skills, such as emotion regulation.. In many skills, the plasticity aspect helps if a skill has not developed, but often it could be harder to master the skills outside of the critical period. Studies following up early intervention programs have clearly shown that preschool-level intervention is more likely to improve children's outcomes than a later-age intervention (Schweinhart, 2006). Another type of evidence is provided by studies of children adopted from orphanages at different ages. Children who spent more than the first 8 months of life in an orphanage exhibited more deviant behaviours and less attachment security than those who were adopted after a shorter amount of time (Chisholm, 1998).

Clearly, a child's brain reacts to both positive and negative stimuli, and both of those can have long-lasting consequences.

During the first few years, development occurs in many domains but there are hardly the boundaries between them that we can distinguish in the pre-school years.

When a parent cuddles a toddler while reading a story, this event provides social, emotional, linguistic, cognitive, and possibly even moral or regulatory experiences. Divisions into domains are approximate at the very early stages: some issues can clearly be labeled as one or the other, but only in total they contribute to the child's development.

By the time we talk about being ready for school, the developmental domains crystallise to a certain extent, and it is possible to talk about several domains that are highly relevant to a child's success at school (Doherty, 1997; Kagan, 1992). These are:

- physical health and well-being
- social and emotional competence
- approaches to learning
- cognitive and language competence
- communication skills.

There are striking disparities in what children know and can do at each stage of their development, and these are often clear before they reach kindergarten. The broad range of individual differences among young children often makes it difficult to distinguish normal variations and maturational delays from transient disorders and persistent impairments. These differences are strongly associated with physical, social and economic circumstances and are usually highly predictive of future school success.

It appears that the differences with which children reach kindergarten do not disappear over the years of schooling – at best, they are kept constant; at worst, they grow larger (Alexander & Entwisle, 1988). According to Entwisle and Alexander (1997), all children make gains during their education, but those who start at a lower point, make less gains than those who start at a higher point: in other words, a relative standing at the

entry to Grade 1 predicts the child's relative position in later school years. Children who have had access to adequate nutrition and shelter, experienced positive stimulation, a warm and loving environment, and were in good health, will start their formal education at the point from which they can make the highest gains. Those who lack these basic necessities will, on average, remain behind – thus it appears that the difference at age 5 may be there for life.

Therefore, it is essential that a snapshot of children's well-being – in the broad sense of this word – is taken at school entry. It is ideal if such a snapshot is taken from many perspectives and includes multidimensional assessments (Love, Aber, & Brooks-Gunn, 1994). Costs and benefits of overburdening children and families, as well as financial considerations have to be taken into account together with the focus of such measurement.

School readiness

The concept that is measurable and focused on the issues reviewed thus far could be described as “school readiness”, or even “readiness for school”. This zooms in on the qualities necessary for the child to have an enjoyable, successful and fulfilling experience in school. This last part of it is very important: at the forefront of this work is always the desire to make a positive difference in the lives of children.

One of the criticisms of the “school readiness” issue is that it is culturally limited. This is especially important in large countries with a dominant language and culture, where there are many other languages and cultures, which may not be perceived as equal

– Australia, Canada, United States, but also in countries that have culture and customs that differ from these countries where English is the predominant language. I would like to argue that at the beginning of the 21st century, the value of education is recognised and valued by every culture. What we as a society have to catch up with, taking advantage of this recognition, is the quality of education that we can provide and the quality of schools and teaching.

Children develop exactly in the same way regardless of their place of birth and ethnicity. There are variations in the manifestations of developmental milestones, but indicators of health are universal. We need to find an indicator that lends itself to a population-level assessment; and that would cover the spectrum of a child's developmental health.

The shift in the age between 5 and 7 years has been termed as “the age of reason and responsibility”, the transition between the preschool and the school-age child (Sameroff & Haith, 1996). Children's way of thinking and behaviour changes dramatically in this period, acquiring the precursors of later maturity. Rogoff et al. (1975) investigated the roles and expectations of children in 50 communities across the world. They found that these change dramatically in the period between 5 and 7, when children are given increased responsibility for various culture-appropriate tasks (e.g., tending animals, caring for younger children, helping in household chores, etc.), which required trust and independence. Moreover, it was in this age-range that children were expected to become “teachable”. Indeed, it is not a simple coincidence that in many countries the age range between 5 and 7 is the time when children start school.

Therefore, “school readiness” is a convenient shortcut to children’s developmental health at the cusp of early years and school-age development. A measurement taken at school entry is a convenient marker for the 5 to 7 age range.

A recent UNICEF-funded initiative, led by Sharon Kagan and Pia Britto, to develop culturally-sensitive early childhood development standards demonstrated impressive universality in the general domains that are relevant to people from 10 countries with a wide variety of cultures and languages (Britto, 2006). All of them had identified at least five areas, and while some added more (like moral awareness or religion), these five: physical health, social and emotional competence, language, communication, and numeracy were universal.

In many ways, the term “school readiness” is simply a shortcut to – or a snapshot of - the outcome of the transition process. Children face many transitions in their lives, but this one – from home, or even preschool – to school, where they assume the full role of the student is probably the most dramatic and traumatic one for many children, especially in the face of serious systems’ discontinuities between the preschool and school environments (Kagan & Neville, 1996). Ever-earlier schooling is being set up to ease this transition into Grade 1. In most western countries, children start kindergarten at age 5 – thus, Grade 1 at 6 – and there are many places that offer an earlier version of kindergarten, the junior kindergarten at age 4. The transition to school does not all happen on the first day; there could be some consequences of the events of that day (Pianta & McCoy, 1997), but the process of adjustment to new environment, learning about learning and about the teacher, and about the school, takes time. The starting point before Grade 1 is a combination of what the child brings to school as an outcome of his

or her first five years in his family, in the neighbourhood, in an idiosyncratic combination with the child's age and gender, and the school practices towards easing the transition process (Meisels, 1998). Since these tend to be similar across the school divisions, it is fairly safe to assume that children bring with them a much larger proportion of variance than could be accounted for by schools. So what has to be captured by the concept of school readiness is really that “whole child” view of their adjustment for formal education as it is offered by school system. It cannot be simply an assessment of their language abilities, neither can it be a measure of their hearing or vision, of whether they can copy a shape or not, or how well they work in a group. It has to be a combination of all the above, set in a developmental perspective, sensitive to differences between and within children as they pertain to different skills (Love et al., 1994; Meisels, 1998), and in a context of early experiences. For example, a child that is not talked to, will not develop adequate language skills, even though she has the propensity to do so, as development is an interactive process, and not simply a maturational one.

Prosperous societies care about their young children. In such a society all citizens have the means to meet their basic needs, there is social cohesion – not division, there are “safety nets”, because various parts of the society work together for the common good. Such a society has healthy economic growth and stability, which encourages support of optimal child development: advantages of having young generation whose developmental needs have been met from the very beginning are well-recognized. This circular relationship is illustrated on Fig.1.

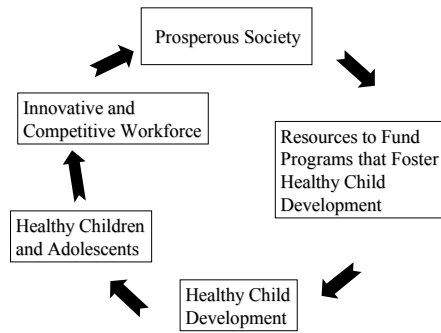


Fig. 1

One way we can try to do this is by, first, taking stock of what we know about children when they enter school. While there are a lot of similarities in general patterns of disadvantage, communities differ in specific patterns and therefore a reliable knowledge basis is crucial for the success of any interventions.

Measurement strategies

The history of measurement of early child development outcomes at population level is not very long, as there are very few of them that have been used repeatedly. They rely on health (e.g., birth weight, weight for height percentiles, immunizations) or educational statistics, for example percent of children of specific age in school (Van der Gaag & Dunkelberg, 2005). For a number of reasons, it is challenging to come up with an indicator that would be acceptable and understandable to lay audiences and yet informative and reflective of child development in the early years. As argued above, child's environmental context influences their outcome – genetic, biological, and physical environments are difficult to disentangle, especially for young children. One of the recent measurements of poverty is taking stock of the number of possessions or amenities

that children themselves or their families have access to. In many ways, these, rather than actual income, may better reflect the socioeconomic status, as they indicate what people choose to spend their money on. In Western countries, of course, the variability between these numbers is too small to use them as reliable indicators. There are ongoing and new initiatives to develop meaningful and comprehensive indicators of child well-being – not only of mortality and life expectancy, but also of the quality of life, with input from children themselves (Bradshaw, Hoelscher, & Richardson, 2006), that would be applicable to countries with various cultural and social fabric. The developmental status of children at the cusp of entering a more responsible and independent role in a society is a crucial characteristic of the well-being of whole societies – more, it is needed not just as an indicator of well-being, but as a tool to monitor how things change – or not – over time with programs and interventions.

A Brief History of the EDI

Early Development Instrument, the tool that we have been using to measure children's school readiness in Canada and several other countries, was a result of many circumstances coming together at the right time (Janus, in prep.), and it would be difficult to mention them all. Two very special people, though, without whom this would not have happened were Fraser Mustard and Dan Offord. Their enthusiasm, and will for things to happen were instrumental in the development of the EDI.

The EDI was designed with a goal in mind: to put into a questionnaire form, and a reliable and valid format, the teachers' informed view on the development, skills and

abilities of the kindergarten children in their classroom. The questions are intended to ask about noticeable markers of children's development, appropriate to this age range, most of which could also be conceivably interpreted as markers of children's brain development.

The goals of the "School Readiness Project" were to ensure that the instrument would provide means to: 1) report on populations of children at school entry; 2) monitor how groups of children were doing; and 3) establish predictive indicators of children's school trajectories. The timing of the measurement, at the cusp of early years and the school career, was envisioned as the best time to take stock of what has happened so far and set the children on a successful trajectory.

In 1999, Fraser Mustard and Margaret McCain published "The Early Years Report". The intellectual discourse captured in this document had been brewing for several years before this publication. One of the threads of this discourse was the need for an indicator of children's brain development with which the state of children could be monitored at the level of communities and neighbourhoods (McCain & Mustard, 1999). Two issues were very clear from the start: one, that national studies were not going to provide such an indicator due to too low representation at the desired levels of aggregation, two, an approximation will have to be found that would provide as close and as meaningful reflection as possible of the brain development.

While the idea of using the NLSCY as the source of data was not satisfactory for the purposes later outlined in the "Early years report", some of the methodology was. It was equally not satisfactory to envisage an individual, task-related assessment of all

children in kindergarten. First, the cost of such an assessment would be prohibitive, thus negating the purpose of population-level data collection; second, although individual tasks are appropriate to test linguistic and cognitive abilities, and some aspects of physical development, they are not appropriate for the assessment of socio-emotional abilities. These have to be relied upon informed observers, who know the children well.

After much deliberation in the initial stages of the development of the EDI, it has been decided that it will be a checklist (and not a direct assessment), based on instruments used in the NLSCY, enriched where necessary in view of some shortcomings in school readiness measurement (Morongello, 1997), completed by the teachers. These decisions were preceded by much discussion on who should be the informant, and whether the aim should be a sample or a population. The final version, a teacher-completed checklist that is recommended for implementation with whole populations of children, was settled upon for several reasons. First, the feasibility of achieving a population-based measure was considered in relation to the identity of the informant: if a parent were the respondent, the necessity to translate the instrument into many languages would have made the cost of the instrument prohibitive. Second, the concept that needed to be captured was the children's ability to take advantage of school activities – in the language of instruction, and therefore, teachers were the most desired and knowledgeable respondents. Third, sample-based data would create their own problems in terms of representativeness and approximations. Data on a whole population of 5-year-olds have the advantage of not being estimates and provide the opportunity to detect patterns and differences that could otherwise be obscured. The next presentation/chapter will clearly demonstrate why the population approach is better than the sample one. Some of the

most exciting findings come from the communities which appear to do the opposite to what you would expect on the basis of the “average” characteristics. Selecting a sample would most likely not show these results. Selecting a sample would also most likely obscure smaller populations, or groups whose claim to the title of “community” is based on their ethnicity, nationality, language, or some other, non-geographic characteristics.

The tool was designed in response to a need for a survey-like instrument that would provide a snapshot of children’s school readiness: informative enough to provide reliable data, interpretable for groups of children, and yet simple enough to be feasible to use for whole populations of children. At this point in time, this is our best effort at having a proximate measure of brain development at approximately 5 years of age. This measure can be related to other population-based characteristics, like low birth weight, school attendance, socioeconomic status.

Following a number of drafts, largely based on instruments which were drawn upon for the battery of questions used in the NLSCY, two years of small-scale and larger-scale implementations, and a set of validity and reliability studies (Janus & Offord, 2006), in press the final version was established in 2000.

Currently, as of April 2006, in Canada there are three provinces that use the EDI for all five-year-olds on a regular basis: BC, Manitoba and Ontario. The EDI has been used in three waves of the federal Understanding the Early Years (UEY) project, and in a number of provincially- or locally-funded initiatives. Among the projects currently under way at the Offord Centre are: improvement of the ways to use the EDI to capture the indicators of child development; a shorter version for translation and adaptation in other

countries; research on school adjustment among children with special needs; and further research on the EDI validity and reliability at the individual as well as neighbourhood level.

In Australia, a federally-funded community project involving 60 sites over three years uses an adopted EDI into the AEDI). Several sites in Western US have used the EDI; the EDI was translated into Spanish and used in Chile; it was also translated into Albanian for a project in Kosovo, into Dutch for use in a research project in Holland; and used in research projects in New Zealand and Jamaica .

To recapitulate, then, the school readiness tool was supposed to capture the holistic development of the child. The framework of our instrument was based on the existing literature on what type of skills and behaviours contribute to school readiness, understood broadly as the ability (in all domains of development) to benefit from the educational activities that are provided by the school (Doherty, 1997). The term itself, “school readiness” is really a shortcut, or a proxy, for a holistic indicator for developmental health, one that covers the main developmental domains, at the same time reflecting outcomes and milestones achieved during the first five years of life within the context of early experiences.

What is the EDI

The EDI covers five major developmental domains: physical health and well-being, social competence, emotional maturity, language and cognitive development, and communication skills and general knowledge. Further work on refining the EDI yielded

a total of 16 more fine-grained subdomains (Janus, Walsh, & Duku, 2005), outlined in Table 1.

The instrument consists of 103 questions which contribute to the five “core” domains. Over and above of these, there are close to 40 items relating to child demographics, attendance, special skills and problems, and preschool. The additional items cover demographics (date of birth, gender), language (first language, mono- versus bilingual), type and timing of the class, and whether the child is repeating the grade. A set of 7 questions contributes to the rating on children’s special skills (e.g., athletics, language, music). A set of 9 questions provides the base for the rating on special problems; followed by a question whether – in the respondent’s opinion – the child needs a further assessment. At the end of the instrument, there are five standard questions referring to the child’s history prior to school entry, and up to five additional ones that can be customised. Throughout, there are several places where comments can be provided.

While the EDI is completed for individual children in a class, the scores are aggregated to school or neighbourhood level, and never reported for individuals. Moreover, the interpretation can only occur at group level, based on the analyses of all children and with reference to the distribution of all scores. Thus, no child can ever be labeled as “not ready to learn”.

School readiness as an indicator of children’s health

In order for a measurable concept to serve as an indicator of children’s health in a community, three major characteristics are needed: the concept needs to reflect a broad concept of health; it needs to be capable of serving as a population-level indicator, and has to be useful at both micro-level (neighbourhood) and the macro-level – city or even country (Janus, 2006). These characteristics, as they apply to the EDI, are reviewed below.

First of all, the EDI does cover all major areas of child developmental health; physical, social, emotional, language/cognitive, and communication. The instrument covers five developmental domains, which in turn consist of more fine-grained sub-domains (Table 1).

Table 1. SCHOOL READINESS DOMAINS AND SUBDOMAINS

Physical Health and Well-being	Social Competence	Emotional Maturity	Language and Cognitive Development	Communication Skills and General Knowledge
<ul style="list-style-type: none"> • Physical readiness for school day • Physical independence • Gross and fine motor skills 	<ul style="list-style-type: none"> • Overall social competence • Responsibility and respect • Approaches to learning • Readiness to explore new things 	<ul style="list-style-type: none"> • Prosocial and helping behaviour • Anxious and fearful behaviour • Aggressive behaviour • Hyperactivity and inattention 	<ul style="list-style-type: none"> • Basic literacy • Interest in literacy/numeracy and memory • Advanced literacy • Basic numeracy 	<ul style="list-style-type: none"> • Communication skills and general knowledge

Is the EDI indeed well-suited to provide a population-level indicator? The EDI’s feasibility and relatively low cost, as well as concentration on a specific age (or specific time in a child’s life), all predispose it to such a function. While a more detailed picture is demonstrated in the next presentation/chapter, below is an example of how changes in the EDI and the population characteristics could be explored.

EDI data were collected in this community for 162 schools, almost 10,000 children in 1999 and 2001. Neighbourhood income data (median) were extracted from Statistics Canada – census done in 1996 (theoretically when the children were growing) and 2001 (concurrently). The scores on the EDI were grouped into Cognitive and Socioemotional areas (Runions, Janus, & Keating, 2006). Table 2 summarises the results of hierarchical regression analyses.

Table 2. EDI 2001 IS PREDICTED BY...

Domains	Cog		Social		
	Tot	ΔR^2	Tot	ΔR^2	
EDI 1999 only		.32		.211	
EDI 99, Income 96+2001	.364	.052	.236	.024	
EDI 99, Income 96	.35	.034	.228	.016	
EDI 99, Inc 96, Inc 01		.364	.018	.236	.008

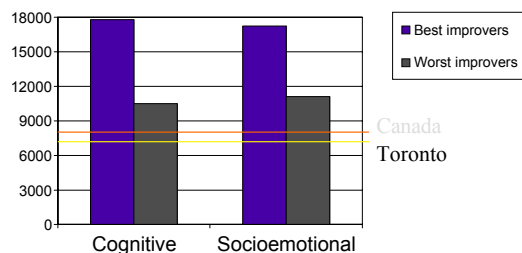
These results show that variance in EDI 2001 is largely explained by the EDI 1999 scores (thus indicating stability of the scores), and the neighbourhood income.

Intriguingly, they also suggest that the addition of the concurrent income levels does not make very much difference in the explanatory value (between close to 2 and 1 % of variance), which poses a question about the EDI’s sensitivity to change.

This question was explored in a subsequent analysis. The 162 schools were divided into 4 equal groups based on improvement (from 1999 to 2001) in Cognitive and Socioemotional scores, and the Best and Worst improvers were contrasted by comparing the change in median income between the neighbourhoods (Figure 2).

Figure 2.

Change in neighbourhood income



(For figure legend) The lines represent the average magnitude of change in income (increase) for Canada and for Toronto.

As is clear from Figure 2, income increased in all neighbourhoods between 1996 and 2001; but the increase was not equal among neighbourhoods. This inequality was reflected/associated with improvement in the EDI scores: neighbourhoods where the EDI improved most between 1999 and 2001 also experienced the highest growth in income. Neighbourhoods where the EDI scores improved worst also experienced increase in median income, and this increase was better than average – but for some reason this was not good enough (for more detail, see Runions, Janus, Keating 2006).

The third quality necessary for an indicator was its usefulness at various levels of aggregation. Experience shows that the EDI provides information that is useful at both local and more global levels. The instrument yields average scores and their distribution, percentages of children whose abilities are above or below specific or global cut-offs, which can be adjusted for an area of interest: neighbourhood, city, province or state, if data were collected for children in all these units. The ways results can be used could be grouped into three categories (Janus, 2006):

- basic information: averages, percentages of vulnerable children,

- comparisons: between neighbourhoods, groups of children, against the baseline or normative data,
- associations: with data from other sources, income, nutrition, culture, services.

Some of these will be illustrated in the following presentations/chapters, as well as during the poster session. More examples can be found in Janus 2006.

The psychometric properties of the EDI

It is not the purpose of this chapter to report in detail on the psychometric properties of the EDI. Instead, a brief overview of selected studies of the EDI's validity and reliability to date is provided. Details of these and other studies are available in Janus & Offord (2005, in press), Janus & Duku (2006, in prep), (Gaskin, Janus, & Duku, 2005) and Duku & Janus (2004).

Validity of a measurement needs to provide evidence that the scores on the measure have a solid scientific background for interpretation as the indicator of the skills being measured. There are a number of ways in which validity can be assessed. Presented here are three types of validity assessment carried out with the EDI:

- Concurrent validity: comparisons with other tests.
- External validity: 1) comparisons with other measures of similar concepts: parent reports; 2) relationships with other measures
- Predictive validity: prediction of later scores

Table 3 shows the results of correlations between the EDI domains and children's scores on a direct developmental assessment, First Step (Miller, 1993), and for a separate

group of children, with the Peabody Picture Vocabulary Test (PPVT) of receptive vocabulary (Dunn & Dunn, 1981), and the Who Am I test (deLemos & Doig, 1999).

Table 3. ASSOCIATION OF THE EDI SCORES WITH OTHER MEASURES.

	Correlations With First Step score N=120	With PPVT N=1700	With Who Am I N=1700
Physical Health and Well-being	Motor 0.54	0.05	0.14
Social Competence	Socio-emotional 0.65	0.22	0.38
Emotional Maturity	Socio-emotional 0.73	0.11	0.36
Language and Cognitive Development	Cognitive 0.58	0.26	0.46
Communication Skills and General Knowledge	Cognitive 0.52	0.57	0.22

Peabody Picture Vocabulary Test (PPVT) (Dunn et al., 1981) is a test of receptive language, which provides a brief index of cognitive functioning. The PPVT score is considered to be a reasonably reliable approximation of the IQ.

Who Am I (deLemos et al., 1999) is a nonverbal language assessment, which provides a reliable measure of development and is valid across different cultural groups, including children whose knowledge of English is limited. It comprises three scales: copying circle, cross, square, triangle, diamond), symbols (printing name, letters, numbers, words, sentences), and drawing (a picture of self). The Who Am I is suitable for children age 3-7.

External validity of the EDI was assessed with parent interviews. Questions in the areas corresponding with the EDI domains were asked (e.g., for physical health, “how would you rate the child’s health?”, “how would you rate the child’s level of activity?”) and the answers correlated with the EDI scores. Individual correlations within the Physical Health and Well-being domain ranged from 0.15-0.34, with the Social Competence and Emotional Maturity domains from 0.21-0.48, and within the Language

and Communication from 0.15-0.26. All correlations were in the expected direction, and 16 out of 24 (66%) were statistically significant.

Predictive validity of the EDI was assessed with three direct tests three years after the original EDI implementation. Table 4 shows the results.

Table 4. PREDICTIVE VALIDITY N=122, all p<0.05.

With Grade 2 scores*		
Physical Health and Well-being	Visual-Motor Integration	0.27
Social Competence	SDQ Emotional score	-0.19a
Emotional Maturity	SDQ Emotional score	-0.20a
Language and Cognitive Development	DTLA-4 scores	0.46
Communication Skills and General Knowledge	DTLA-4 scores	0.43

*Higher values on the EDI indicate better scores; higher values on the SDQ indicate lower scores, and therefore the negative correlation was expected.

As mentioned before, the EDI has been used with minimal changes in six other countries. Analyses on consistency of the domains in five of those are presented in table 5. All the coefficients are high, indicating high internal consistency of the domains. The lowest values were obtained for the Physical Health and Well-being domain in Jamaica (0.641) and Chile (0.779).

Recently, a shorter version of the EDI was developed. Each of the 16 subdomains is represented by three questions. This version consists of 48 questions – three for each of the 16 subdomains. The three were chosen based on their reliability scores within the Canadian normative sample. However, when compared with reliabilities in Australian and US samples, there was a high agreement in terms of which three were the best.

In Jamaica, the full version of the EDI was used without any modifications. It is there that the reliabilities generally are the lowest (though still acceptable). I believe this indicates that perhaps not all items on our Physical Health and well-being scale are

equally relevant for children in Jamaica, as they are for children in these other countries. It is matter of debate whether these relevancies can be decided before implementing the full version, but I think they can – that is why there is a need of a process in adaptation of any tool for local circumstances.

The domain scores based on the full-length EDI (henceforth called “EDI”) and the short version (“short-EDI”) ranged from 0.795 to 0.973. In terms of identifying the same children as vulnerable (in the lowest 10th percentile on 1 or more domains), the percentages of children vulnerable or not identified by the short EDI versus the EDI were 92%. Correlations of the short version with direct assessments were also very similar to those with EDI.

Table 5. Reliability of EDI domains in samples from different countries

Domain & Sub-domains	Canada	Seattle, WA	Perth, Australia	Jamaica	Chile	New Zealand
physical health and well-being	0.831	0.823	0.806	0.641	0.779	.75
social competence	0.953	0.958	0.942	0.930	0.928	.95
emotional maturity	0.923	0.926	0.922	0.866	0.917	.92
language and cognitive development	0.907	0.892	0.883	0.883	0.882	.92
communication and general knowledge	0.931	0.957	0.934	0.890	0.864	.92

Table 6. Reliability of Short EDI domains in samples from different countries

Domain & Sub-domains	Canada	Seattle, WA	Perth, Australia	Jamaica	Chile
physical health and well-being	0.766	0.745	0.748	0.550	0.716
social competence	0.905	0.916	0.890	0.848	0.848
emotional maturity	0.836	0.841	0.838	0.672	0.835
language and cognitive development	0.856	0.829	0.842	0.820	0.820
communication and general knowledge	0.939	0.936	0.893	0.790	0.855

Can the EDI-like approach provide an answer to calls for universal indicator of children’s healthy development?

So far, our Canadian database has over 300,000 kindergarten children. The EDI, with few, if any, modifications, has been used in six other countries, two of which required translation. Others will speak on the examples of how the EDI was used in some of them. I would like to briefly address the possibilities that an EDI-like approach, in other words, comprehensive monitoring of early child development, brings to the state of knowledge on children’s health.

First of all, it provides a holistic picture of children's well-being. Areas of both strengths and deficits can be described in more detail and compared across groups of children. Second, this approach does not identify individual children's deficits (beyond the respondent's knowledge that they had to say "no" to specific questions), thus not labeling individuals. Third, it provides means for international comparison and assessment of holding up to standards that transcend local context, yet are sensitive to it.

What it cannot do is – to a certain extent – its strength in terms of the inability to give a diagnosis. By itself, the measurement alone also is not going to change anything. It cannot be interpreted for an individual child, only in comparison with data from many children, and therefore will not provide means for exclusion. While in its generic version, the EDI is completed by teachers, and has a set bank of questions, there is room for adjustment and testing of new possibilities. For example, in the recent application in Kosovo, we modified the questions to ensure that they make sense for children there, who speak Albanian. In terms of respondents, the EDI has a fairly high interrater reliability, established with early childhood educators.

There is a need, well recognised by many individuals and organisations, such as the UNICEF, for example, to have markers of children's well-being that go beyond poverty rates. They need to be sensitive to a local context, but cover the universals. The EDI, especially the short form, may provide the means to add an important dimension to monitoring the well-being of children. This would be a result of a careful and well-planned process of adaptation on one hand, and an assured retention of core concepts. While having one eye on comparability, we should not lose from our view the fact that there are differences in the contexts of children's development across the globe. Just like

in our work in Canada and Australia we believe it is very important to go down to the level of communities, and neighbourhoods, to understand the forces driving children's outcomes, it is important to keep this level of detail in the international work.

Conclusions

To conclude, it is necessary to reiterate once again the basics that guide the EDI approach, and continue to matter in using the results of the EDI at the local and broader levels. First, children develop the same way everywhere. Second, we have the same responsibility for their well-being, beyond the basic life necessities, everywhere. Third, the only way to ensure that whatever we are doing is actually working, and reaching those who need this help is to monitor children's well-being and its changes, and interpret those, not only to see whether we are actually achieving any results but especially to make sure that we are not doing any harm. In a tool like the EDI, if used with caution, we have an opportunity to measure the well-being of children in a way that accounts for the development of the whole child as she or he grows into a young person who will hopefully one day become a meaningful link in that circle of prosperous societies.

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