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Explaining the academic achievement at school leaving for pupils with a history of language impairment: Previous academic achievement and literacy skills

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Abstract

The relationships are explored between language and literacy and academic success at 16 years in an English sample of 62 young people with a history of specific language impairment identified at 8 years. Data were available from national assessments at 16 and 14; in addition the pupils had completed a range of standardized tests to examine language, literacy and non-verbal ability at 10 years and 8 months and at 16 years. Concurrent measures of literacy had the highest correlations with academic performance. However, analysis revealed a complex model identifying relationships between academic performance at 16 and previous academic attainments in secondary school (national assessments at 14) and a measure of language (listening to paragraphs, Clinical Evaluation of Language Fundamentals 3 or CELF-R^{UK}; Peers et al., 1999). Standardized measures of literacy, non-verbal ability and listening to paragraphs (CELF-R^{UK}) taken at age 11 accounted for over 50% of the variance in performance on Key Stage 3 (KS3) assessments at 14 in English, maths and science. Current gaps in our understanding of the factors that support successful school performance are discussed.

Keywords

attainments, specific language impairment, literacy, writing

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I Introduction

Raising the academic attainments of all pupils is a key challenge for policy and practice. There are continuing debates about the most appropriate ways to meet the educational needs of children with speech language and communication needs (SLCN). These debates revolve around the rights to be educated in mainstream settings (Rustemier, 2002; Lindsay, 2007), the most appropriate educational placement to raise achievements and well-being (Zigmond, 2003; Hutcheson et al., 2004) and evidence-based pedagogical practices (Norwich, 2002; Norwich and Lewis, 2007). There is continual concern for children with SLCN being identified as the 'the most vulnerable and most in need of effective support to reach their potential' (Bercow, 2008) and a lack of data on the factors which support academic achievement and attainment.

In this article we consider what is known about the academic achievement of pupils with a history of specific language problems and then consider what data are needed to inform our support of the children and young people. Using longitudinal data from a cohort of pupils identified in two English local authorities as having a specific language difficulty (Dockrell et al., 2007b) we consider their profile of achievement at the end of compulsory education and what factors predict their academic attainment on leaving compulsory education.

There is, now, a consensus that children identified with specific language impairment (SLI) are a heterogeneous group in terms of both the nature and severity of their problems with language and communication (Bishop, 2006), their behavioural and socio-emotional outcomes (Lindsay et al., 2007) and outcomes in adulthood (Carroll and Dockrell, 2010). Longitudinal studies that address the relationships between language difficulties and academic attainment are relatively few (Aram et al., 1984; Mawhood et al., 2000; Clegg et al., 2005) and are often compromised by the points in history when data were collected (Mawhood et al., 2000; Law et al., 2009). Previous studies have pointed to the poor academic achievement of these young people. However, these studies included relatively small numbers of participants (Aram et al., 1984, $n = 20$; Mawhood et al., 2000, $n = 20$). There have been significant changes in terms of educational provision, policy and practice since these participants attended school (Lindsay and Dockrell, 2008). More recent studies, from both North America and England, point to a mixed picture of attainments, where a more positive prognosis for the pupils has been identified despite generally lower school grades and higher levels of communication difficulties (Felsenfeld et al., 1994; Snowling et al., 2001; Young et al., 2002; Conti-Ramsden et al., 2009; Durkin et al., 2009). These studies have emphasized language skills and, to a lesser extent, literacy skills as predictors of later achievement. No attempt has been made to consider participants' prior academic attainment in secondary school as a predictor of performance at the end of secondary school (see Conti-Ramsden et al., 2009). Longitudinal investigations of causal effects on attainment allow for the inclusion of prior measures of the attainment, thus controlling for the possibility of autoregressive effects.

Many children with specific language impairments experience additional challenges that can directly affect access to the curriculum and ultimately academic achievement. Of particular importance are difficulties with literacy, including inefficiencies in decoding (Stothard et al., 1998; Catts et al., 2002), compromised reading comprehension (Mackie and Dockrell, 2004; Nation et al., 2004), spelling problems (Mackie and Dockrell, 2004) and limitations in the production of written text (Bishop and Clarkson, 2003; Dockrell et al., 2009). In UK post-16 educational contexts continuing difficulties with basic skills serve as barriers to future educational and occupational opportunities (Dockrell et al., 2007b). Thus practitioners need to consider the pupil's competencies beyond the pupil's specific language problems and how these additional challenges will impact on their academic achievements.

In addition to a pupil's individual profile of cognitive skills there are other factors that affect academic achievement. Such factors include social disadvantage, the school's ability to meet the pattern of educational needs, the specialist support the pupil receives such as speech and language therapy and the young person's educational placement (Freeman and Alkin, 2000; Harrison et al., 2009; Perry and McConney, 2010). There is increasing evidence that such contextual factors play a significant role in academic attainments (Stewart, 2008). The relative importance of these various factors vary over the educational phases and with respect to the curricular demands being placed on pupils.

The majority of studies that consider patterns of performance for these pupils assume that the significant predictors of performance are the pupils' language or cognitive levels. Little, if any, information is provided about the pupils' prior academic attainments, the contexts in which they are being educated and the support which they receive. Moreover, emphasis is often placed on the participants' previous rather than their concurrent levels of performance. Any longitudinal analyses should include previous academic performance in regression models to establish which factors add to performance above and beyond previous levels of academic achievement.

II Rationale for the current study

The present article examines academic attainments at school leaving age in a group of pupils who were known to have a specific language impairment at the age of 8 years. The impact of language and literacy skills at the end of compulsory schooling are considered while controlling for previous academic achievement measured by national test results for the pupils. In relation to pupil variables we consider language, literacy and non-verbal abilities. We provide information about the schools that the pupils were attending and we examine differences in outcome across social disadvantage, school context, and speech and language therapy support while in secondary school.

III Method

1 Participants

Sixty-nine monolingual English-speaking children (17 girls and 52 boys) were identified as having SLI in Year 3 when they were of a mean age of 8;3 (i.e. 8 years and 3 months; age range 7;6–8;10). Pupils were subsequently seen on three further occasions:

- about two years later in Year 6, when the sample had a mean age of 10;8 (range 10;2–11;4);
- the following year on entry to secondary school / high school (Year 7, mean age 12;1, range 11;3–12;6); and
- prior to entry into the final compulsory phase of secondary school education, when pupils had a mean age 13;11 (Year 9, range 13;4–14;10).

Pupils were approached again prior to their final year of compulsory schooling in the UK (Year 11 mean age 15;10, range 15;2–16;4). Data were provided by the UK government's Department for Children Schools and Families (DCSF) on the academic attainments of 64 pupils, of whom 62 agreed to complete formal testing. Thus, data for both national assessments and standardized assessments were available for 62 pupils. Occasionally pupils opted out of assessments and these data are recorded as missing.

These pupils were taking part in a longitudinal study charting the educational and social needs of children with SLI (Dockrell et al., 2007b). At identification, all study participants were experiencing

significant difficulties with language in the presence of average non-verbal abilities. Profiles of language, literacy and cognitive skills for these phases are presented elsewhere (Dockrell et al., 2007a; Dockrell and Lindsay, 2008).

a Population characteristics: At initial identification the participants represented 0.75% of the Year 3 population across two local authorities (LAs) in England. All pupils had English as their first language. Eleven per cent (n = 8) of the total sample were eligible for free school meals in Year 11. This was comparable to the national secondary school average of 14.3% for that year (Department for Children, Schools and Families, 2005). There were no significant differences between young people in mainstream or special provision ($\chi^2 = 5.30$, $df = 3$, n.s.) in terms of free school meal (FSM) entitlement, although no pupils eligible for FSM were in special schools in Year 11. In Year 11 the only standardized measure that differentiated the FSM and the non-FSM group was spelling, with those receiving FSM scoring significantly higher ($t = 2.37$, $df = 50$, $p = .02$).

In year 11, 64% of the pupils had statements of special educational needs, 11% were classified as 'school action plus'. A classification of 'school action plus' meant that the pupil received support from a professional external to the school (e.g. a speech and language therapist; SLT). Six per cent were at school action where additional support was provided from within the school's own resources, and 19% no longer had any statutory identification of special educational need. Of those whose needs were recorded, 28% were still identified as having a primary speech language and communication need. In contrast at this point 25% were recorded with a primary need of moderate learning difficulty, 13% with autistic spectrum disorder (ASD) and 6% as behavioural, emotional and social difficulties, and 3% with a specific learning difficulty. Thus over time the perception of the primary need had changed for the majority of the pupils.

b Educational contexts: When the pupils were in Year 7, special educational needs coordinators (SENCOs) in the secondary schools identified a range of different school funded provision that had been dedicated for children with additional learning needs above and beyond specialist individual targeted support. As Figure 2 shows literacy was targeted directly in 90% of the cases. In addition, there was use of additional teacher and teaching assistant (TA) time[1] to support pupils with additional learning needs. All schools reported meeting additional learning needs for all pupils by at least two forms of school-based support. These data indicate that, on average, pupils were located in secondary schools that had support systems in place and that they were familiar with the needs of diverse learners. Parents also reported that they felt that the support provided reflected an individualized approach rather than being subject to generic support, with 83% of the participants receiving highly or quite individualized support (Dockrell et al., 2007b). In addition, parents reported that 27 pupils were receiving support from speech and language therapists and seven were receiving additional support from a tutor or mentor.

2 Materials

Measures were identified to tap both receptive and expressive oral language skills, literacy, non-verbal ability and written language. Language assessments previously identified as clinical markers of SLI were included in the assessment battery. Reading was assessed for both accuracy and comprehension. Tests were identified to be age appropriate and culturally appropriate, standardized with measures of reliability and validity, and used with children who have language problems. All measures are used for the identification and assessment of children with SLI in the UK.

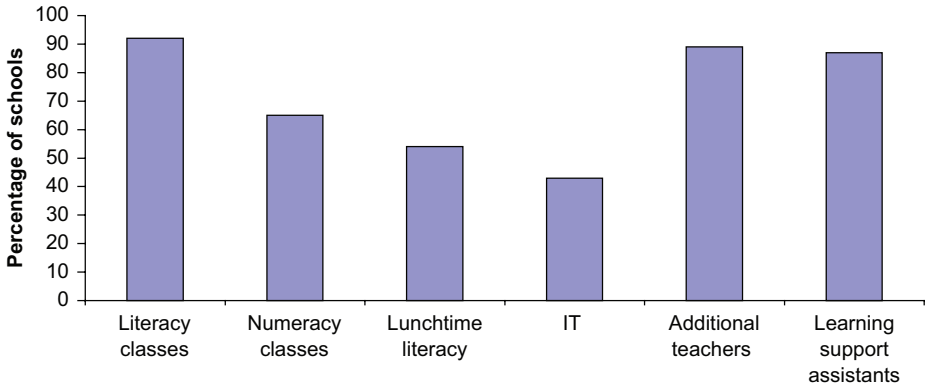

Figure 1 Percentage types of resources provided by secondary schools

Measures used at age 8 (Year 3) to identify the sample and age 11 (Year 6) to profile continuing need are reported in Dockrell et al. (2007a). All measures used at 14 and 16 are reported here. Measures of reliability and validity are reported for each scale on first mention. Unless otherwise stated information was gained from technical manuals.

a Non-verbal ability (14): British Ability Scales II (BAS II) Matrices subtest (Elliot et al., 1997): Children are presented with a set of patterns where one pattern is incomplete. There is a choice of six responses and children are required to point to the missing piece: reliability .85; validity with the WISC-III Performance scale .47.

b Vocabulary (16): British Picture Vocabulary Scale (BPVS; Dunn et al., 1997): Children are shown four line drawings and asked to choose the one that best illustrates a word spoken by the assessor: reliability .89; validity with the Expressive One-word Vocabulary test .72.

c Grammar (14 and 16): Test of Reception of Grammar (TROG II; Bishop, 1983): A multiple-choice test designed to assess understanding of grammatical constructions, children are shown four pictures and the assessor reads a sentence. The child is required to select a picture that matches the sentence: reliability .88; validity with the Clinical Evaluation of Language Fundamentals: Revised UK Edition (CELF-R^{UK}; Peers et al., 1999) .53.

CELF-R^{UK} (Peers et al., 1999): Formulated Sentences and Listening to Paragraphs. Formulated sentences requires a child to produce a sentence in response to an orally presented single word or two-word combination: reliability .82; validity with other CELF-R^{UK} expressive subscales .43–.49. Listening to paragraphs requires the child to attend to a short paragraph and answer specific questions related to the content: reliability .74; validity with other receptive scales .30–.43

d Reading (16): BAS II Word Reading Scale: This scale assesses recognition and oral reading of single words. The principal aim is to test single-word decoding ability using a sample ranging from common words found in children's books to less common words: reliability .93; validity with WORD reading scale .71 (Wechsler Objective Reading Dimensions; Wechsler, 1993).

Test of Word Reading Efficiency (TOWRE; Torgesen et al., 1999): This contains two subtests. The Sight Word Efficiency (SWE) subtest assesses the number of real printed words that can be accurately identified within 45 seconds, and the Phonetic Decoding Efficiency (PDE) subtest measures the number of pronounceable printed non-words that can be accurately decoded within 45 seconds.

e *Reading comprehension scale*: Wechsler Objective Reading Dimensions (WORD; Wechsler, 1993): The reading comprehension scale measures the pupil's understanding of short written passages of text. The WORD is standardized on children between the ages of 6 and 16 years and has a split-half reliability for children age 15 to 16 of .82 for reading comprehension.

f Spelling (16): British Abilities Scales II (BAS II); Spelling Scale: This scale provides a number of phonetically regular and irregular words to assess the child's ability to produce correct spellings. Each item is first presented in isolation, then within the context of a sentence, and finally in isolation. The child has to respond by writing the word: reliability .91; validity with Wechsler Objective Reading Dimension (WORD) spelling .63.

g Written language (16): The Wechsler Objective Language Dimensions (WOLD): Writing Expression (Rust, 1996): The child is asked to write a letter outlining his or her ideal house. Children are allowed 15 minutes to complete the task. This free writing task addresses the development of ideas and organization, as well as punctuation and use of capitals. The written output can be scored either holistically or analytically: reliability .89, correlation with Woodcock–Johnson Psycho-Educational Battery: Revised (Mather and Jaffe, 1996) dictation .72. Analytic scoring was used (see Dockrell et al., 2007a)

h Academic attainments: National measures of academic attainment were used to evaluate pupil progress. At Key Stage 3 (KS3) these were national compulsory assessments (standard assessment tasks, SATs) in English, maths and science completed at age 14. We used the average SATs score as the measure of previous academic attainment achieved in secondary school.

Pupils' academic attainments at school leaving were evaluated through the General Certificate of Secondary Education (GCSE) grades and points achieved. GCSEs are graded A* to G; bands of pass grades are described as either level 2 (A* to C), the higher level, or level 1 (D to G). Points achieved at the end of compulsory schooling are derived from aggregating points allocated for different grades for each GCSE subject examination taken, entry level qualifications and other national examinations taken at 16.

3 Procedure

The project received ethical approval from the relevant university panel. Pupils were allowed to terminate the session or opt out of a test if they wished.

Attempts were made to contact all participants in their final year of compulsory education. The pupils who completed psychometric assessments were being educated in a wide range of provision: 38 in mainstream classes, 9 in special provision within mainstream schools and 15 in special schools including residential special schools for children with specific language impairments.

All pupils were assessed individually in a quiet room at school by a qualified educational psychologist. Informed consent from schools, parents and children was provided prior to any testing.

Table 1 Differences between children with a history of SLI and norm at 16 years of age

Competency assessed	Mean Z	*SD*	*t* (*df* = 61)	Effect size *d*
Language understanding (Listening to paragraphs, CELF-R^{UK})	–1.16	0.66	–13.80***	1.75
Language grammatical comprehension (TROG)	–0.23	1.03	–1.79	0.23
Vocabulary comprehension (BPVS)	–1.28	1.11	–9.01***	1.15
Single word reading	–1.82	0.95	–14.97***	1.95
Reading comprehension	–1.60	0.71	–17.77***	2.26
Spelling	–1.68	1.01	–13.06***	1.65
Writing	–2.20	1.10	–15.71***	2.14

Note: *** $p < .001$

Testing occurred over three days. The first session involved a familiarization with the research officer and a discussion about the longitudinal study. All tests were administered using the standard procedures in the manuals. Pupils were presented with a certificate of merit for participation in the study that they could include in their record of achievement. Data on academic achievement were provided for each pupil by the DCSF. Data relating to school context and specialist support were provided by the special educational needs coordinator or the form tutor. Parents also provided information about any additional support that their children received.

IV Results

The results are presented in three sections. Section 1 describes the pupils' performance at the end of compulsory education, Section 2 considers verbal and non-verbal predictors of pupils' performance, and Section 3 examines the role of wider contextual factors which may influence academic performance.

1 Academic achievement at the end of compulsory education

Table 1 presents pupils' performance at the end of compulsory education at 16 years. As Table 1 shows pupils were still performing significantly below the norm on measures of language and literacy. The data were significant using Mauchley's test of sphericity ($p = .001$) so the Greenhouse Geisser correction was used. Pupils performed significantly differently across assessments ($F(4.83, 294.669) = 43.408$, $p < .0005$ partial η^2 .42). In all cases literacy scores were significantly lower than language scores ($p < .001$) and pupils' performance on the writing measure was significantly poorer than all other measures ($p < .003$ single word reading to $p < .0005$ for all other measures). Despite these significant limitations in literacy and language the majority of pupils completed one or more formal assessments at the end of their school career.

Pupils took an average of seven formal qualifications (range 0–14) with an average of five GCSEs; a smaller but significant proportion of pupils took entry level qualifications. Entry level is below the level expected at this phase of education. In addition to the required assessments in maths and English, pupils took a range of other GCSE qualifications including science ($n = 60$), information technology ($n = 33$), design and technology ($n = 33$), religious studies ($n = 23$), physical education ($n = 16$), history ($n = 15$), art and design ($n = 14$), personal and social education ($n = 13$), French ($n = 10$), home economics ($n = 8$), geography ($n = 7$), with smaller numbers of

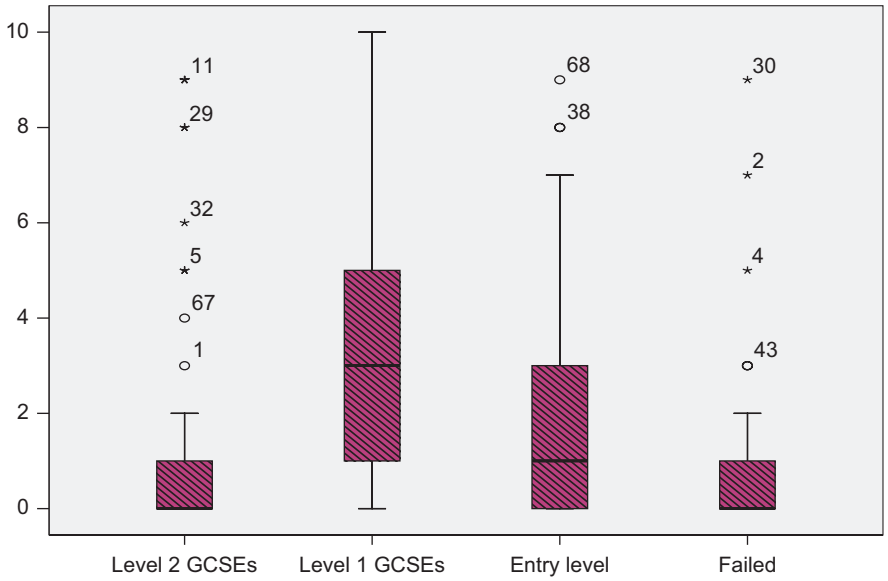

Figure 2 Box plots of levels of qualifications achieved by participants at age 16: Number of GCSEs obtained

Table 2 Comparison of GCSE results with national and home local authority averages (percentages)

	5 A*–C	5 A*–C including English and Maths	Any pass
Study participants	12.5	2.8	85.0
With statement (National)	7.1	3.5	80.6
SEN without a statement (National)	17.1	8.9	91.5
No identified SEN (National)	63.4	49.9	98.6

Source: Data from DfES research and statistics gateway (http://www.dfes.gov.uk/rsgateway/DB/SFR/s000640/index.shtml)

students taking other subjects. Few students were taking vocational GCSEs or GNVQs (vocational qualifications).

The box plot in Figure 2 provides details of the distribution of levels and numbers of qualifications gained. Four-two per cent of the assessments recorded were below the national assessment key-stage level (entry level and below). Of the 342 GCSE level examinations, 25% were achieved at level 2, 60% at level 1 and 15% were failed. The distributions of the all examination results are shown in Figure 2. Nonetheless 12.5% of the pupils achieved 5 GCSEs at level 2. Seventy-five per cent received a GCSE in maths ($n = 47$), in contrast to only 44% ($n = 27$) in English, the majority achieving level 1 passes.

Table 2 provides comparative data for the current cohort both nationally and for their respective LAs at the time in which the examinations were taken. Relatively, they performed well compared with the national statistics for young people with special educational needs in terms of percentages achieving both GCSE 5 A*–C and Any Passes. However, in terms of gaining both maths and English and three other GCSEs their performance was poor.

Table 3 Correlations between GCSE points score and assessments of academic attainments, non-verbal ability, language and literacy at age 15

	GCSE points	1	2	3	4	5	6	7	8	9
1. Key stage 3 mean SATs score	**.60*****									
2. Non-verbal ability (matrices)	.37**	**.51*****								
3. Vocabulary (BPVS)	.44**	.43**	**.53*****							
4. Formulated sentences (CELF-R^{UK})	.34*	.37**	.29*	**.51*****						
5. Listening to paragraphs (CELF-R^{UK})	**.45*****	.40**	.26*	**.46*****	.38**					
6. Receptive grammar (TROG)	.24	.06	.27*	.43**	.29*	.11				
7. Single word reading (BAS)	**.45*****	**.54*****	**.52*****	**.51*****	.36**	.22	.33*			
8. Reading comprehension (WORD)	**.46*****	.42**	**.63*****	.56**	.43**	.27*	.30*	**.54*****		
9. Spelling (BAS)	.39**	**.66*****	.44**	.27*	.18	.08	.29*	**.74*****	.40**	
10. Writing (WOLD)	**.56*****	**.70*****	.42**	**.55*****	.37**	**.47*****	.31*	**.59*****	**.45*****	**.65*****

Notes: Corrected significance level .005 highlighted in bold. Significance levels .05*, .01**, .001***

2 *Relationships between language and literacy measures with attainment*

We examined the extent to which attainment at school leaving was related to current levels of language and literacy and with previous academic achievement (mean KS3 SATs) and non-verbal ability. Correlations between GCSE points and measures of non-verbal ability, language and literacy are presented in Table 3. Applying a Bonferonni correction for multiple comparisons sets the significance level at .005. As Table 3 shows significant relationships between GCSE points remain with mean KS3 SATs for the pupils' literacy skills and listening to paragraphs (CELF-R^{UK}) but not non-verbal ability or any other language measure.

The data were analysed using hierarchical multiple regressions to test in sequence the role of language and literacy on points achieved after accounting for previous academic attainment. Variables with significant correlations using the Bonferonni criteria were included as predictors. Previous academic attainment was entered as the first regressor followed by oral language comprehension (Listening to paragraphs, CELF-R^{UK}) in the next step and reading (comprehension and decoding) in the final step. A significant model emerged ($F(2, 61) = 14.890$, $p < .0005$, $R^2_{adj} = .31$), which included previous academic attainment ($\beta = .44$, $p < .0001$) and oral language comprehension ($\beta = .23$, $p = .03$). The inclusion of oral language comprehension added an additional 4% of variance explained (R^2 change = .044) to the 29% accounted for by previous academic achievement. Literacy measures added in subsequent steps were not significant and did not add to the variance explained.

Given the significant and robust impact of attainment levels at KS3 on GCSE performance we examined the extent to which standardized measures of non-verbal ability, literacy and language collected at the end of Year 6, mean age 10;8 (Dockrell et al., 2007b), prior to entering secondary school, predicted performance on KS3 attainments.

The correlation matrix between the scores achieved at age 10;8 and KS3 assessments at age 14 is presented in Table 4. The Bonferonni correction for multiple correlations was set at .004. As Table 4 shows the strongest correlations with KS3 performance were with non-verbal ability and

Table 4 Correlations between language and literacy measures assessed in Year 6 (age 11) and KS3 average standards assessment tasks (SATs) Year 9 (age 14)

	KS3 mean SATs score	1	2	3	4	5	6	7	8	9
Non-verbal ability BAS matrices	**.56*****									
Vocabulary (BPVS)	**.52*****	.38								
Receptive grammar (TROG)	**.49*****	.35								
Word structure (CELF-R^{UK})	.41**	.43**	.43**							
Recalling sentences (CELF-R^{UK})	.41**	.19	**.51*****	**.63*****						
Listening to paragraphs (CELF-R^{UK})	**.47*****	.21	.36**	**.58*****	**.55*****					
Single word reading (BAS)	**.68*****	**.68*****	**.48*****	.23	.41**	.35**				
Reading comprehension (NARA)	**.70*****	**.49*****	.37**	.42**	.43**	.29*	.33*			
Single word spelling (BAS)	**.64*****	**.48*****	**.50*****	**.57*****	**.53*****	.37**	.41**	**.78*****		
Text writing (WOLD)	**.57*****	**.57*****	.35***	.39**	.39**	.26*	.28*	**.92**	**.68*****	

Notes: Corrected significance level .004 highlighted in bold. Significance levels .05*, .01**, .001***; NARA: Neale analysis of reading ability

the literacy measures (reading, writing and spelling) with reading comprehension showing the strongest relationship. The significant language measures using the new significance level were, once again, listening to paragraphs (CELF-R^{UK}) and the TROG. We were interested in identifying any effect of language skills above and beyond non-verbal ability and literacy. Non-verbal ability was entered as the first regressor followed by reading comprehension in the next step, then by oral language comprehension (Listening to paragraphs) and the TROG in the final step. A significant model emerged ($F(3, 56) = 23.251$, $p < .0005$, $R^2_{adj} = .54$), which did not include the TROG. The model included non-verbal ability ($\beta = .28$, $p = .01$), reading comprehension ($\beta = .470$, $p < .001$) and oral language comprehension ($\beta = .20$, $p = .05$). The inclusion of oral language comprehension added an additional 4% of variance explained (R^2 change = .035) to the 50% accounted by non-verbal ability and reading comprehension.

3 Wider contextual factors

The previous analyses have focused on pupil achievement independent of their social and educational contexts. In this section we consider other factors that might impinge on pupil attainment. We examined the differences in attainment for pupils eligible for free school meals (FSM) and the other participants (no FSM). There was no difference in the performance of pupils eligible for FSM and other pupils (number of GCSEs M (FSM) = 4, M (no FSM) = 4; $t = .196$, $df = 59$, n.s.; GCSE points achieved $t = .612$, $df = 53$, n.s.).

Table 5 provides profiles of performance as indicated by numbers of GCSE subjects passed and total points scores for pupils in different designated provision, different levels of identified need (as defined by being on the special educational needs register) and receipt of speech and language therapy in secondary school. As Table 5 shows there were large standard deviations across all measures indicating substantial variability within the different comparison groups. There were no significant differences between pupils placed in mainstream or specialist settings, but pupils on school action plus or with statements of special educational needs performed worse than those who did not have this designation at age 16, a pattern evident also for pupils in receipt of speech and language therapy.

Table 5 GCSE points scores across different patterns of support

Variable	Attainments	Mean, *SD*	Significance
Mainstream or specialist provision	Points achieved	Mainstream 164, *133.49* Specialist provision 150.36, *95.88*	$t = 0.428$, $df = 56$, *ns*
In receipt of speech and language therapy	Points achieved	NO SLT 192.58, *171.30* SLT 136.91, *100.97*	$t = 1.541$, $df = 62$, *ns*

V Discussion

1 Overview of results

The study aimed to examine the academic attainment of pupils with a history of specific language impairment at the end of compulsory education in England. On the whole pupils were achieving success in a range of subjects but there was considerable variation across the participants. Performance in GCSE English and maths was an area of weakness relative to national data for other designated groups of pupils with special educational needs. Success rates and points achieved were virtually identical to those reported from the Manchester Longitudinal Study (Conti-Ramsden et al., 2009) and point to the reliability and validity of the data.

Concurrent associations between academic performance and standardized assessments were significant for all the literacy measures. In contrast the only language measure associated with academic performance controlling for multiple correlations was listening to paragraphs (CELF-R^{UK}). The regression analyses indicated that previous academic attainment, as measured by KS3 mean attainments, was a more powerful predictor of attainment than concurrent measures of literacy. Importantly listening to paragraphs (CELF-R^{UK}) still contributed unique variance to the model. Given the importance of the pupils' performance in KS3 we examined which cognitive, language and literacy skills predicted their performance on this measure. Using the measures taken prior to entry to secondary school (Year 6) we found significant associations between the average KS3 SATs score and literacy measures and with the oral language measures of receptive grammar (TROG) and listening to paragraphs (CELF-R^{UK}).

Although it is well established that written language skills are built on earlier oral language skills, our data suggest that by age 14 literacy is the significant predictor of attainment at age 16 years. The assessments at 14 examine skills in English, maths and science and these key skills were important in the pupils' final achievements. Importantly, key features in these age-14 assessments were literacy skills. The current study highlights the importance of both literacy skills and non-verbal ability in influencing the attainments of pupils with a history or language difficulties in secondary school and the reduced impact of oral language, a result also found by Conti-Ramsden and colleagues (Conti-Ramsden et al., 2009).

Reading, spelling and writing all had high and significant correlations with assessments at 14. Reading difficulties will limit a pupil's ability to learn from print (Stanovich, 1986), and reading skills are related to spelling and writing (Abbott et al., 2010). The importance of targeting these skills for pupils with a history of language difficulties in secondary school is a key priority. Literacy and numeracy skills are positively associated with earnings, over and above any general effect on earnings from a person being more cognitively able and indeed over and above the effect of education on earnings (Vignoles et al., 2010).

The role of oral language once literacy and prior attainments were controlled was relatively modest: both at 14 and 16 years of age our measure of oral language comprehension contributed an added 4% to the variance explained by the models. While the contribution is modest it was greater than the contribution identified in the Manchester study (Conti-Ramsden et al., 2009) where expressive language contributed an additional 2% of unique variance. Their receptive language measure of word associations did not contribute to their model. Word associations is a time limited assessment, which may not reflect the demands placed on pupils' language understanding in a secondary school class, i.e. generating single words in a time-limited fashion. In contrast, a task of listening to paragraphs after which a pupil answers questions to orally presented materials appears, from our data, to capture language demands in secondary schools above and beyond literacy and non-verbal ability.

The continued effect of oral language comprehension across this educational phase has implications for both teaching and learning. Listening comprehension (oral language comprehension) is a key component of reading (Hoover and Gough, 1990). Performance on this task may also be an ecologically valid measure of the demands that are placed on pupils in secondary school classes. Much of the learning in secondary schools occurs through teacher talk and pupil discussion. Classroom literacy experiences that emphasize discussion-based approaches in the context of high academic demands are important drivers in the internalizing of knowledge and skills in English lessons (Applebee et al., 2003). Pupils who are restricted in their ability to process such information will be at a disadvantage with curricular content. It is also possible that this measure of oral language places greater demands on working memory than the other language measures used, and that its predictive role reflects these additional demands. Working memory is highly associated with academic achievement (Gathercole et al., 2004), and further work should consider the ways in which these two factors interact in classroom learning.

We also considered whether there were other factors in our dataset that could account for the pupils' performance. Our evidence suggests that in our sample differences in attainment could not be accounted for by social disadvantage, as indicated by eligibility for free school meals, educational placement (specialist or mainstream) or current support by speech and language therapy. There are a number of possible explanations for these non-significant results. The sample size may be too small to detect these contextual effects. But it is also possible that either the continuing severity of the pupils needs minimizes the impact of factors identified in larger populations with more varied levels of performance, or that these factors are more relevant for younger pupils.

2 Summary and implications for practice

These data point to the importance of literacy skills including reading, spelling and writing for pupils with a history of speech and language difficulty. They also highlight the fact that more demanding measures of language comprehension are likely to be better predictors of pupils' success and perhaps, therefore, a more appropriate target for intervention, either directly or by altering teaching and learning contexts to scaffold the pupil's ability to understand the task demands. Together these conclusions indicate the need for collaboration between specialists in education settings and speech and language therapists and the identification of evidence-based interventions to support the pupils' basic skills.

At age 16 the variables measured accounted for 27% of the variance in the points that the pupils achieved in their examinations. There is clearly a sizeable amount of variance in the pupil's examination results at the end of compulsory education that is not accounted for by the measures used in this study. It is important to consider other pupil variables such as motivation, self-esteem and

self-efficacy and also contextual factors such as family support, specialized instruction and school contexts in addition to within-child factors typically measured.

The schools in the current study were sensitive to pupils' needs, as evidenced by the support provided for pupils with special educational needs. It is clear from these data that there is no simple relationship between language difficulties and academic achievement, and the data indicate that the age at which these relationships are examined is critical. If we wish to further raise achievement and expectations for pupils with language learning needs it is vital we target the skills that are going to support their success, identify the appropriate interventions to do this, and be cognizant of other key variables that may mediate performance.

Note

1 At the time of data collection a variety of terms were in use to describe extra support including learning support assistant (LSA). We use TA as the generic term to refer to identified extra teaching assistant support.

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