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ACHIEVEMENTS OF EARLY START PUPILS IN JUNIOR–INFANT CLASSES

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Teachers in junior-infant classes early in the school year rated pupils (*N* = 975) who had attended Early Start (a preschool programme in primary schools in disadvantaged areas) on a series of language and cognitive competencies (Time 1). A high level of competence was reported on many of the competencies, more so on the cognitive than on the language competencies. The mean ratings achieved by these pupils were higher than those achieved by pupils in the same classes who had not attended Early Start (*N* = 574). Later in the school year (Time 2), pupils were again rated. Early Start participants (*N* = 825) again achieved higher mean ratings than pupils who had not attended Early Start (*N* = 468). When Time 1 ratings were included in regression analyses to predict Time 2 ratings, attendance at Early Start did not make a significant contribution to prediction.

Reviews of international studies indicate that early childhood education and care programmes can have positive language and cognitive outcomes for all children but particularly for children from low-income families. There is evidence that the estimated effects of high quality preschool on such children can persist into the early grades of elementary or primary school, with best results reported for interventions that are integrated with primary schools (Magnuson, Ruhm & Waldfogel, 2007). Even when there are initial gains, however, several researchers have concluded that early academic advantages tend to fade as other children catch up, curricula become more diverse, and developmental tasks present additional ongoing challenges (Farran, 2000; Fukkink & Blok, 2010; Gilliam & Zigler, 2000; Kellaghan, 1977). Given the diversity of findings, it is not surprising that much has been made of the inadequacies of interventions and of study methodologies (Barnett, 1995) as evaluation studies continue to focus on issues of quality and quantity in efforts to identify best practice. A key objective of such studies has been to compare the outcomes of programmes that vary in their characteristics (e.g., home or centre-based, or combined), inputs (e.g., scale and funding, duration and intensity, staff experience and curricular activities), and target groups (e.g., mothers, infants, toddlers, preschool and school-age children). These investigations have been

supported by important follow-up studies of early education, subsequent school achievement, and life course. In a recent review of research that tracked children at risk who had received well-resourced preschool education, Thorpe, Cloney and Tayler (2010) concluded that participants had more long-term life successes (e.g., high school completion and higher lifetime earnings) and less adversity (e.g., need for special education, participation in crime, early parenthood, and unemployment) than comparable children who had not experienced an early educational programme (see also Barnett, 1995; Campbell & Ramey, 1994; Schweinhart et al., 2005).

As part of an integrated approach to problems of economic and social disadvantage in designated schools in Ireland, Early Start was launched in 1994 to prepare three-year-old children for entry to primary school. Drawing heavily on the experience of an earlier preschool project (Kellaghan, 1977), it was introduced to eight locations in its first year of operation and to a further 32 locations in 1995. Primarily designed to promote language and cognitive development, the Early Start intervention has a number of features that differentiate it from provision in infant classes in primary schools. First, the school day, consisting of a morning or afternoon session, is shorter for Early Start pupils. Secondly, class size is limited to 15. Thirdly, each teacher is assisted by a full-time Child Care worker. Fourthly, all schools with an Early Start centre have the support of a Home-School-Community Liaison co-ordinator (a provision subsequently extended to all primary schools designated as disadvantaged) whose services may also be diverted towards Early Start. The involvement of parents was regarded as a key objective of the intervention, while it was also envisaged that each Early Start centre would evolve in association with other locally-based agencies and individuals dealing with disadvantage.

In an evaluation of Early Start in the original group of eight participating schools between 1994 and 1998, many aspects of implementation were examined including enrolment and attendance, the nature and duration of classroom activities, staff and pupil interaction, and parent involvement (Educational Research Centre, 1998; Kelly & Kellaghan, 1999). The achievements of pupils were also tracked in a number of ways. In the first approach, a sample of pupils (N = 96) enrolled in junior infants was assessed in the areas of cognition, language, and motor skills using the American Guidance Service 'Early Screening Profiles', a standardized screening battery developed for children aged

from 2 years to 6 years and 11 months (Harrison, 1990). These pupils had not attended Early Start and may be regarded as a control group against which the performance of children who had attended Early Start could be compared. Subsequent testing of a sample of the first two cohorts of Early Start pupils was carried out when they reached junior infants in 1995/96 (N = 90) and 1996/97 (N = 81). Teachers of junior infants (N = 17), whose classes included the first cohort of Early Start participants, were also interviewed about the progress of pupils. In the second approach, the literacy and numeracy achievements of all pupils who were in second class (N = 412) in the eight participating schools in 1994/95 were administered the Drumcondra Primary Reading Test Level 2, Form A (Educational Research Centre, 1995) and the Drumcondra Mathematics Test Level 1, Form B (Educational Research Centre, 1997). Their performance was then compared with that of the 1998/99 second class cohort (N = 384) which included 179 children in the first Early Start cohort.[1]

According to the teachers who were interviewed, children who had attended Early Start adapted more readily to school than children who had not had that experience. Early Start participants, when they reached junior infants, were judged to have higher levels of cognitive and social maturity, to be better adapted to classroom procedures, and to have higher levels of self-determination and independence. However, the test results of the first two cohorts of Early Start pupils when they were in junior infants classes were not found to differ significantly from those of pupils who had not attended Early Start, though language performance of the second cohort was significantly better than that of the first cohort (Educational Research Centre, 1998). The literacy and numeracy assessments of second class pupils yielded similar results. Differences between the achievements of pupils who had attended Early Start and those who had not were not statistically significant (Kelly & Kellaghan, 1999).

Though not inconsistent with outcomes reported in studies in other countries, the test results of Early Start pupils were regarded as disappointing. A review of the evaluation findings recognized that the assessment of pupils was, for the most part, limited to literacy and numeracy skills as measured by standardized tests. It concluded that problems with implementation, identified in the initial phase of operation,

[1] Only children who had attended for more than half of the days (82+) that Early Start was in operation were included in analyses.

may have contributed to the failure of Early Start to impact on achievement. In addition to the duration and intensity of the programme, which would be considered inadequate by international standards, attention was drawn to low attendance in some schools, difficulty in reaching parents, and problems in the working relationship between teachers and Child Care workers. Of more fundamental importance perhaps, the report questioned whether there had been sufficient emphasis on cognitive activities, while endorsing the reservations of teachers about the adequacy of in-service provision and the absence of curricular guidelines. It also raised questions about adult-child interaction in Early Start, noting that research on early intervention showed that 'individual attention/ tutoring produces better results' (Kelly & Kellaghan, 1999, p.14).

Subsequent small-scale evaluation studies indicated progress in dealing with some of these issues (Lewis & Archer, 2002; Lewis & Archer, 2003). The two main supports identified by experienced school personnel as having facilitated an improvement in the implementation of Early Start were the introduction of written curricular guidelines based on the Rutland Street curriculum (see Kellaghan, 1977) and continuing in-career development that included visits to classrooms. Other positive developments were an increase in parent involvement, better working relationships between teachers and Child Care workers, and a shift towards small-group learning contexts. A core curriculum was established, based on an 'objectives-led' model, which focussed primarily on language and cognitive development. A systematic approach to profiling pupil achievement was also introduced, the main purpose of which was to assist with curriculum planning and preparation. In a classroom observation study of 19 Early Start centres, Lewis and Archer (2003) confirmed all of these developments and described Early Start as a high-quality intervention based on adult-child interaction with a strong emphasis on language development. Their findings indicated that significant change had taken place since the earlier evaluation was completed and supported a decision to re-examine the impact of Early Start on teachers' perceptions of pupils' competencies in language and cognitive tasks.

The study described in this paper was conducted within a context of improved implementation of Early Start. It was designed to allow for comparison between children when they were in junior-infant classes, who had and had not attended Early Start, and focussed on the following questions. Firstly, to what extent did teachers perceive children who had

attended Early Start to be competent in the kinds of tasks specified in objectives of the Early Start curriculum a few months after they had left the preschool? (Time 1). Secondly, did teachers rate children who had attended Early Start differently in terms of their language and cognitive competencies than their classmates who had not attended Early Start? Finally, were pupils who had attended Early Start rated more positively by teachers than pupils who had not attended Early Start later in the school year? (Time 2).

METHOD

Procedure

Time 1. In the first phase of the study, in the first half of the first school term (October 2006), 1,749 pupil rating forms were sent to 95 junior-infant teachers in 40 schools to which an Early Start centre was attached. Rating forms were also sent to 27 junior-infant teachers in 14 schools which did not have an Early Start centre but to which five or more Early Start pupils had transferred.[2] Two of the schools with an Early Start centre did not have junior-infant classes and a third declined to participate. Ninety (73.8%) of the 122 teachers (all female, except one) who were sent rating forms returned them. Of the estimated 2,214 pupils for whom forms were issued, completed forms were returned for 1,565 pupils (70.7%). Following some exclusions for technical reasons, data were available for analysis for 1,546 pupils, 972 (62.9%) of whom had attended Early Start and 574 (37.1%) of whom had not.

Time 2. In the second phase of the study, teachers who had rated pupils at Time 1 were asked to repeat the rating towards the end of the second junior-infant school term (March 2007). Four teachers who had returned rating forms for 80 pupils at Time 1 could not be identified as they had not put their names on the forms. Thus, the request for data at Time 2 was limited to 86 teachers and 1,485 pupils. Of these, 78 teachers returned forms for a total of 1,342 pupils. Rating forms for 43 pupils were discarded as Time 1 ratings had not been received for them (due mainly to late enrolment). The total number of matched records was 1,299, providing a response rate of 87.5 percent.

[2] Principals in schools with an Early Start centre identified the schools to which pupils had transferred.

The gender composition of pupils at Time 1 was 49.7% female and 50.3% male and mean age (on 31/12/2006) was 57.9 months. Most (85.1%) were native English speakers (Table 1). Among those who had attended Early Start, there were more girls than boys [$\chi^2(1, N = 1{,}542) = 5.97, p < .05$] and pupils were somewhat younger (57.8 months) than pupils who had not attended Early Start (58.3 months) [$t(1{,}016) = -2.12, p < .05$]. In the non-Early Start group, there were more non-native English speakers [$\chi^2(1, N = 1{,}537) = 65.89, p < .001$] and more of them, compared to their Early Start peers, had attended a preschool other than Early Start [$\chi^2(1, N = 1{,}506) = 274.06, p < .001$].

Table 1
Numbers (and Percentages) of Early Start and Non-Early Start Pupils by Gender, Non-Native English Speaker Status and Other Preschool Attendance

		Early Start		Non-Early Start		
Pupil Characteristics		N	(%)	N	(%)	Total
		972	(62.9)	574	(37.1)	1,546
Gender	Male	466	(47.9)	310	(54.4)	776
	Female	506	(52.1)	260	(45.6)	766
	Total	972		570		1,542
Non-Native Speaker	Yes	89	(9.2)	140	(24.5)	229
	No	876	(90.8)	432	(75.5)	1,308
	Total	965		572		1,537
Other Preschool	Yes	93	(9.6)	251	(47.0)	344
	No	879	(90.4)	283	(53.0)	1,162
	Total	972		534		1,506

Instruments

Pupil Characteristics Form. Junior-infant teachers completed a pupil characteristics form at Time 1, providing information on the following characteristics of each pupil: name, gender, attendance at Early Start, native

speaker status, attendance at a preschool other than Early Start, and age in months (calculated from date of birth)[3].

Language and Cognitive Ratings. A pupil rating form, consisting of a set of 18 language tasks and 18 cognitive tasks, was devised to record information about teachers' judgments of pupils' competencies. The forms were pilot-tested in two Early Start schools in 2004 and amended in light of teachers' observations. Most of the tasks or items were derived or adapted from the Early Start 'preliminary' and 'end-of-year' achievement profiles (In-Career Development Team, 1998). The language rating form also included items from Shiel and Murphy's (2000) work on assessing oral language, reading, and writing in primary schools while the cognitive rating form was informed by the mathematics component of a programme devised by Gleeson, Kelly and Archer (1988). Teachers indicated the extent to which they perceived each pupil in their class to be competent in each of the language and cognitive tasks on a 4-point scale [very well (3); well (2); not well (1); not at all (0)]. A 'don't know' option was also provided. To construct the language scale at time 1, the 18 language variables from the first set of ratings were summed to provide a total language score, which was then divided by the total number of items completed (if a pupil had not been rated on an item, the item was excluded) to produce an average scale score. The same procedure was used to construct the cognitive scale at Time 1 and each of the language and cognitive scales at Time 2. Cronbach's alpha coefficients are .98 for the language scale (at both Time 1 and Time 2) and .97 for the cognitive scale (at both Time 1 and Time 2). Correlations between ratings at Time 1 and Time 2 are positive (language, r = .77; cognitive, r = .71).

Analyses

The data were first examined in frequency distributions and histograms and, in further descriptive analysis, the mean language and cognitive ratings of pupils who had attended Early Start were compared with those of pupils who had not attended Early Start. Independent t tests were conducted to test the statistical significance of differences between the groups.

[3] In correlation analyses, the variables were coded: Early Start attendance (yes = 1, no = 0); other preschool attendance (yes = 1, no = 0); non-native speaker (no = 1, yes = 0); gender (male = 1, female = 0).

Since an inspection of rating distributions indicated that the data were not normally distributed, due to the relatively large proportion of pupils receiving perfect or near perfect ratings, a Levene's *F* test was carried out to check for homogeneity of variance. The *F* test was conducted on the language ratings and the cognitive ratings at Time 1 and Time 2 as part of the univariate GLM procedure in SPSS. Homogeneity of variance across groups (Early Start and non-Early Start) was not observed for either the language or cognitive ratings. Since the variances between the two groups were found to differ significantly, the data needed to be transformed to fit more closely the assumptions for parametric statistics[4]. To compensate for the apparent ceiling effects in the data, box-cox transformations for data with skewed errors were calculated (see Hutcheson & Sofroniou, 1999). For Time 1 data, it was estimated that a power transformation of 1.70 was appropriate for the language ratings and a transformation of 2.00 for the cognitive ratings. Following the transformation, homogeneity of variance was observed for the language ratings, but not for the cognitive ratings. The variance properties for the cognitive ratings were, however, improved as indicated by a decrease in the *F* value and an increase in the *p* value compared to the results of the *F* test conducted prior to the transformation. For Time 2 data, a power transformation of 2.63 was applied to the language ratings and a transformation of 3.67 to the cognitive ratings. Homogeneity of variance across groups was observed for both the transformed language and cognitive ratings[5]. An inspection of histograms suggested that the data more closely approximated a normal distribution. The transformed language and cognitive variables were used in all correlation analyses.

Ordinary least squares regressions were fitted to the transformed language and cognitive data. The independent variables were Early Start attendance, age, gender, non-native English speaker, and attendance at a preschool other than Early Start. Time 1 ratings were included as an additional independent variable in Time 2 regression analyses. A

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[4] Language ratings: F (7, 1,485) = 3.69, $p < .01$ (Time 1); F (7, 1,239) = 4.04, $p < .001$ (Time 2).
Cognitive ratings: F (7, 1,480) = 3.64, $p < .01$ (Time 1); F (7, 1,236) = 3.85, $p < .001$ (Time 2).

[5] Transformed language ratings: F (7, 1,485) = .81, $p > .05$ (Time 1); F (7, 1,239) = .97, $p > .05$ (Time 2). Transformed cognitive ratings: F (7, 1,480) = 2.09, $p = .041$ (Time 1); F (7, 1,236) = 1.5, $p > .05$ (Time 2).

simultaneous entry method was used, such that the effect of each of the independent variables is net of the effects of the other variables. Histograms for both language and cognitive data indicated that the residuals were normally distributed and an inspection of a scatter plot of the predicted values against the residuals suggested that variance for both response variables was constant.

RESULTS

To what extent are pupils at the start of Junior Infants (Time 1) who had attended Early Start rated by their teachers as competent in carrying out the language and cognitive tasks specified in the Early Start curriculum?

More than half of the pupils who had attended Early Start could, according to their teachers, do all 18 of the language tasks either 'well' or 'very well' at the start of junior infants while most (about 7 in 10) were considered to have achieved this standard in as many as 15 tasks (Table 2). Difficulties in completing some tasks (involving sequencing, full and/or complex sentence structure, and confident articulation) were reported for relatively small proportions of pupils. In the case of about one-quarter of pupils, competency was not achieved in half of the language tasks (the tasks were completed 'not well' or 'not at all').

At least 7 in 10 pupils who had attended Early Start were rated by their teachers as competent in 15 of the 18 cognitive tasks at the start of junior infants (Table 3). There are only three tasks (involving general problem-solving as well as the more specific competencies of arranging graduated objects and comparing them on different dimensions) in which more than 1 in 5 pupils was considered not competent. Comparing Tables 2 and 3, it can be seen that in general a higher proportion of pupils were rated competent in the cognitive tasks than in the language tasks. More than 4 in 5 pupils were considered competent in 12 of the cognitive tasks but in only 7 of the language tasks. A finding common to both sets of analyses is the limited extent to which the 'don't know' option was used, suggesting that, in general, teachers were confident in their ability to rate pupils.

Table 2
Numbers (and Percentages) of Early Start Pupils in Receipt of Each Rating by Teachers on Language Tasks (Time 1)

Language Tasks (1-10)	Very Well/ Well		Not Well/ Not at All		Don't Know		Total
	N	(%)	N	(%)	N	(%)	N
Express simple personal needs (e.g., ask for something, state play preferences, make a complaint)	848	(87.2)	123	(12.6)	1	(0.1)	972
Follow simple instructions (e.g., 'put the paintbrush in the jar on the top shelf'; 'bring your lunch box to table')	876	(90.2)	94	(9.6)	1	(0.1)	971
Name a series of objects (e.g., body parts, a number of toys)	882	(91.1)	83	(8.5)	3	(0.3)	968
Follow instructions relating to the use of a book (e.g., turn the page)	900	(92.8)	67	(6.9)	2	(0.2)	969
Request books to be read or propose the telling of a story	746	(77.0)	193	(19.9)	28	(2.9)	967
Show recognition of reading activity (e.g., by stating or indicating that someone is reading) or reading material – posters, cards, signs, books, magazines (e.g., by asking what does that say?)	779	(80.4)	162	(16.7)	28	(2.9)	969
Listen attentively to stories and poems read aloud	822	(84.9)	145	(15.0)	1	(0.1)	968
Speak audibly, clearly, and with confidence on most occasions	677	(70.5)	282	(29.3)	1	(0.1)	960
Relate an imaginative story based on a sequence of between three and six pictures using appropriate sequencing terms (e.g., first, next)	513	(53.8)	271	(28.5)	169	(17.7)	953
Recite some rhymes, poems, songs from memory with expression	777	(80.7)	183	(18.9)	3	(0.3)	963

Table 2 Contd.

Language Tasks (11-18)	Very Well/ Well		Not Well/ Not at All		Don't Know		Total
	N	(%)	N	(%)	N	(%)	N
Retell stories heard in class, recalling main characters and events in appropriate sequence	669	(69.5)	252	(26.2)	42	(4.4)	963
Initiate and sustain a conversation on a familiar topic with an adult or other pupils, demonstrating an understanding of turn-taking	712	(73.5)	243	(25.0)	15	(1.5)	970
Describe objects on the basis of distinctive traits and attributes relating to size, height, length, weight, sound and texture	616	(64.8)	246	(25.6)	100	(10.4)	962
Use language to create and sustain imaginary play situations (e.g., a train journey, a visit to the doctor, lunch time)	659	(68.9)	239	(25.0)	58	(6.1)	956
Describe problems and propose possible solutions (e.g., 'I can't make a bridge because I don't have the right blocks')	666	(69.4)	235	(24.5)	59	(6.1)	960
Discuss, predict and speculate about outcomes of concrete activities, real-life situations, and story scenarios (e.g., make suggestions about what might have happened if it had rained during a trip to the beach)	664	(69.0)	219	(22.8)	79	(8.2)	962
Use full sentence structure with nouns and verbs in the correct tense	678	(70.6)	217	(28.2)	12	(1.2)	961
Use complex sentence structure including words like, if, because, and might to explain simple cause/effect relationships (e.g., 'if we had more blocks, we might be able to build a tower')	609	(62.8)	315	(32.5)	45	(4.6)	969

Table 3
Numbers (and Percentages) of Early Start Pupils in Receipt of Each Rating by Teachers on Cognitive Tasks (Time 1)

Cognitive Tasks (1-10)	Very Well/ Well		Not Well/ Not at All		Don't Know		Total
	N	(%)	N	(%)	N	(%)	N
Match in one-to-one correspondence (e.g., make pairs of buckets and spades from a set of six buckets and a set of six spades)	895	(92.8)	63	(6.5)	6	(0.6)	964
Identify a problem and suggest a logical solution	662	(70.0)	221	(23.3)	63	(6.7)	946
Make visual representations through painting or art work	787	(81.8)	167	(17.3)	8	(0.8)	962
Sort and classify primary colours (red, yellow, blue, green)	906	(93.6)	57	(5.9)	5	(0.5)	968
Sort and classify on the basis of shape (circles, squares, triangles)	798	(83.2)	89	(9.1)	73	(7.5)	960
Show understanding of position and relationships in space (e.g., arrange spoons to fit in a drawer)	726	(75.4)	117	(12.2)	120	(12.5)	963
Manipulate and organise self in space in a variety of contexts (e.g., go behind the door, in front of the book corner, through the hoop)	808	(83.9)	138	(14.4)	17	(1.8)	963
Understand that numbers are used for counting	878	(91.2)	72	(7.4)	13	(1.3)	963
Count numbers 1-5 in correct sequence	858	(89.3)	95	(9.8)	8	(0.8)	961
Show understanding of cause and effect (e.g., recognise the impact of heat on ice-cream, or water on plants)	602	(63.9)	184	(19.6)	156	(16.6)	942

Table 3 Contd.

Cognitive Tasks (11-18)	Very Well/ Well		Not Well/ Not at All		Don't Know		Total
	N	(%)	N	(%)	N	(%)	N
Create and sustain imaginary contexts using role play to symbolise meaning beyond the concrete present (e.g., construct a farm)	675	(71.5)	185	(19.6)	84	(8.9)	944
Compare two objects (e.g., a pencil and a crayon) along a range of dimensions (length, width, weight) indicating gross similarities and differences (e.g., which object is longer, shorter or heavier, lighter)	638	(67.0)	201	(21.2)	113	(11.9)	952
Arrange a series of graduated objects (up to five objects) from a variety of dimensions (size, length, height, weight)	586	(61.4)	234	(24.5)	134	(14.0)	954
Reproduce and repeat a pattern of two or three objects	768	(79.8)	155	(16.1)	39	(4.1)	962
Sort and classify on the basis of function (e.g., distinguish between dolls and soft toys, sheep and cows, trees and flowers)	838	(87.6)	97	(10.1)	21	(2.2)	956
Work independently for sustained periods completing tasks as required	784	(81.8)	173	(18.1)	1	(0.1)	958
Show positive indications of adult dependence, seeking help as required or join with adults in creating structures, threading beads	824	(85.7)	123	(12.8)	15	(1.5)	962
Adapt to the structures of the day, adopting behaviours required for the various learning contexts (e.g., sit in a circle for story telling)	826	(85.8)	136	(14.1)	1	(0.1)	963

Are pupils who had attended Early Start rated differently than their classmates who had not attended Early Start at the start of Junior Infants (Time 1)?

Distributions of the mean language and cognitive ratings of the Early Start group and the non-Early Start comparison group at the start of junior infants are presented in Figures 1 and 2. The figures show evidence of a ceiling effect for the ratings, especially for pupils who had attended Early Start.

Figure 1
Distribution of Language Ratings at the Start of Junior Infants (3 = Very Well, 0 = Not at All)

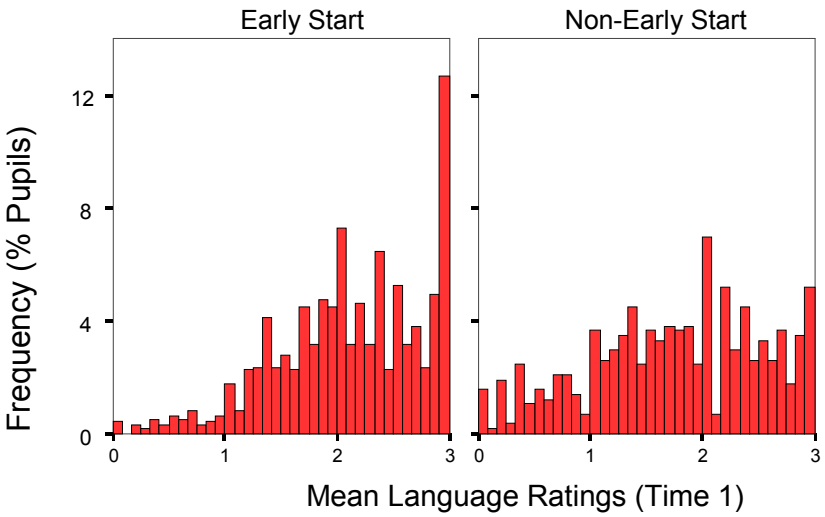
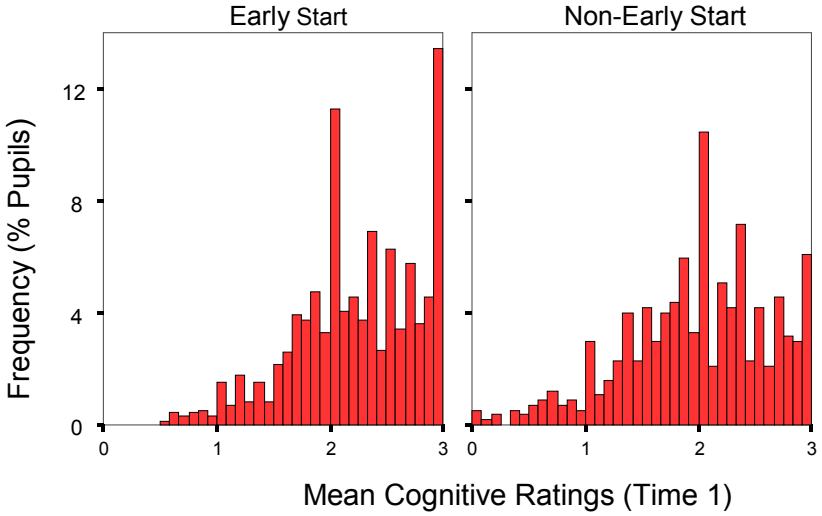


Figure 2
Distribution of Cognitive Ratings at the Start of Junior Infants (3 = Very Well, 0 = Not at All)



In the case of both language [t (1,047.40) = 8.94] and cognitive ratings [t (1,073.29) = 7.90], Early Start pupils significantly outperformed non-Early Start pupils ($p < .001$). The data also indicate that between-group differences are greater for language ratings than for cognitive ratings (Table 4).

Table 4
Mean Ratings and Standard Deviations of Early Start and Non-Early Start Pupils (Time 1)

	Early Start			Non-Early Start			Mean
	N	M	SD	N	M	SD	Difference
Language (N=1,546)	972	2.09	.65	574	1.75	.77	.34
Cognitive (N=1,541	968	2.23	.55	573	1.97	.63	.26

Pearson's *r* correlation coefficients reveal a strong positive association between the language and cognitive ratings (Table 5). The language and cognitive ratings are also positively associated with having attended Early Start, being older, and having attended another preschool. Both sets of ratings are negatively associated with being male and a non-native speaker.

Table 5
Correlations between Language Ratings, Cognitive Ratings, and Pupil Characteristics (Time 1)

	Language Rating	Cognitive Rating	Early Start Attendance	Non-Native Speaker	Other Preschool	Age (Months)
Cognitive Rating	.84**					
Early Start Attendance	.22**	.20**				
Non-Native Speaker	-.36**	-.21**	-.21**			
Other Preschool	.09**	.10**	-.42**	-.05		
Age (Months)	.10**	.15**	-.06*	-.02	.08**	
Gender	-.13**	-.16**	-.07*	-.01	-.02	.08**

**$p < .01$ (2-tailed). *$p < .05$ (2-tailed). $N > 1500$ for each correlation.

Multiple regression analyses of data collected at the start of junior infants (Time 1) indicated that pupil characteristics and attendance at Early Start predicted almost one-fifth of the variance in language ratings (R^2 =.19) (Table 6). All variables contribute significantly ($p < .001$). Inspection of Beta coefficients (measured in standard deviation units) indicates that the strongest predictor relates to whether or not a pupil was a non-native speaker. A one standard deviation increase in the non-native speaker variable is associated with a .29 decrease in language rating when other variables are held constant. Early Start attendance is also a relatively strong predictor of language ratings. A one standard deviation increase in this predictor is associated with a .23 increase in rating.

Table 6
Coefficients of Variables Predicting Language Ratings at the Start of Junior Infants (Time 1)

Predictor Variables (N = 1,489)	Unstandardized Coefficients B	SE	Standardized Coefficients β
(Constant)	2.97	.81	.23***
Attended Early Start	1.17	.14	-.29***
Non-native speaker	-2.02	.17	.16***
Attended other preschool	.94	.16	.10***
Age (months)	.06	.01	-.13***
Gender	-.64	.12	

R^2 = .19, p < .001. Adjusted R^2 = .18. *** p < .001.

Regression analyses involving cognitive ratings indicated that 14% of the variance was predicted from the combined independent variables (Table 7). The association between the cognitive ratings and each independent variable is statistically significant. The strongest predictor relates to whether or not a pupil had attended Early Start. A one standard deviation increase in Early Start attendance is associated with a .24 increase in cognitive rating.

Table 7
Coefficients of Variables Predicting Cognitive Ratings at the Start of Junior Infants (Time 1)

Predictor Variables (N = 1,484)	Unstandardized Coefficients B	SE	Standardized Coefficients β
(Constant)	2.05	1.19	
Attended Early Start	1.81	.21	.24***
Non-native speaker	-1.47	.25	-.15***
Attended other preschool	1.47	.23	.17***
Age (months)	.13	.02	.15***
Gender	-1.07	.17	-.15***

R^2 = .14, p < .001. Adjusted R^2 = .14. *** p < .001.

To what extent do pupils who had attended Early Start maintain their advantage over classmates who had not attended Early Start towards the end of Junior Infants (Time 2)?

As in the case of Time 1 data, a descriptive analysis was undertaken to provide an overview of the distribution of ratings at Time 2 (Figures 3 and 4). Evidence of a ceiling effect for the ratings is even stronger for both Early Start and non-Early Start pupils at Time 2 than at Time 1. For those who had attended Early Start, it was calculated that 9% averaged a perfect language rating of 3 at Time 1 compared to 23% at Time 2. The comparable percentages for the cognitive ratings of this group at Time 1 and Time 2 are 11% and 25% respectively. Of pupils who had not attended Early Start, 4% averaged a perfect language rating at Time 1 compared to 15% at Time 2, while 5% averaged a perfect cognitive rating at Time 1 compared to 16% at Time 2. As in the case of the Time 1 distribution, the histograms for Time 2 show that the ceiling effects are more pronounced for the Early Start group.

Figure 3
Distribution of Language Ratings at the End of Junior Infants (3 = Very Well, 0 = Not at All)

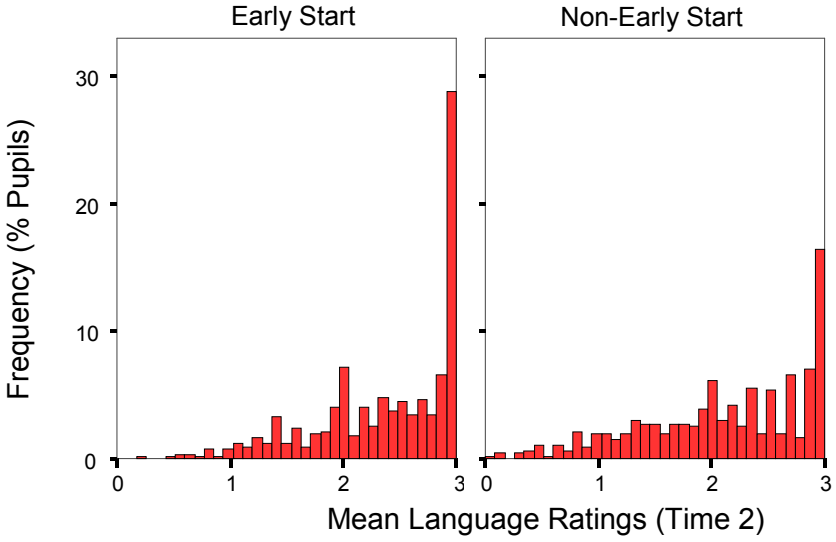
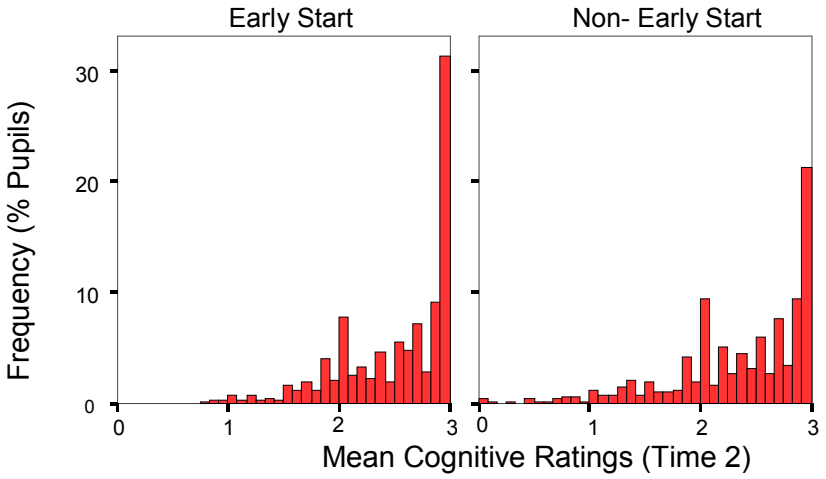


Figure 4
Distribution of Cognitive Ratings at the End of Junior Infants (3 = Very Well, 0 = Not at All)



Changes over time in the relationship between Early Start attendance and pupil ratings were examined by comparing the mean ratings for Early Start and non-Early Start pupils at Time 1 and Time 2. Only pupils whose language and cognitive ratings were returned on both occasions were included in the analysis. Results showed (a) higher average ratings for the Early Start group at Time 1 and Time 2; (b) higher average ratings for both groups on the cognitive profile than on the language profile at Time 1 and Time 2; (c) an improvement for both groups in both domains over time; and (d) smaller differences between the groups at Time 2 than at Time 1 (Table 8). Average Time 2 ratings for non-Early Start pupils were about the same (in the language domain) or better (in the cognitive domain) than average Time 1 ratings for Early Start pupils. Results of independent *t* tests indicated that the differences between the means for the two groups are significant ($p < .001$) on both occasions for language ratings [$t(850.66) = 8.05$] (Time 1); [$t(845.26) = 6.39$] (Time 2); and for cognitive ratings [$t(859.59) = 7.39$] (Time1); [$t(821.77) = 4.86$] (Time 2).

Table 8
Mean Ratings and Standard Deviations of Early Start and Non-Early Start Pupils (Time 1 and Time 2)

	Time 1							Time 2						
	Early Start			Non-Early Start			Mean	Early Start			Non-Early Start			Mean
	N	M	SD	N	M	SD	Difference	N	M	SD	N	M	SD	Difference
Language (N=1,286)	819	2.10	.65	467	1.76	.76	.34	819	2.37	.62	467	2.12	.73	.25
Cognitive (N=1,286)	819	2.23	.55	467	1.97	.64	.26	819	2.50	.51	467	2.34	.63	.16

Regression analyses (not reported) to predict language and cognitive ratings at Time 2, similar to those carried out at Time 1 (Tables 6 and 7), yielded similar findings: all independent variables made significant contributions to the explanation of variance. Two further analyses were carried out to determine if Early Start attendance contributed to the prediction of Time 2 ratings when Time 1 ratings were included in the regression models. The addition of the earlier ratings increased the percentage of variance explained considerably in the case of both the language (Table 9) and cognitive (Table 10) ratings. However, attendance at Early Start did not make a significant contribution to prediction.

Table 9
Coefficients of Variables Predicting Time 2 Language Ratings with Time 1 Language Ratings included to Control for Initial Differences between Early Start and Non-Early Start Pupils

Predictor Variables (N = 1,245)	Unstandardized Coefficients		Standardized Coefficients
	B	SE	β
(Constant)	3.84	2.88	
Attended Early Start	.04	.50	.00
Non-native speaker	.12	.64	.00
Attended other preschool	.49	.56	.02
Age (months)	- .00	.05	.00
Gender	- 1.75	.41	- .08***
Time 1 language ratings	3.29	.09	.74***

R^2 = .57, p < .001. Adjusted R^2 = .57. *** p < .001.

Table 10
Coefficients of Variables Predicting Time 2 Cognitive Ratings with Time 1 Cognitive Ratings included to Control for Initial Differences between Early Start and Non-Early Start Pupils

Predictor Variables (N = 1,238)	Unstandardized Coefficients		Standardized Coefficients
	B	SE	β
(Constant)	17.34	14.19	
Attended Early Start	- .65	2.50	- .01
Non-native speaker	2.56	3.04	.02
Attended other preschool	2.65	2.79	.02
Age (months)	- .04	.25	- .00
Gender	- 6.60	2.05	- .07**
Time 1 cognitive ratings	9.05	.31	.67***

R^2 = .46, p < .001. Adjusted R^2 = .46. ** p < .01. *** p < .001.

CONCLUSION

Our study comprised three areas of investigation. The first was to establish the extent to which pupils who had attended Early Start would be considered competent by their teachers in the kinds of tasks specified in the Early Start curriculum a few months after they had left preschool, that is, during the first term of junior infants. We found that a large proportion of the pupils were considered competent in a range of language tasks while an even larger proportion were rated competent in a range of cognitive tasks. Areas in language development that appeared to be problematic for relatively large proportions of pupils involved sequencing (e.g., first, next), identification of criterial attributes of objects (e.g., size, height, length), and use of complex sentence structures (e.g., involving cause-effect relationships). Problems relating to speaking with confidence may have broader implications relating to sense of one's own competence (self-efficacy). Problem areas identified in the cognitive tasks relating to seriation (e.g., arranging graduated objects in a series, differentiating objects of the basis of length, weight, etc) bear a similarity to the areas

identified as problematic in the language competencies. They also have clear implications for the development of numeracy.

In the second area of investigation, teachers' ratings of pupils who had attended Early Start were compared with ratings of their classmates who had not had the experience of Early Start. Pupils who had attended Early Start received higher language and cognitive ratings than pupils who had not. Furthermore, while pupil age, gender, native speaker status, and attendance at a preschool other than Early Start all contributed significantly to prediction of both language and cognitive ratings, attendance at Early Start was the strongest predictor of cognitive ratings, and the second strongest predictor of language ratings.

In the third area of investigation, teachers rated both Early Start and non-Early Start pupils again later in the junior infants school year. Early Start participants again achieved higher mean ratings than pupils who had not attended Early Start. The language and cognitive ratings of both groups had improved and mean differences between the groups were smaller than at the start of junior infants but still significantly different. Average ratings of the non-Early Start group at the end of junior infants were about the same as the earlier ratings of classmates who had attended Early Start in the language domain and were higher in the cognitive domain. Interpretation of these findings is complicated by 'ceiling effects' in the data, particularly evident in the great proportions of Early Start participants who received perfect or near-perfect ratings at the start of junior infants, indicating that they had achieved the expected level of competence in the curriculum objectives specified.

In our final analyses, the addition of teacher ratings obtained at the beginning of junior infants to the regression model had the effect of reducing the contribution, to insignificant status, of all variables (with a minor exception) to variance in the later teacher ratings. When pupils' prior competencies were taken into account, Early Start attendance did not make a significant contribution to their competencies assessed at a later date. These findings serve to underline the very significant role that prior scholastic performance plays in later assessments of that performance, whether assessed by teachers or in more formal test procedures.

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