Scottish Early Development Instrument Phase 2 Technical Report

September 2012

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Executive summary

Early childhood is recognised as a key developmental phase with implications for longer term social, academic, health and wellbeing outcomes in later childhood and indeed throughout the adult lifespan. Community level data on inequalities in early child development is therefore required to establish the impact of government early years policies and programmes on children's strengths and vulnerabilities at local and national level, and to allow us to target tailored intervention that matches identified local community needs for improving children's readiness for the transition to school.

The aim of the study was to carry out a Scottish pilot of the 104-item Early Development Instrument (EDI), an internationally validated measure of children's global development at school entry, which had been developed in Canada. Phase 1 had been previously piloted in East Lothian, Scotland, in March 2011 with 14 P1 teachers assessing a cohort of 154 children, following which the instrument was adapted for the Scottish context (Scottish Early Development Instrument: SEDI). The Phase II pilot was then carried out using the SEDI in January 2012, analysing data from a larger sample of 1090 East Lothian P1 children evaluated by 68 teachers. Analyses of the Phase II data demonstrated that the SEDI displayed adequate psychometric and discriminatory properties and is appropriate for use across Scotland without any further modifications.

Introduction

The Early Development Instrument (EDI) is a 104-item questionnaire that assesses children's readiness for school. It was produced in response to the need for a Scottish measure that could not only assess how well communities prepare their children for school but that also could produce findings readily accessible and interpretable by health, educational and social work agencies for planning and evaluation purposes. EDI results have provided a holistic overview of child development across communities in Canada and Australia. Within Scotland, there have been few means by which geographical or socioeconomic inequalities in child development have been collectively and consistently measured to identify early years inequalities. The aim of this study was to pilot a Scottish EDI within one local authority, East Lothian.

Method

Measure

The EDI is a questionnaire that is completed by class/nursery teachers. It evaluates five domains of child development, namely: *Physical health and wellbeing* (items A2-A13 and C58/ 17-28 and 126); *Social competence* (items C1-C25 and C27/69-93 and 95); *Emotional maturity* (items C28-C57/ 96-125); *Language and cognitive development* (items B8-B33/ 36-61); and *Communication and general knowledge* (items B1-B7 and C26/29-35 and 94). In addition, all domains, with the exception of *Communication and general knowledge*, comprise a number of sub-domains. For example, the *Physical health and wellbeing* domain comprises the sub-domains, *Gross and fine motor skills*, *Physical readiness for the school day* and *Physical independence*. All questionnaire items are scored from 0-10 and the domain score is calculated as a mean of valid answers. All domains therefore have the same minimum and maximum, even though there are different numbers of items. Children whose scores fall in the bottom 10% are classed as vulnerable in that domain. If scores are beneath the 10th percentile on more than one domain, then children are classed as globally vulnerable.

Participants

There were two phases of data collection in this pilot study. The purpose of Phase 1 was to determine with a small sample whether the EDI seemed an appropriate tool for wider use with a Scottish population and to incorporate adaptations into a Scottish version (Scottish Early Development Instrument: SEDI). One hundred and fifty-four P1 pupils (82 female, 72 male) from East Lothian Education Authority participated in Phase 1. Questionnaires for these pupils were completed by 14 teachers. Mean pupil age

was 66.86 months (SD = 4.07, range 51- 81 months). Adaptations resulting from Phase 1 are presented in Appendix A.

The Phase 2 sample was recruited from all 1180 P1 pupils in East Lothian. Eighteen children however opted[1] out of participation (see also Table 1). Data from an additional 72 children were excluded (see next section for exclusion criteria). Pupil postcodes were grouped into five categories using the Scottish Neighbourhood statistics website to give an Index of Deprivation with a score of 1 being the most deprived area and 5 the most affluent. Frequency of participants in each quintile is shown in Table 2.

Data preparation and preliminary analyses

Data preparation for Phase 2 was carried out in the same manner as for Phase 1. Completed forms were electronically scanned into Excel format. Data conversion of raw scores into a range from 0-10 was carried out at McMaster University so that scores across domains could be compared. These data were then imported into PASW spreadsheets. Items on the questionnaire are labelled 1-145 (inclusive of questions concerning date of completion, for example) however on the raw data file given in excel they were labelled as qa1, for example, which is also how they are referred to in the information pertaining to factor analysis and reliability from the Canadian sample. Both labels were included in the SPSS file and are given in the following analysis for ease of interpretation. In addition, when the raw data were imported in SPSS, all questions showed data type as "unknown". This had to be amended to nominal and numeric before any further analyses could be performed. Information about participants' date of birth had to be amended and converted to age in months. Further, a number of date of births were incorrect (e.g. wrong year entered) and therefore had to be checked and corrected manually.

SES quintile coding based on each participant's postcode was added to the dataset, using the Index of Deprivation (2009 SIMD decile score) available from the Scottish Neighbourhood Statistics website (http://www.sns.gov.uk/). These ranged from 1 (most affluent) to 10 (most deprived) areas. These scores were then converted to quintiles, with quintile 1 representing the most deprived area and quintile 5 representing the most affluent. For some participants, profiles were not yet available due to their residence being built after the time of the available information. In these cases where possible a decile for the nearest property in terms of location was entered. For seven children there was no quintile information. Unlike for Phase 1, where this was carried out manually, Phase 2 postcodes were entered in batches into the website by The University of Edinburgh research team, a more efficient process for dealing with the larger Phase 2 dataset.

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[1] The opt-out group comprised 11 females and 7 males. One of the opt-out pupils had been in class less than one month; two pupils' data were recorded 'opt-out' because they had moved school.

Scoring for a number of items was reversed so that for all items a higher score was more positive. Items which were reversed are shown in Appendix B. The reversing of items led to the creation of a number of new variables in the data file indicated by variable names of qa5R, for example. In addition, as a response of "don't know" was available for all items (scored as 88 in sections A, B & C and 8 in section D) new variables were created in which these responses were excluded and were instead counted as missing (e.g. qa5_RDKE[2]). This was necessary in order to compute reliability coefficients. Furthermore, domain scores were included in the data file to represent the mean of all items in said domain. Thus the data file labelled as "Child_QuesPhase2April_Opt In_ AdditionalVariables12 SPSS.sav" contains a number of additional variables.

Exclusion Criteria

Ninety pupils were excluded from the study (see Table 1). It should be noted that criteria 1, 2, 3 and 4 are not exclusive of each other, so that one pupil appeared in Table 1 as excluded due to two separate criteria. Opt-out data by quintile are presented in Table 2.

Table 1: Exclusion Criteria and Numbers Excluded

	Criteria	Numbers Excluded
1	Participants who opted out	18
2	Participants who scored 'yes' or 'don't know' for Q.13 (identified special needs)	47
3	Participants in school < 1 month and those missing data for this question (Q.11)	30
4	Participants who had 30% of the items missing, or with > 1 domain scale data missing	1
	Total excluded based on criteria (actual number excluded):	96 (90)

Table 2 shows exclusion criterion 1 opt-out data by quintile. This indicates that there was opt-out across all quintiles except the most deprived quintile.

Forty-two participants were excluded from the final sample due to having been identified by Q13 as having additional support needs including five participants where teachers recorded 'I don't know' responses (exclusion criterion 2).   Further, in question D1/127 when teachers were asked if these children

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[2] RDKE = Reversed and Don't Know Excluded

with 'additional needs' had a problem that 'influences his/her ability to do school work in a regular classroom', only forty participants were identified as having such a problem. Teachers were then asked to identify the nature of the problem within ten specified areas and if this was based on their own observation and/or medical diagnosis and/or information from parents; the ten specified areas plus the other specified different areas of difficulty are identified as shown in Table 3.

Table 2: Frequency of Opt-Out from Each SES Quintile (Opt-out N = 18).

Quintile	Opt-Out Frequency
1: Most Deprived	0
2: Deprived	5
3: Average	2
4: Affluent	6
5: Most Affluent	4

Table 3: Frequency of Area of Difficulty Specified in Response to Question D1 (127) – 'Does the Student Have a Problem That Influences His/Her Ability to do School Work in a Regular Classroom?'

Area of difficulty	Observed by teacher (%)	Medical diagnosis/parental information (%)
Physical Disability	4 (8.5)	5 (10.6)
Visual Impairment	1 (2.1)	0
Hearing Impairment	1 (2.1)	4 (8.5)
Speech Impairment	15 (31.9)	21 (44.7)
Learning Disability	8 (17)	4 (8.5)
Emotional Problems	7 (14.9)	2 (4.3)
Behavioural Problems	11 (23.4)	1 (2.1)
Home Environment/Problems at Home	6 (12.8)	0
Chronic Medical/Health Problems	2 (4.3)	1 (2.1)
Unaddressed Dental Needs	0 (0)	0 (0)
Other – please specify		
Fine Motor Difficulties	1 (2.1)	1 (2.1)
Hyperacusis: Sensitivity to Sound	1 (2.1)	1 (2.1)
Motor Skill Development	1 (2.1)	1 (0.1)
Nystagmus: Visual Impairment	1 (2.1)	1 (2.1)
Registered as Deaf: Wears 2 hearing aids which loop to teachers microphone	1 (2.1)	1 (2.1)
Total	60 (127.5)	43 (89.3)

Teachers were also asked to specify if pupils had received a diagnosis or identification by a doctor or psychological professional (see Table 4).

Table 4: Frequency of Diagnosis Specified for Question D3 (139) – 'If the Child Has Received a Diagnosis or Identification by a Doctor or Psychological Professional Please Indicate'

Diagnosis	Frequency (%)
Acquired Brain Injury	1 (2.1)
Autism	1 (2.1)
Developmentally Delayed/Global delay	5 (10.6)
Motor Impairments	1 (2.1)
Cerebral Palsy	1 (2.1)
Speech and Language Disorders	7 (14.9)
Other	3 (6.4)
Total	19 (40.4)

Thirty of the pupils were identified as receiving "school based support (e.g. educational assistant, equipment)" with 30 pupils also receiving further assessment and an additional 18 on a waiting list. In addition, teachers felt that 30 of the pupils identified were in need of further assessment with two 'I don't know' responses elicited for this question. Thirty participants were excluded by criterion 3, 19 with missing data and 11 who had been in school less than 1 month. One was excluded from the analysis by criterion 4 because there were two sets of missing domain scale data.

Reliability

Cronbach's alpha was employed to assess the internal reliability of each SEDI domain and sub-domain. The overall Cronbach's alpha for all domains was .97, indicating high levels of internal reliability. Alpha coefficients for each domain and sub-domain are illustrated in Table 5.

Table 5: Reliability Coefficients for SEDI Domains and Sub-Domains

Domain	Sub-Domain	Cronbach's Alpha
Physical health and well being		*.78*
	Gross and fine motor skills alpha	.87
	Physical readiness for school day	.51
	Physical independence	.22
Social competence		*.96*
	Responsibility and respect subscale	.94

	Approaches to learning	.93
	Overall social competence	.88
	Readiness to explore new things	.87
Emotional maturity		*.91*
	Prosocial and helping behaviour	.92
	Hyperactivity and inattention	.92
	Anxious and fearful behaviour	.79
	Aggressive behaviour	.84
Language and cognitive development		*.91*
	Basic numeracy	.79
	Basic literacy skills	.81
	Advanced literacy	.80
	Interest in literacy/numeracy and memory	.72
Communication and general knowledge		*.93*

Table 5 shows good reliability for four of the five domains with alpha coefficients above .91, and the fifth (*Physical Health and Wellbeing*) .78. Sub-domains also indicated good levels of reliability except for *Physical independence* and the *Physical readiness for school day* with Cronbach's alpha of .22 and .51 respectively. Item deletion did not significantly improve these reliabilities. Deletion of item C58 (126; 'sucks a thumb') only increased *Physical independence* to .27, still well below the minimum recommended value of .7 for reliability. It should be noted though that the reliability of .26 reported by Janus, Walsh and Duku (2005) for a large sample of Canadian children was similarly poor for this sub-domain. When *Physical readiness for school day* sub-domain was examined, deletion of item A4 (19; 'late') increased reliability only from .51 to .60, again still below the recommended minimum value of .7. For the sub-domain of *Gross and fine motor skills* all items contributed similarly to reliability so item deletion did not improve internal reliability there either.

Factor Analysis

Domains

A factor analysis was performed using varimax rotation to determine whether the same five factors (domains) reported in other samples of children with the EDI were also found in our sample with the SEDI. Five factors were therefore requested in the factor analysis. Bartlett's test of sphericity was significant (p<0.05) indicating that the data were factorable and the KMO was 0.96 suggesting good factorability. The determinant of the matrix was (1.59 E - 033) indicating multicollinearity was not a problem.

The five extracted factors accounted for 51.83% of the variance. However it is worth noting that 15 factors with eigenvalues greater than one were identified. This is further illustrated in the scree plot in Figure 1.
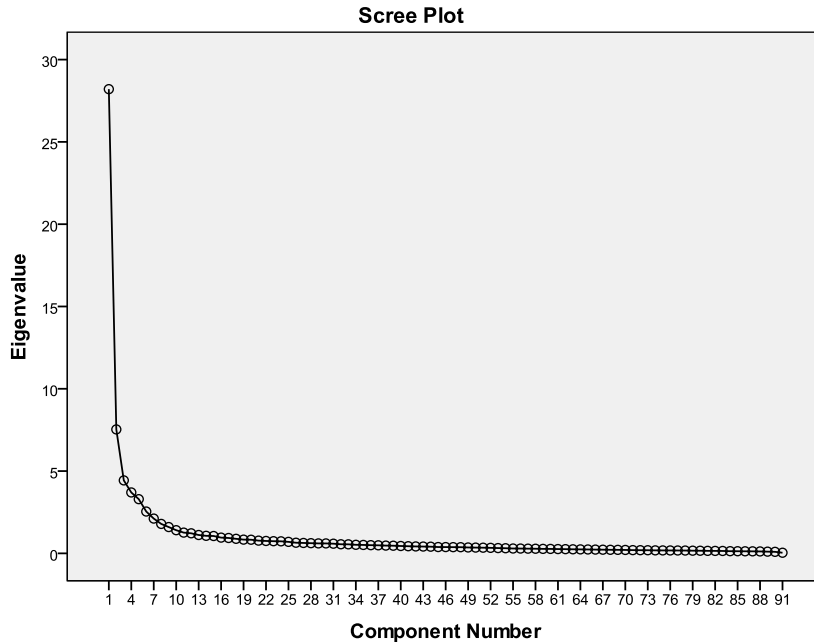

Figure 1:   Scree Plot Illustrating Extracted Factors.

Several items were excluded from this analysis because they did not load onto any items during data screening, a method of exclusion advised by Field (2005). Excluded items were: *too tired/sick to do work, late, hungry, independent in washroom abilities, hand preference, handles a book, is able to read complex words, is interested in writing voluntarily, is able to recognise geometric shapes, understands time concepts, sucks a thumb/finger*. Inspection of the rotated component matrix illustrated factor loadings across most of the five factors. Two items did not load onto any factors – '*is eager to play with a new toy'*, '*is eager to play with a new game'*. Table 6 shows which items loaded on to each factor and the associated factor loading. From Table 6, it can be seen that the factor loadings are not completely consistent with those reported previous published factor analytic studies of the EDI (see Appendix A for previous factors obtained). It is possible that differences in the Scottish population may contribute somewhat to these differences. Factors 1, 4 and 5 have similar loadings to the factor analysis completed for Phase I of the SEDI.

Sub-domains

Physical health and wellbeing To assess whether the three sub-domains of: *gross and fine motor skills*, *physical readiness for school day* and *physical independence* within the *Physical health and wellbeing* domain were also found with the SEDI, a factor analysis was performed using varimax rotation.

Three factors were requested in the factor analysis, in line with expectations from previous administrations of the instrument. Bartlett's test of sphericity was significant ($p<0.05$) indicating that the data were factorable and the KMO was 0.81 suggesting good factorability. The determinant of the matrix was 0.24 thus multicollinearity was not a problem. The three extracted factors accounted for 51.32% of the variance. However four factors with eigenvalues greater than one were identified (see Figure 2).
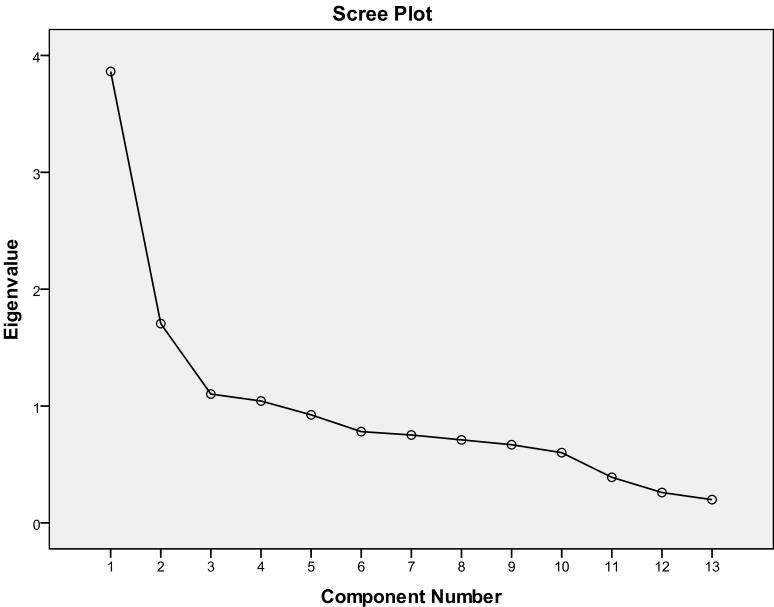

Figure 2: Scree Plot Illustrating Extracted Factors

Table 6: Items and factor loadings for all five factors

Factor	Item number	Item	Factor loading
Factor 1	C2 (70)	Ability to get along with peers	.515
	C3 (71)	Plays and works cooperatively with other children at the level appropriate for his/her age	.551
	C4 (72)	Is able to play with various children	.426
	C5 (73)	Follows rules and instructions	.445
	C6 (74)	Respects the property of others	.683
	C7 (75)	Demonstrates self-control	.744
	C9 (77)	Demonstrates respect for adults	.681
	C10 (78)	Demonstrates respect for other children	.719
	C11 (79)	Accepts responsibility for actions	.742
	C12 (80)	Listens attentively	.580
	C13 (81)	Follows directions	.617
	C16 (84)	Takes care of school materials	.680
	C17 (85)	Works neatly and carefully	.478
	C23 (91)	Is able to follow one-step instructions	.445
	C24 (92)	Is able to follow class routines without reminders	.559
	C25 (93)	Is able to adjust to changes in routines	.503
	C27 (95)	Shows tolerance to someone who made a mistake	.601
	C37 (105)	Gets into physical fights	.652
	C38 (106)	Bullies or is mean to others	.689
	C39 (107)	Kicks, bites, hits other children or adults	.650
	C40 (108)	Takes things that do not belong to him/her	.609
	C41 (109)	Laughs at other children's discomfort	.600
	C42 (110)	Can't sit still, is restless	.676
	C43 (111)	Is distractible, has trouble sticking to any activity	.638
	C44 (112)	Fidgets	.640
	C45 (113)	Is disobedient	.757
	C46 (114)	Has temper tantrums	.472
	C47 (115)	Is impulsive, acts without thinking	.757
	C48 (116)	Has difficulty awaiting turn in games or groups	.730
	C49 (117)	Cannot settle to anything for more than a few moments	.638
	C50 (118)	Is inattentive	.615
Factor 2	B9 (37)	Is generally interested in books	.515

	B10 (38)	Is interested in reading	.559
	B11 (39)	Is able to identify at least 10 letters of the alphabet	.715
	B12 (40)	Is able to attach sounds to letters	.752
	B13 (41)	Is showing awareness of rhyming words	.625
	B14 (42)	Is able to participate in group reading activities	.599
	B15 (43)	Is able to read simple words	.745
	B17 (45)	Is able to read simple sentences	.577
	B18 (46)	Is experimenting with writing tools	.500
	B19 (47)	Is aware of writing directions in English	.697
	B21 (49)	Is able to write his/her own name	.623
	B22 (50)	Is able to write simple words	.745
	C26 (94)	Shows knowledge about the world	.537
	B23 (51)	Is able to write simple sentences	.409
	B25 (53)	Is interested in mathematics	.527
	B26 (54)	Is interested in games involving numbers	.448
	B27 (55)	Sorts and Classifies	.464
	B28 (56)	Is able to use one-to-one correspondence	.593
	B29 (57)	Counts to 20	.586
	B30 (58)	Is able to recognise numbers 1-10	.715
	B31 (59)	Is able to say which number is bigger of the two	.608
	C15 (83)	Works independently	.491
	C18 (86)	Is curious about the world	.453
	C21 (89)	Is eager to play with/read a new book	.482
	C22 (90)	Is able to solve day-to-day problems by him/herself	.412
Factor 3	A8 (23)	Well coordinated	.426
	A9 (24)	Proficiency at holding a pen, crayons or a brush	.613
	A10 (25)	Ability to manipulate objects	.701
	A11 (26)	Ability to climb stairs	.667
	A12 (27)	Levels of energy throughout the school day	.587
	A13 (28)	Overall physical development	.722
	B1 (29)	Use language effectively in English	.754
	B2 (30)	Listen in English	.740
	B3 (31)	Tells a story	.756
	B4 (32)	Take part in imaginative play	.595

	B5 (33)	Communicate own needs in a way understandable to adults and peers	.758
	B6 (34)	Understands on first try what is being said to him/her	.745
	B7 (35)	Articulates clearly, without sound substitutions	.718
	B 24 (52)	Is able to remember things easily	.477
	C1 (69)	Overall social/emotional development	.517
	C14 (82)	Completes work on time	.461
Factor 4	C28 (96)	Will try to help someone who has been hurt	.717
	C29 (97)	Volunteers to help clear up a mess someone else has made	.679
	C30 (98)	If there is a quarrel or dispute will try to stop it	.691
	C31 (99)	Offers to help other children who have difficulty with a task	.623
	C32 (100)	Comforts a child who is crying or upset	.779
	C33 (101)	Spontaneously helps to pick up objects which another child has dropped	.702
	C34 (102)	Will invite bystanders to join in a game	.720
	C35 (103)	Helps other children who are feeling sick	.765
Factor 5	C8 (76)	Shows self-confidence	.525
	C36 (104)	Is upset when left by parent/guardian	.556
	C51 (119)	Seems to be unhappy, sad or depressed	.571
	C52 (120)	Appears fearful or anxious	.765
	C53 (121)	Appears worried	.791
	C54 (122)	Cries a lot	.591
	C55 (123)	Is nervous, high-strung, or tense	.686
	C56 (124)	Is incapable of making decisions	.459
	C 57 (125)	Shy	.511
Items that did not load onto any factors:			
	C19 (87)	Is eager to play with a new toy	-
	C20 (88)	Is eager to play a new game	-
Items not included in factor analysis:			
	A2 (17)	Over or underdressed for school related activities	-
	A3 (18)	Too tired/sick to do work	-
	A4 (19)	Late	-
	A5 (20)	Hungry	-
	A6 (21)	Independent in washroom abilities	-
	A7 (22)	Hand preference	-
	B8 (36)	Handles a book	-

B16 (44)	Is able to read complex words	-
B20 (48)	Is interested in writing voluntarily	-
B32 (60)	Is able to recognise geometric shapes	-
B33 (61)	Understands simple time concepts	-
C58 (126)	Sucks a thumb/finger	-

Table 7: Items and Factor Loadings for Three Factors

Factor	Item number	Item	Factor loading SEDI	Factor loading EDI Canada
Factor 1: Gross & Fine Motor Skills				
	C2 (70)	Proficiency at holding pen, crayons, or brush	.762	.829
	C3 (71)	Ability to manipulate objects	.850	.897
	C4 (72)	Ability to climb stairs	.803	.874
	C5 (73)	Level of energy throughout the school day	.721	.763
	C6 (74)	Overall physical development	.844	.868
Factor 2: Physical Readiness for School Day				
	C7 (75)	Over/Under dressed for school-related activities	.695	.754
	C9 (77)	Too tired/sick to do work	.670	.736
	C10 (78)	Late	.600	.640
	C11 (79)	Hungry	.687	.773
Factor 3: Physical Independence				
	C12 (80)	Is independent in washroom activities most of the time	.844	.561
	C13 (81)	Shows an established hand preference	.453	.657
	C16 (84)	Is well coordinated (moves without running into things or tripping over things)	.460	.536
Does not load onto any factors:				
	C17 (85)	Sucks a thumb/finger	-	.401

Inspection of the rotated component matrix illustrated factor loadings for the three factors. One item did not load onto any factors, '*sucks a thumb*', which loaded on to factor 3, '*physical independence*' sub-domain in the Canadian sample (Janus, Walsh, & Duku, 2005). Table 7 shows that factor loadings otherwise are fairly consistent with previous factor analysis.

Results

Sample characteristics

(a) Pupil characteristics

The sample then consisted of 1090 sets of pupil data (524 females, 563 males, 3 where gender was not recorded). Mean age was 5.1 years, SD = 0 .32, range = 4.49 – 6.94.

One hundred and ninety three pupils were taught in composite P1/2 classes with the remaining 896 pupils in P1 only classes (one child's data was not supplied for this item). Mean number of sessions absent was 5.21 ($SD = 6.67$, range = 0.78). 1078 pupils were known to have attended an organised pre-school or nursery (teachers were not sure or did not supply data for six participants). Four pupils were identified as having 'repeated a grade' – it is unsure as to whether teachers were referring to such children as having repeating nursery or P1 for this question (although it is very uncommon for pupils to repeat P1 in Scotland).

Table 8 shows that most children had English as their first language with 26 pupils identified as speaking English as well as another language, of which 14 other languages were identified: Dutch/Flemish, French, German, Italian, Japanese, Indonesian/Malay, Mandarin, Polish, Punjabi, Romanian, Spanish, Thai, Turkish, and other. Only 11 of these pupils were considered to have English as their second language though. A further seven pupils were identified as speaking 'another language only', with these languages being identified as Polish and Urdu. A further 28 pupils were identified by teachers as unable to communicate adequately in their first language with one 'don't know' response. Table 9 indicates that the communities from which the participants were drawn reflected the range of socio-economic quintile groups although it should be noted that there were only 39 participants from quintile 1, the most deprived quintile, a much smaller group than for the other quintiles in the study.

Although no participants were considered to have Identified Special Needs, when teachers were asked whether the student had a problem that 'influences his/her ability to do school work in a regular classroom' (question D1/127), 103 participants were identified. Teachers were then asked to identify the nature of the problem within ten specified areas and state whether this was based on their own observation, and/or medical diagnosis, and/or information from parents. The ten specified areas and other specified different areas of difficulty identified are shown in Table 10. Furthermore, teachers were asked whether pupils had received a diagnosis, or identification by a doctor or psychological professional. Four diagnostic categories were identified (see Table 11).

Table 8: Descriptive Language Statistics for Each SES Quintile

Quintile	Most common foreign language	% communicates adequately in own language	Repeating grade	Question 9: Percentage and Language		
				English only	Other only	English and other
1: Most Deprived	Urdu	94.9	-	97.4	2.6 Urdu	-
2: Deprived	Polish Spanish	97.0	0.4	95.7	1.3 Polish Urdu	3.0 German Japanese Mandarin Polish Spanish Turkish
3: Average	No language predominant	97.8	0.4	96.9	0.4 Polish	2.7 German Italian Indonesian/Malay Mandarin Polish Thai
4: Affluent	Polish German	97.0	0.5	97.0	0.5	2.2 Dutch/Flemish French German Japanese Polish Romanian Spanish Other
5: Most Affluent	Punjabi	98.9%	-	(98.3)	-	1.7 Punjabi Spanish

Table 9: Descriptive Statistics for Participants in each SES Quintile*

SES Quintile	Number of Children	Number with Additional Support Needs Excluded from Analysis	Percentage Female/Male	Age Average (Range)	Percentage that Attended Pre-school Nursery	Average Sessions Absenteeism
1: Most Deprived	39	2	41/59	5.5 (4.92 – 6.36)	100	5.33
2: Deprived	232	16	45.5/54.5	5.5 (4.89 – 6.94)	98.3	7.37
3: Average	226	9	48.4/51.6	5.5 (4.49 – 6.23)	98.7	5.29
4: Affluent	406	8	50.5/49.5	5.5 (4.51 – 6.34)	99.8	4.49
5: Most Affluent	180	7	48.0/52.0	5.5 (4.92 – 6.39)	98.9	4.06

*There were seven children for whom quintile information was not available and whose data are not included in this table

Table 10: Frequency of Area of Difficulty Specified in Response to Question D1 (127) – 'Does the Student Have a Problem That Influences His/Her Ability to do School Work in a Regular Classroom?'

Area of difficulty	Observed by teacher (%)	Medical diagnosis/parental information (%)
Physical Disability	2 (0.2)	2 (0.2)
Visual Impairment	7 (0.6)	8 (0.7)
Hearing Impairment	3 (0.3)	4 (0.4)
Speech Impairment	34 (3.1)	25 (2.3)
Learning Disability	8 (0.7)	2 (0.2)
Emotional Problems	10 (0.9)	5 (0.5)
Behavioural Problems	15 (1.4)	4 (0.4)
Home Environment/Problems at Home	14 (1.3)	14 (1.3)
Chronic Medical/Health Problems	2 (0.2)	4 (0.4)
Unaddressed Dental Needs	0 (0)	0 (0)
Other – please specify		
Lack of English vocabulary	1 (0.1)	-
Immature: low social and emotional skills	3 (0.3)	-
Hearing: Currently attending hospital regarding hearing aids	1 (0.1)	1 (0.1)
Co-Morbid poor communication and motor skill development	2 (0.2)	-
Poor muscle control around mouth	1 (0.1)	1 (0.1)
Difficulties understanding directions/instructions/prepositions	1 (0.1)	-
Speech impairment (S.A.L.T. interventions)	1 (0.1)	1 (0.1)
Parental alcohol abuse: very late/disorganised/dishevelled	1 (0.1)	-
Often Very Tired	1 (0.1)	-
ADHD: child being tested	1 (0.1)	1 (0.1)
Family Breakdown Issues: lack of concentration/ lack of emotional control	2 (0.2)	2 (0.2)
Total	110 (10.2)	74 (7)

Table 11: Frequency of Diagnosis Specified for Question D3 (139) – 'If the Child Has Received a Diagnosis or Identification by a Doctor or Psychological Professional Please Indicate'

Diagnosis	Frequency
Genetic/congenital disorder (CF & PKU)	1
Speech and Language Disorders	7
Asthma	1
Other	1
Total	10

Thirty-two pupils were identified as receiving "school based support (e.g. educational assistant, equipment)" and 25 pupils as receiving further assessment with an additional 30 on a waiting list. In addition, teachers felt that 76 of the pupils identified were in need of further assessment. Moreover, a total of 45 'I don't know' responses were given by teachers for these items.

(b) Teacher characteristics

Sixty eight different teachers completed the EDI, 66 females and two male. Seventeen of the teachers were aged between 20 and 29 years old, 18 were 30-39 years, 19 were 40-49 years with a further 14 teachers aged 50- 59 years (see Figure 3).

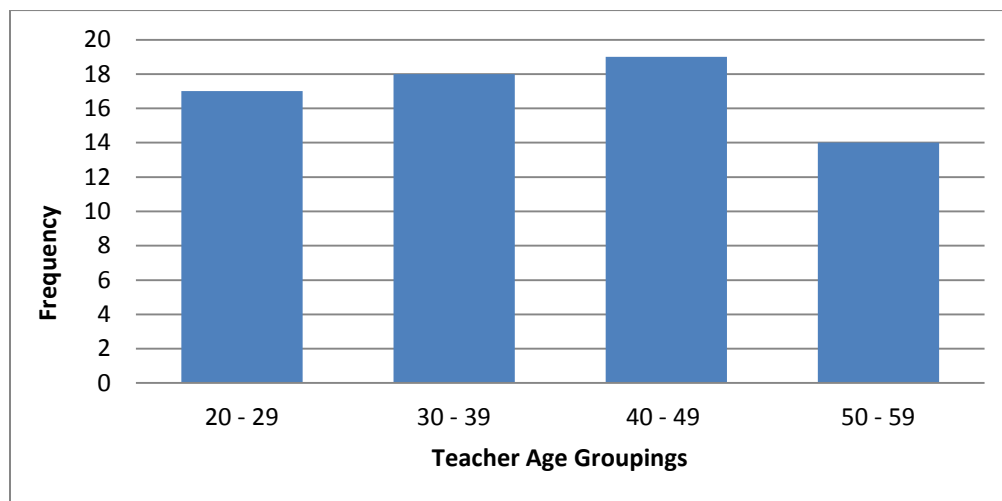Figure 3: *Teacher Age Categories with Frequency*

Mean number of years experience as a teacher was 12.46 ($SD = 9.55$, range 1-39). Mean number of years at the present school was 7.53 ($SD = 6.91$, range 0-31). Mean number of years as a P1 teacher

was 5.84 (*SD* = 7.82, range 0-30). Mean number of pupils in the class was 20.60 (*SD*=4.02, range 4-27). Teacher qualifications can be seen in Table 12.

Table 12: Level of Qualification

Qualification Type (completed levels of education)	Frequency (%)
Some Coursework Towards A Bachelors Degree	1 (1.5)
A Teaching Certificate of Diploma	11 (16.2)
Bachelor of Education Degree	38 (55.9)
Other Undergraduate Degree	18 (26.5)
Postgraduate Certificate in Education (PGCE)	16 (23.5)
Professional Graduate Diploma in Education (PGDE)	9 (13.2)
Some Coursework Towards Postgraduate Masters	4 (5.9)
Postgraduate Masters Degree	1 (1.5)
Some Coursework Towards a Doctorate	0
Doctorate	0
Other	2 (2.9)

SEDI Frequency by Domain

Physical health and wellbeing. Table 13 shows that participants performed well in this domain. Only small numbers of participants were not at the required level, suggesting possible ceiling effects. For items which required a three-point Likert response, there was a negative skew with higher frequency of responses towards the more positive end of the scale, and few participants rated '*poor/very poor'*. There was a more equitable distribution across *yes/no* responses for '*is late'* indicating that a significant number children have problems arriving at school on time. On the other hand for '*sucks thumb'*, most participants scored '*never*' rather than '*often*' or '*sometimes*'. Few children (*n* = 6) scored '*no*' for '*is independent in toilet habits most of the time*', showing that this item was not too useful in the present sample for discriminating participant school readiness skills.

Communication and General Knowledge. Table 14 shows that, as for other domains assessed, the majority of participants were rated as *average* or *very good/good*, with few participants receiving a response of *poor/very poor* or *never/not true*. C26 (94; '*Answers questions showing knowledge about the world*') received the greatest frequency of positive responses with 920 participants rated as scoring positively on this item and only '19' children scored as *never/not true*.

Language and Cognitive Development. Table 15 again indicates no complete ceiling or floor effects for this domain. However two items, B8 (36; '*knows how to handle a book'*) and B27 (55; '*is able to sort and classify objects by a common characteristic'*) had few participants receiving a response of '*no'* (*n* = 5 and 9 respectively), suggesting these two questions may not be as appropriate for the age of the

participants within the present sample as for younger participants. Further, B16 (44; '*is able to read complex words*'), B20 (48; '*is interested in writing voluntarily*') and B23 (51; '*is able to write simple sentences*') generated higher frequency of '*no*' responses (n =642, 282 and 214 respectively) than did other items. Items in the *language and cognitive* domain, with the exception of B16 (44), had a higher frequency of positive responses, compared to the other domains.

Social Competence. Teachers were required to respond on a three-point Likert scale for this scale, instead of *yes/no* as for the above domains. The majority of items showed responses towards the positive end of the scale (e.g. higher frequency for *average/very good* and lower frequency for *poor/very poor)* (see Table 16). Most items showed distribution across the possible responses although for some this distribution was not as marked. '*Is eager to play a new game'*, '*is eager to play with a new toy'* and '*demonstrates respect for adults'* generally yielded few '*never/not true'* responses (*n* = 5, 5 and 4 respectively), indicating that these items may not be the most useful for distinguishing performance at the lower end of the scale.

Emotional Maturity. This domain also used a three-point Likert response scale. Items C28-C35 showed a relatively even distribution across all three responses (see Table 17). For items C36-C57, most participants received a more positive score. For example, item C41 (109) asked whether participants '*laugh(s) at another child's discomfort'* and this was rated *often/very true* for only seven participants. There was a higher frequency for items, '*distractible'* C43 (111), '*fidgets'* C44 (112) and '*unable to sit still (restless*)' C42 (110).

Table 13: Physical Health and Wellbeing: Frequency of Response (Percentage)

Item		Questionnaire Response		
		Yes (%)	No (%)	
A2 (17)	Over or underdressed for school related activities	36 (3.3)	1051 (96.7)	
A3 (18)	Too tired/sick to do work	81 (7.4)	1007 (92.6)	
A4 (19)	Late	235 (21.7)	849 (78.3)	
A5 (20)	Hungry	36 (3.3)	1047 (96.7)	
A6 (21)	Independent in toilet habits	1083 (99.4)	6 (0.6)	
A7 (22)	Hand preference	1061 (97.4)	28 (2.6)	
A8 (23)	Well coordinated	990 (90.9)	99 (9.1)	
		Poor/very poor (%)	Average (%)	Very good/good (%)
A9 (24)	Proficiency at holding a pen, crayons or a brush	76 (7.0)	321 (29.5)	692 (63.5)
A10 (25)	Ability to manipulate objects	37 (3.4)	290 (26.7)	761 (69.9)
A11 (26)	Ability to climb stairs	23 (2.2)	296 (27.9)	742 (69.9)
A12 (27)	Levels of energy throughout the school day	48 (4.4)	342 (31.4)	699 (64.2)
A13 (28)	Overall physical development	15 (1.4)	347 (31.9)	727 (66.8)
		Often/very true (%)	Sometimes/ Somewhat true (%)	Never/not true (%)
C58 (126)	Sucks a thumb/finger	997 (93.6)	49 (4.6)	23 (2.2)

Table 14:Communication and General Knowledge: Frequency of Response (Percentage)

Item		Questionnaire Response		
		Poor/very poor (%)	Average (%)	Very good/good (%)
B1 (29)	Use language effectively in English	44 (4.0)	277 (25.4)	769 (70.6)
B2 (30)	Listen in English	38 (3.5)	266 (24.4)	786 (72.1)
B3 (31)	Tell a story	67 (6.2)	310 (28.5)	710 (65.3)
B4 (32)	Take part in imaginative play	29 (2.7)	289 (26.5)	771 (70.8)
B5 (33)	Communicate own needs in a way understandable to adults and peers	37 (3.4)	286 (26.2)	767 (70.4)
B6 (34)	Understands on first try what is being said to him/her	48 (4.4)	264 (24.2)	777 (71.3)
B7 (35)	Articulates clearly, without sound substitutions	64 (5.9)	268 (24.6)	757 (69.5)
		Never/not true (%)	Sometimes/ somewhat true (%)	Often/very true (%)
C26 (94)	Answers questions showing knowledge about the world	19 (1.7)	149 (13.7)	920 (84.6)

Table 15: *Language and Cognitive Development: Frequency of Response (Percentage)*

Item		Questionnaire Response	
		No (%)	Yes (%)
B8 (36)	Knows how to handle a book	5 (0.5)	1084 (99.5)
B9 (37)	Is generally interested in books	42 (3.9)	1043 (96.1)
B10 (38)	Is interested in reading	88 (8.1)	994 (91.9)
B11 (39)	Is able to identify at least 10 letters of the alphabet	52 (4.8)	1036 (95.0)
B12 (40)	Is able to attach sounds to letters	49 (4.5)	1040 (95.5)
B13 (41)	Is showing awareness of rhyming words	105 (9.8)	970 (90.2)
B14 (42)	Is able to participate in group reading activities	37 (3.4)	1053 (96.6)
B15 (43)	Is able to read simple words	97 (8.9)	993 (91.1)
B16 (44)	Is able to read complex words	654 (60.2)	432 (39.8)
B17 (45)	Is able to read simple sentences	214 (19.7)	874 (80.3)
B18 (46)	Is experimenting with writing tools	59 (5.4)	1030 (94.6)
B19 (47)	Is aware of writing directions in English	37 (3.4)	1051 (96.6)
B20 (48)	Is interested in writing voluntarily	282 (25.9)	805 (74.1)
B21 (49)	Is able to write his/her own name	63 (5.8)	1027 (94.2)
B22 (50)	Is able to write simple words	152 (13.9)	938 (86.1)
B23 (51)	Is able to write simple sentences	391 (36.0)	696 (64.0)
B24 (52)	Is able to remember things easily	172 (15.9)	910 (84.1)
B25 (53)	Is interested in mathematics	67 (6.2)	1012 (93.8)
B26 (54)	Is interested in games involving numbers	48 (4.4)	1037 (95.6)
B27 (55)	Is able to sort and classify objects by a common characteristic	9 (0.8)	1075 (99.2)
B28 (56)	Is able to use one-to-one correspondence	57 (5.2)	1032 (94.8)
B29 (57)	Is able to count to 20	161 (14.8)	929 (85.2)
B30 (58)	Is able to recognise numbers 1-10	75 (6.9)	1015 (93.1)
B31 (59)	Is able to say which number is bigger of the two	124 (11.8)	930 (88.2)
B32 (60)	Is able to recognise geometric shapes	30 (2.8)	1055 (97.2)
B33 (61)	Understands simple time concepts	35 (3.2)	1050 (96.8)

Table 16: Social Competence: Frequency of Response (Percentage)

Item		Questionnaire Response		
		Poor/very poor (%)	Average (%)	Very good/good (%)
C1 (69)	Overall social/emotional development	61 (5.6)	366 (33.6)	662 (60.8)
C2 (70)	Ability to get along with peers	43 (3.9)	357 (32.8)	689 (63.3)
		Never/not true (%)	Sometimes/ somewhat true (%)	Often/very true (%)
C3 (71)	Plays and works cooperatively with other children at the level appropriate for his/her age	13 (1.2)	264 (24.2)	813 (74.6)
C4 (72)	Is able to play with various children	23 (2.1)	315 (28.9)	752 (69.0)
C5 (73)	Follows rules and instructions	5 (0.5)	237 (21.7)	848 (77.8)
C6 (74)	Respects the property of others	7 (0.6)	163 (15.0)	919 (84.4)
C7 (75)	Demonstrates self-control	26 (2.4)	226 (20.7)	838 (76.9)
C8 (76)	Shows self-confidence	43 (3.9)	417 (38.3)	630 (57.8)
C9 (77)	Demonstrates respect for adults	4 (0.4)	126 (11.6)	959 (88.1)
C10 (78)	Demonstrates respect for other children	10 (0.9)	193 (17.7)	886 (81.4)
C11 (79)	Accepts responsibility for actions	32 (2.9)	211 (19.4)	845 (77.7)
C12 (80)	Listens attentively	39 (3.6)	379 (34.8)	672 (61.7)
C13 (81)	Follows directions	21 (1.9)	274 (25.2)	794 (72.9)
C14 (82)	Completes work on time	52 (4.8)	321 (29.4)	717 (65.8)
C15 (83)	Works independently	59 (5.4)	285 (26.1)	746 (68.4)
C16 (84)	Takes care of school materials	9 (0.8)	165 (15.1)	916 (84.0)
C17 (85)	Works neatly and carefully	63 (5.8)	311 (28.6)	715 (65.7)
C18 (86)	Is curious about the world	12 (1.1)	166 (15.3)	907 (83.6)
C19 (87)	Is eager to play with a new toy	5 (0.5)	98 (9.0)	983 (90.5)
C20 (88)	Is eager to play a new game	5 (0.5)	104 (9.6)	977 (90.0)
C21 (89)	Is eager to play with/read a new book	26 (2.4)	182 (16.7)	880 (80.9)
C22 (90)	Is able to solve day-to-day problems by him/herself	57 (5.2)	343 (31.5)	688 (63.2)
C23 (91)	Is able to follow one-step instructions	13 (1.2)	160 (14.7)	916 (84.1)
C24 (92)	Is able to follow class routines without reminders	26 (2.4)	252 (23.1)	812 (74.5)
C25 (93)	Is able to adjust to changes in routines	21 (1.9)	221 (20.3)	847 (77.8)
C27 (95)	Shows tolerance to someone who made a mistake	12 (1.1)	185 (17.0)	890 (81.9)

Table 17: Emotional Maturity: Frequency of Response (Percentage)

Item		Questionnaire Response (%)		
		Never/not true	Sometimes/Somewhat true	Often/very true
C28 (96)	Will try to help someone who has been hurt	28 (2.6)	406 (38.0)	58.2 (59.4)
C29 (97)	Volunteers to help clear up a mess someone else has made	163 (15.0)	454 (41.8)	468 (43.1)
C30 (98)	If there is a quarrel or dispute will try to stop it	228 (23.7)	489 (50.8)	245 (25.5)
C31 (99)	Offers to help other children who have difficulty with a task	188 (17.7)	502 (47.1)	375 (35.2)
C32 (100)	Comforts a child who is crying or upset	75 (7.1)	483 (46.0)	492 (46.9)
C33 (101)	Spontaneously picks up objects which other child has dropped	228 (21.1)	483 (44.6)	372 (34.3)
C34 (102)	Will invite bystanders to join in a game	150 (15.9)	516 (54.5)	280 (29.6)
C35 (103)	Helps other children who are feeling sick	73 (7.3)	464 (46.1)	469 (46.6)
C36 (104)	Is upset when left by parent/guardian	856 (78.7)	196 (18.0)	36 (3.3)
C37 (105)	Gets into physical fights	975 (89.8)	96 (8.8)	15 (1.4)
C38 (106)	Bullies or is mean to others	970 (89.2)	107 (9.8)	11 (1.0)
C39 (107)	Kicks, bites, hits other children or adults	998 (92.0)	76 (7.0)	11 (1.0)
C40 (108)	Takes things that do not belong to him/her	1015 (93.4)	63 (5.8)	9 (0.8)
C41 (109)	Laughs at other children's discomfort	968 (89.4)	108 (10)	7 (0.6)
C42 (110)	Can't sit still, is restless	778 (71.5)	250 (23.0)	60 (5.5)
C43 (111)	Is distractible, has trouble sticking to any activity	747 (68.7)	281 (25.8)	60 (5.5)
C44 (112)	Fidgets	727 (66.8)	297 (27.3)	64 (5.9)
C45 (113)	Is disobedient	972 (89.3)	104 (9.6)	12 (1.1)
C46 (114)	Has temper tantrums	1032 (94.9)	47 (4.3)	9 (0.8)
C47 (115)	Is impulsive, acts without thinking	880 (80.9)	176 (16.2)	32 (2.9)
C48 (116)	Has difficulty awaiting turn in games or groups	868 (80.0)	179 (16.5)	38 (3.5)
C49	Cannot settle to anything for more	927 (85.2)	127 (11,7)	34 (3.1)

(117)	than a few moments			
C50 (118)	Is inattentive	797 (73.3)	248 (22.8)	42 (3.9)
C51 (119)	Seems to be unhappy, sad or depressed	966 (89.0)	101 (9.3)	19 (1.7)
C52 (120)	Appears fearful or anxious	901 (83.0)	169 (15.6)	16 (1.5)
C53 (121)	Appears worried	807 (74.2)	264 (24.3)	16 (1.5)
C54 (122)	Cries a lot	975 (89.6)	97 (8.9)	16 (1.5)
C55 (123)	Is nervous, high-strung, or tense	935 (85.9)	136 (12.5)	17 (1.6)
C56 (124)	Is incapable of making decisions	899 (82.6)	174 (16.0)	15 (1.4)
C57 (125)	Is shy	705 (64.9)	335 (36.8)	47 (4.3)

SEDI Vulnerability by Domain and SES Quintile

All *yes/no* scores and three-point Likert scores on the SEDI were translated by the McMaster EDI team into scores on ten-point scales to allow comparison across domains. Mean scores for each domain were then calculated. Figure 4 illustrates mean scores by domain and gender. Gender differences are similar to those reported in other countries (Janus & Duku, 2012).

Scores were then further categorised according to SES quintile groups. Figure 5 illustrates mean scores for each domain by quintile group. It shows that participants who lived in quintile 1 had the lowest scores for all SEDI other groups across all SEDI domains. A one-way analysis of variance indicated that there were significant differences between quintile groups for *Physical health and wellbeing* ($F_{(4, 1081)}$ = 7.55, p = .000); *Social competence* ($F_{(4, 1082)}$ = 5.07, p = .000); *Language and cognitive development* ($F_{(4, 1082)}$ = 9.69, p = .000) and *Communication & general knowledge* ($F_{(4, 1082)}$ = 5.11, p = 0.000). There were no significant differences between quintiles found in the *Emotional maturity* domain ($F_{(4, 1079)}$ = 1.78, $p > .05$). Post-hoc comparisons showed significant differences between quintile groups 1 and 5 ($p<.05$), 2 and 4 ($p=.000$) and 2 and 5 ($p<.000$) for *Physical health and wellbeing* with quintile group 5 scoring significantly higher than 1, and quintiles 4 and 5 scoring higher than 2.
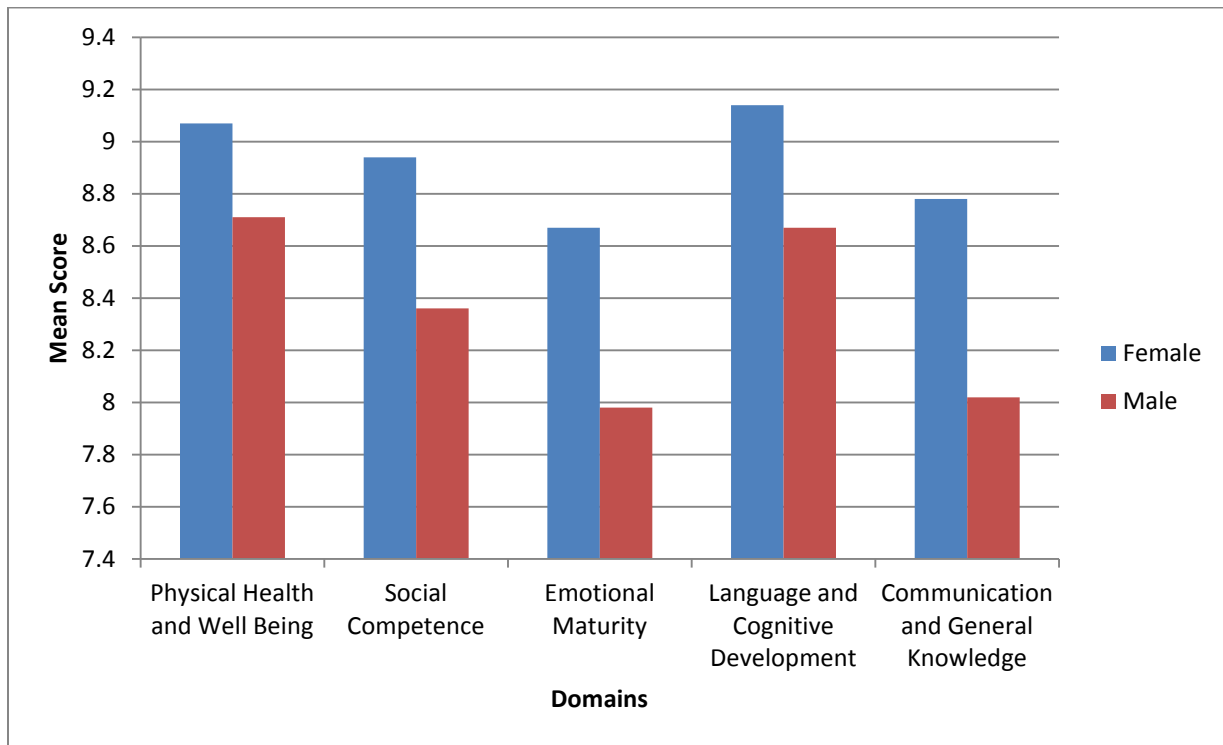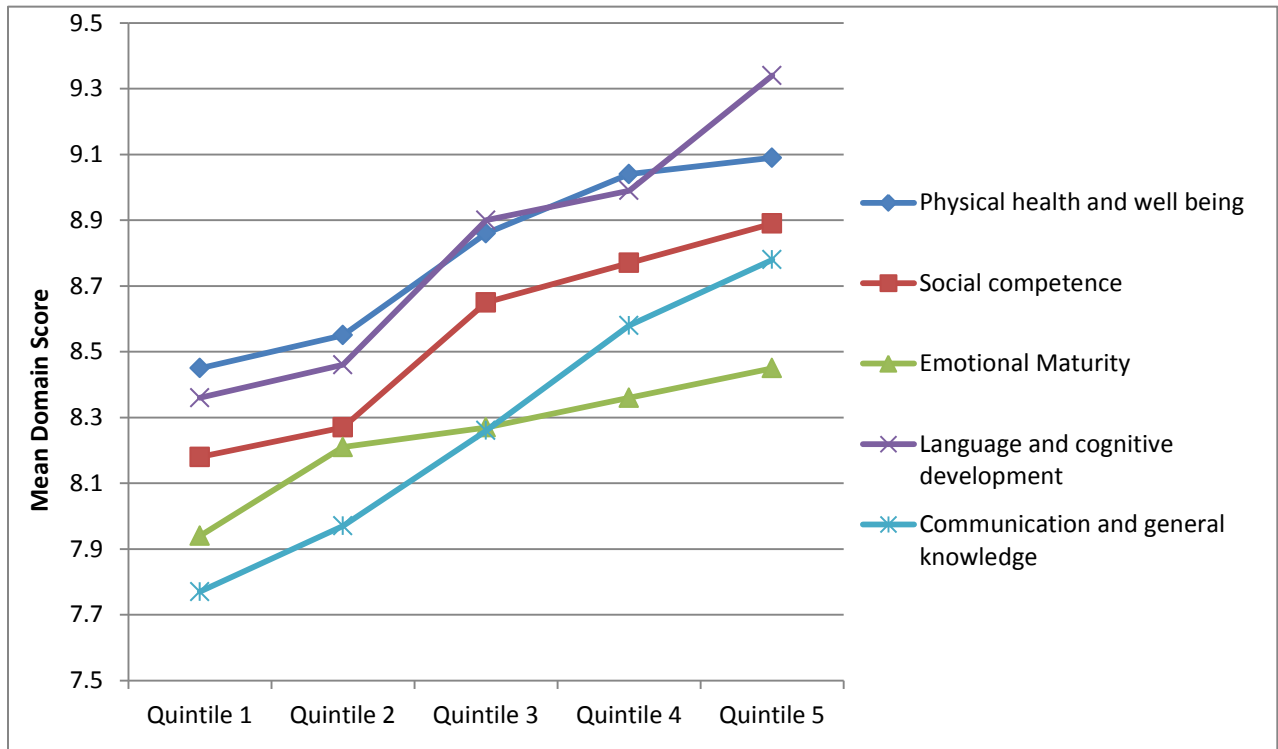
Figure 4: EDI Domain Score by Gender

Figure 5: EDI Domain Score by SES Quintile

For *Social competence*, there were significant differences between quintiles 2 and 4 ($p<.005$), and 2 and 5 ($p<.005$) with quintiles 4 and 5 again scoring higher than quintile 2. The same pattern of results was found for the *Communication and general knowledge* domain with groups 4 and 5 scoring significantly higher than group 2 ($p<.0001$, $p<.005$ respectively). For *Language and cognitive development*, there were significant differences between quintile groups 2 and 4 ($p=.000$) and 2 and 3 ($p<.05$) with group 4 and 3 scoring higher than 2. Additionally, there were significant differences with quintiles 2 and 3, and quintile 5 ($p=.000$, $p<.05$ respectively), each time with quintile 5 scoring higher. No other significant group differences were found. Taking account of the small number of participants in quintile 1, as only 4% East Lothian children were within this lowest SES postcode category, these results suggest that the SEDI can discriminate school readiness skills across socio-economic gradients as exemplified by postcode quintiles.

Domain Cut-Offs: Vulnerable, At-Risk and On-Track by Quintile

Mean scores for the sample and 10%, 25% and 50% cut-off vulnerability scores for each domain
are reported in Table 18.

Table 18: Mean Score and 10/25/50% Cut-Off Scores by Domain

Domain	Score			Cut-off		
	Min	Max	Mean (SD)	10%	25%	50%
Physical health and wellbeing (n=13 items)	2.31	10.00	8.89 (1.30)	7.31	8.08	9.23
Social competence (n=26 items)	0.00	10.00	8.64 (1.71)	5.96	7.88	9.42
Emotional maturity (n=30 items)	2.41	10.00	8.31 (1.32)	6.50	7.67	8.57
Language and cognitive development (n=26 items)	0.38	10.00	8.89 (1.59)	6.92	8.46	9.62
Communication and general knowledge (n=8 items)	0.00	10.00	8.39(2.25)	5.00	6.88	10.00

Using the cut-off values in Table 18 to determine the lowest performing 10$^{\%}$ for each domain, we
calculated the frequency and percentage of children classed as developmentally vulnerable in each
quintile for each SEDI domain, i.e., those with scores on or beneath the sample 10th percentile cut-off
score. In addition, children whose score fell between the 10th and the 25th percentile were classed as 'at-
risk', those whose scores were between the 25th percentile and 50th percentile were classed as 'on-track 1',
and those above the 50th percentile were 'on-track 2', following the procedures employed in both the
Canadian and Australian administration of the EDI. Tables 19 - 22 show these vulnerability frequencies
and percentages for each domain, by SES quintile group, and by gender.

Table 19: Physical Health and Wellbeing by Quintile and Gender

SES Quintile Gender	Number of children (%)	Mean score out of 10 (SD)	Developmentally Vulnerable In the lowest 10%	Developmentally At Risk Between the 10th and the 25th percentile	On-Track Between the 25th and 50th percentile	Above the 50% percentile
			%	%	%	%
1 Most Deprived	39 (3.6)	8.45 (1.67)	25.6	12.8	28.2	33.3
2 Deprived	232 (21.3)	8.55 (1.38)	22.4	18.1	25.4	34.1
3 Average	226 (20.7)	8.86 (1.31)	14.6	14.6	26.5	44.2
4 Affluent	406 (37.2)	9.04 (1.28)	12.8	8.6	25.6	53.0
5 Most Affluent	180 (16.5)	9.09 (1.05)	6.7	17.9	25.1	50.3
Gender[a]						
Male	563	8.71 (1.39)	18.7	14.1	26.0	41.3
Female	524	9.08 (1.16)	10.3	12.8	26.0	51.0

[a]3 children had no gender information recorded

Table 20: Social Competence by Quintile and Gender

SES Quintile Gender	Number of children (%)*	Mean score out of 10 (SD)	Developmentally Vulnerable In the lowest 10%	Developmentally At Risk Between the 10th and the 25th percentile	On-Track Between the 25th and 50th percentile	Above the 50% percentile
			%	%	%	%
1 Most Deprived	39 (3.6)	8.18 (1.97)	20.6	8.8	35.3	35.3
2 Deprived	232 (21.3)	8.27 (1.91)	14.4	19.1	29.8	36.7
3 Average	226 (20.7)	8.65 (1.73)	11.9	12.4	23.3	52.4
4 Affluent	406 (37.2)	8.77 (1.63)	8.6	12.6	25.7	53.1
5 Most Affluent	180 (16.5)	8.89 (1.42)	6.3	15.0	26.3	52.5
Gender						
Male	563	8.36 (1.79)	13.0	18.2	30.0	59.6
Female	524	8.94 (1.57)	7.9	10.0	22.5	49.8

Table 21: Emotional Maturity by Quintile and Gender

SES Quintile / Gender	Number of children (%)	Mean score out of 10 (SD)	Developmentally Vulnerable In the lowest 10%	Developmentally At Risk Between the 10th and the 25th percentile	On-Track Between the 25th and 50th percentile	Above the 50% percentile
			%	%	%	%
1 Most Deprived	39 (3.6)	7.94 (1.52)	15.8	21.1	28.9	34.2
2 Deprived	232 (21.3)	8.21 (1.44)	13.9	16.5	25.1	44.6
3 Average	226 (20.7)	8.27 (1.36)	11.9	19.0	17.3	51.8
4 Affluent	406 (37.2)	8.36 (1.26)	9.7	18.1	20.8	51.4
5 Most Affluent	180 (16.5)	8.45 (1.17)	7.3	14.6	23	55.1
Gender						
Male	563	7.98 (1.37)	15.4	22.2	22.8	39.6
Female	524	8.67 (1.17)	6.1	12.3	20.3	61.3

Table 22: Language and Cognitive Development by Quintile and Gender

| SES Quintile / Gender	Number of children (%)	Mean score out of 10 (SD)	Developmentally Vulnerable In the lowest 10%	Developmentally At Risk Between the 10th and the 25th percentile	On-Track Between the 25th and 50th percentile	Above the 50% percentile
			%	%	%	%
1 Most Deprived	39 (3.6)	8.36 (1.70)	18.9	18.9	45.9	16.2
2 Deprived	232 (21.3)	8.46 (1.93)	19.0	11.1	43.5	26.4
3 Average	226 (20.7)	8.90 (1.61)	10.5	14.3	34.3	41.0
4 Affluent	406 (37.2)	8.99 (1.51)	8.8	8.3	53.5	29.5
5 Most Affluent	180 (16.5)	9.34 (0.93)	1.8	10.7	42.6	45.0
Gender						
Male	563	8.67 (1.74)	13.4	12.2	46.1	28.3
Female	524	9.14 (1.36)	7.4	9.4	45.0	38.2

Table 23: Communication & General Knowledge by Quintile and Gender

SES Quintile Gender	Number of children (%)	Mean score out of 10 (SD)	Developmentally Vulnerable In the lowest 10%	Developmentally At Risk Between the 10th and the 25th percentile	On-Track Between the 25th and 50th percentile	Above the 50% percentile
			%	%	%	%
1 Most Deprived	39 (3.6)	21.3 (2.66)	17.9	17.9	64.1	0
2 Deprived	232 (21.3)	20.7 (2.47)	18.1	16.8	65.1	0
3 Average	226 (20.7)	37.2 (2.33)	15.9	14.2	69.9	0
4 Affluent	406 (37.2)	16.5 (2.11)	9.4	12.1	78.6	0
5 Most Affluent	180 (16.5)	11.6 (1.93)	5.6	15.0	79.4	0
Gender						
Male	563	8.02 (2.35)	15.5	17.4	67.1	0
Female	524	8.78 (2.06)	8.6	10.9	80.5	0

Inspection of these figures demonstrates that the majority of participants were 'on-track', regardless of quintile group or domain. The *Communication and general knowledge* domain further displayed ceiling effects for all quintile groups highlighting that for this SEDI component, children from all quintiles tended to score highly. Figure 6 provides a graphical illustration of the above information.

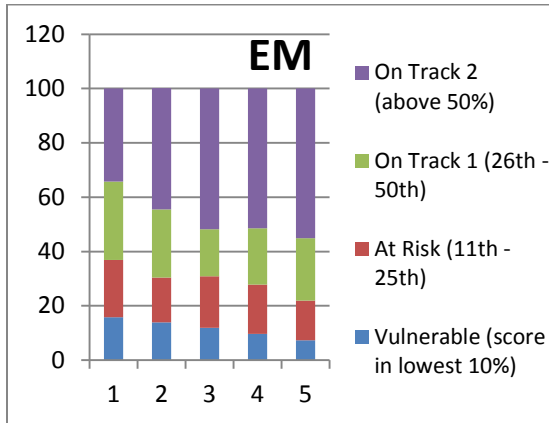*Figure 6: Domain: Percentage Vulnerable by Quintile*.
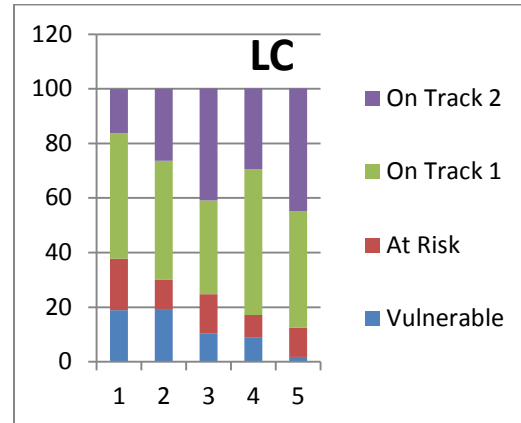
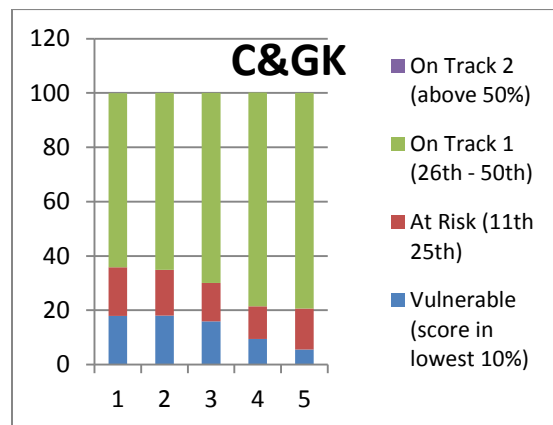Physical Health & Well Being
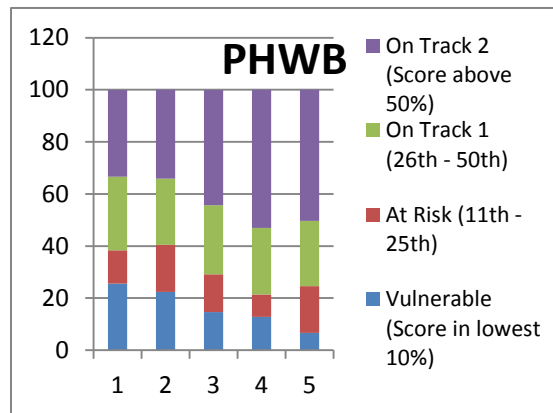
Social Competence
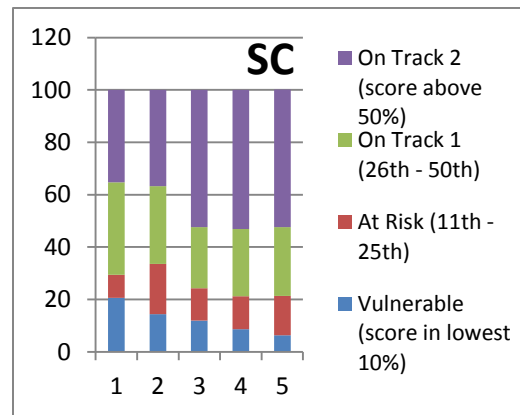
Emotional Maturity

Language & Cognition

Communication & General Knowledge

Developmentally vulnerabilities in one, two or more domains by quintile

We then examined the data for developmental vulnerability in one or more domains. 297 children in the sample (27.3%) were recorded as vulnerable in one or more domains, and 168 (15.4) on two or more domains. Developmental vulnerabilities by quintile can be seen in Figure 7. Quintile 5, the most affluent SES grouping, showed the lowest vulnerability rates (16.7%) in one or more domains, and quintile 1, the least affluent, demonstrated the highest rate of vulnerability (38.5%).   Overall rate of vulnerability in this local authority sample, for one or more domains at 27.3% was similar to other populations reported in their EDI studies, e.g., British Columbia, Canada 29%; Australia 23.5%. Figure 5 also illustrates percentage vulnerabilities in two or more domains by quintile.   A similar pattern of results was found, with quintile 5 (the most affluent area) showing the lowest vulnerability rates (7.2%) and quintile 1 the highest vulnerability rate (25.6%). Comparison of the East Lothian sample's mean scores with those reported for Australian and Canadian samples indicated that the children in the sample scored

higher than Canadian but lower than Australian children on each of the five domains (see Figure 8). This may partly reflect different school start ages in these countries.

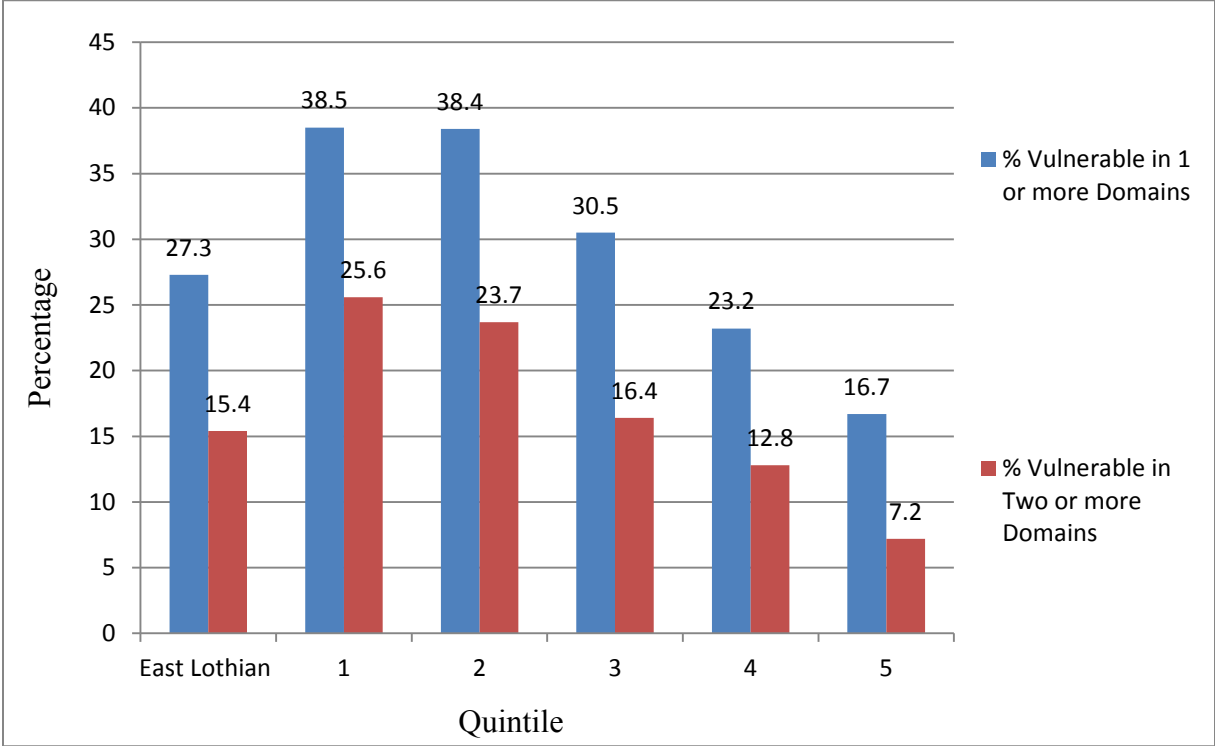*Figure 7: Percentage of children vulnerable on one, two, or more domains by quintile*
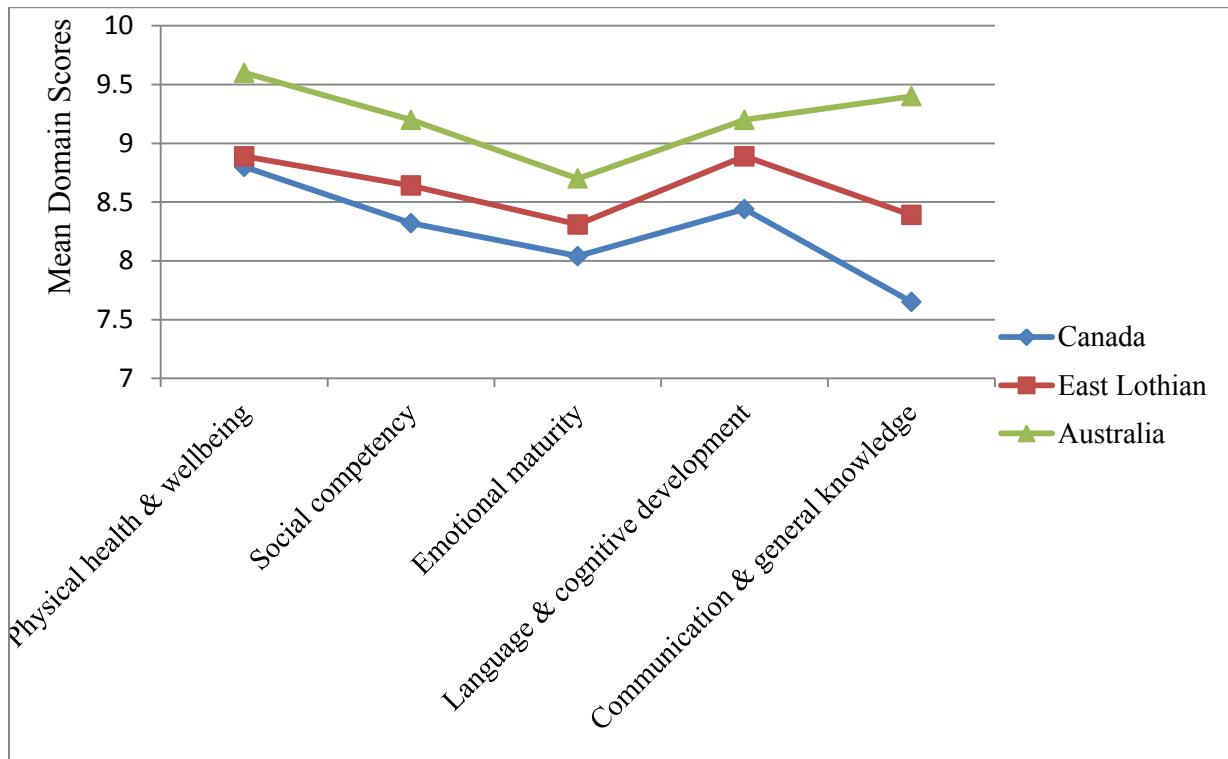
Figure 8: Mean Domain Scores for Canada, Australia and East Lothian.

Conclusions and recommendations

The study's aim was to test the usefulness of the EDI as a tool to assess global development in Scottish children at school entry. This two-phase pilot study was carried out within the East Lothian area, with Phase 1 demonstrating the EDI's usability and psychometrical robustness with a small cohort of children and with some adaptations indicated for the Scottish context. The purpose of Pilot Phase 2 was then to administer the SEDI across the whole of East Lothian and to examine the usefulness of the instrument for its purpose. Analyses of Phase 2 data revealed that the SEDI has adequate psychometric properties within this larger sample with good levels of internal reliability except for the *Physical Health and Wellbeing* domain, in common with other studies.

Factor analysis broadly provided support for the EDI/SEDI factorial structure, although did generate some factor loadings that were not completely consistent with those previously reported. Twelve items that were deemed problematic had to be excluded from the factor analysis because of skewed data responses (ceiling effects). '*Sucks a thumb'* did not load onto any factors and displayed floor effects. This had been highlighted in Phase 1 also. This item should be monitored in further Scottish populations (Janus & Duku, 2012). Following factor analysis, two items '*is eager to play with a new toy'*, *is eager to play a new game'* did not load onto any domains.

Further, the SEDI was able to discriminate SES gradient by area postcode and demonstrate community strengths and vulnerabilities. The tool's simplicity, usability, and low cost all readily lend themselves to community-wide implementation within Scotland. Future analysis could be conducted for whole populations of Scottish children with the benefit of offering the community 'an accurate, holistic picture' that helps provide a baseline for targeted interventions (Janus & Offord, 2007).

References

Janus, M., & Duku,E. (2012). *Result of the Phase II implementation of the EDI in Scotland. Technical Report*. Offord Centre for Child Studies. Offord Centre, McMaster University, Canada.

Janus, M., & Offord, D. (2007). Developmental and psychometric properties of the Early Development Instrument: A measure of children' school readiness. *Canadian Journal of Behavioural Science, 39* (1), 1 – 22.

Janus, M., Walsh, C., & Duku, E. (2005). *Early Development Instrument: Factor structure, sub-domains and multiple challenge index*. Offord Centre, McMaster University, Canada

Appendix A: Modifications to Phase 2 SEDI suggested from Phase 1 EDI

Phase 1	Phase 2
Technical:	
Teachers entered wrong year in 'date of completion' field	The addition of the year '2012' to this field
No information available on 'opt-out' participants	Non-domain general information data collected for 'opt-out' participants,
Teachers unsure how to answer certain questions i.e. 'climb stairs'.	Teachers given additional guidance on appropriate answers before given questionnaire
Cultural:	
Teachers unsure of including the wording 'learning needs'	Amended to 'additional support needs'
'Regular days absence' not applicable to Scottish context.	Total 'regular sessions of absence' were collected instead
'Repeated grade' highlighted as not typical in Scottish context	Amended to 'repeated primary'
Teacher qualifications not appropriate to Scottish context	Teachers qualifications changed to be more culturally specific

Appendix B: Items reversed in data preparation

Item		Original scoring	Reversed scoring
A2 (17)	Over or underdressed for school related activities	0 = No, 1=Yes	0=Yes, 1=No
A3 (18)	Too tired/sick to do work	0 = No, 1=Yes	0=Yes, 1=No
A4 (19)	Late	0 = No, 1=Yes	0=Yes, 1=No
A5 (20)	Hungry	0 = No, 1=Yes	0=Yes, 1=No
C36 (104)	Is upset when left by parent/guardian	0=Never, 1=Sometimes, 2=Often	0=Often, 1=Sometimes, 2=Never
C37 (105)	Gets into physical fight	0=Never, 1=Sometimes, 2=Often	0=Often, 1=Sometimes, 2=Never
C38 (106)	Bullies or is mean to others	0=Never, 1=Sometimes, 2=Often	0=Often, 1=Sometimes, 2=Never
C 39 (107)	Kicks, bites, hits other children or adults	0=Never, 1=Sometimes, 2=Often	0=Often, 1=Sometimes, 2=Never
C 40 (108)	Takes things that do not belong to him/her	0=Never, 1=Sometimes, 2=Often	0=Often, 1=Sometimes, 2=Never
C 41 (109)	Laughs at other children's discomfort	0=Never, 1=Sometimes, 2=Often	0=Often, 1=Sometimes, 2=Never
C 42 (110)	Can't sit still, is restless	0=Never, 1=Sometimes, 2=Often	0=Often, 1=Sometimes, 2=Never
C 43 (111)	Is distractible, has trouble sticking to any activity	0=Never, 1=Sometimes, 2=Often	0=Often, 1=Sometimes, 2=Never
C 44 (112)	Fidgets	0=Never, 1=Sometimes, 2=Often	0=Often, 1=Sometimes, 2=Never
C 45 (113)	Is disobedient	0=Never, 1=Sometimes, 2=Often	0=Often, 1=Sometimes, 2=Never
C 46 (114)	Has temper tantrums	0=Never, 1=Sometimes, 2=Often	0=Often, 1=Sometimes, 2=Never
C 47 (115)	Is impulsive, acts without thinking	0=Never, 1=Sometimes, 2=Often	0=Often, 1=Sometimes, 2=Never
C 48 (116)	Has difficulty awaiting turn in games or groups	0=Never, 1=Sometimes, 2=Often	0=Often, 1=Sometimes, 2=Never
C 49 (117)	Cannot settle to anything for more than a few moments	0=Never, 1=Sometimes, 2=Often	0=Often, 1=Sometimes, 2=Never

C 50 (118)	Is inattentive	0=Never, 1=Sometimes, 2=Often	0=Often, 1=Sometimes, 2=Never
C 51 (119)	Seems to be unhappy, sad or depressed	0=Never, 1=Sometimes, 2=Often	0=Often, 1=Sometimes, 2=Never
C 52 (120)	Appears fearful or anxious	0=Never, 1=Sometimes, 2=Often	0=Often, 1=Sometimes, 2=Never
C 53 (121)	Appears worried	0=Never, 1=Sometimes, 2=Often	0=Often, 1=Sometimes, 2=Never
C 54 (122)	Cries a lot	0=Never, 1=Sometimes, 2=Often	0=Often, 1=Sometimes, 2=Never
C 55 (123)	Is nervous, high-strung, or tense	0=Never, 1=Sometimes, 2=Often	0=Often, 1=Sometimes, 2=Never
C 56 (124)	Is incapable of making decisions	0=Never, 1=Sometimes, 2=Often	0=Often, 1=Sometimes, 2=Never
C 57 (125)	Is shy	0=Never, 1=Sometimes, 2=Often	0=Often, 1=Sometimes, 2=Never
C58 (126)	Sucks a thumb/finger	0=Never, 1=Sometimes, 2=Often	0=Often, 1=Sometimes, 2=Never