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Abstract

The literacy abilities of 11-year old children with specific language impairment (SLI) were investigated through comparing subgroups with current expressive-only language impairment (E-SLI, $n = 30$), current combined expressive and receptive language impairment (ER-SLI, $n = 32$) and a history of now-resolved language impairment (Resolved-SLI, $n = 28$). The ER-SLI subgroup performed less well than the E-SLI subgroup on measures of single word reading and reading comprehension and in turn the E-SLI subgroups performed less well than the Resolved-SLI subgroup. Further analysis of individual variation within subgroups revealed that all three subgroups had a considerable proportion of individuals with literacy difficulties. In addition, direct comparisons of E-SLI versus ER-SLI subgroups revealed the ER-SLI subgroup to have a significantly larger proportion of children with severe literacy difficulties than the E-SLI subgroup. In contrast, the Resolved-SLI subgroup had virtually no children with severe literacy difficulties. The implications of these findings for practice are discussed.

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Introduction

There is considerable evidence which suggests that the term specific language impairment (SLI) does not refer to a homogeneous group of children and as such should not be treated as a unitary construct (eg, Leonard, 1998). Thus, it has been thought desirable to search for subgroups of children with SLI for reasons of theoretical, terminological, clinical and diagnostic significance. To date, major typological accounts do not enjoy consensus. However, an interesting observation is that patterns of language comprehension and production impairment cut across the majority of typologies. This provides strong impetus for comparing and contrasting subgroups of SLI that differ along this distinction as a primary feature. Further, empirical studies of both normal and impaired language learners provide support for this major dissociation between receptive and expressive language. For example, in studies on normal language acquisition, three groups of children have been found (Bates and Thal, 1991). There are those who are above the median on both comprehension and production, those that are below the median on both, and a final group in which comprehension outstrips current levels of language production (Bates *et al.*, 1987, 1988). This dissociation of comprehension and expression in typical populations is well documented throughout the child language literature (eg, Mills *et al.*, 1993; Snyder *et al.*, 1981). It appears to be a robust and pervasive phenomenon in the early stages of normal language development (Bates *et al.*, 1995) and developmental asynchrony between the two modalities is common.

Farmer (1996) conducted a study of children with SLI with the aim of examining these patterns of association and disassociation. The children attended a school for those with SLI and were heterogeneous in nature (comprising those described as having ER-SLI, E-SLI, dyspraxia, pragmatic language disorder, language and general delay and communication disorder). Following statistical modelling to explore language development, it was found that production and comprehension were not associated. In fact, clear dissociation was observed between the understanding and expression of language. Bates *et al.* (1995) also examined evidence from atypical and typical children. They found that in a sample of toddlers with delayed onset of expressive language or 'late talkers', striking dissociation between comprehension and production was observed. Comprehension vocabulary was well above the average comprehension expected for children with production vocabularies in that range. The authors argue that this provides an extreme variant of the comprehension/production dissociations described for children in the normal range.

It needs to be noted that whenever two variables (such as receptive and expressive language) are less than perfectly correlated, a possibility of double dissociation exists: children may have selective impairments on receptive as well as expressive language. Evidence provided by Bates *et al.* (1995) reviewed above suggests that receptive only difficulties are rare or do not occur. Our own subgrouping relating to this study, revealed only one case of receptive-only difficulties among 200 children (see section below on subgroup

formation criteria). It has to be noted nonetheless, that identification of children with SLI is heavily weighted by the child's expressive and phonological skills (Tomblin, 1996; Tomblin *et al.*, 1997). This may be due in part to the fact that expressive skills are those that can be readily observed by parents and others, whereas receptive skills are much less transparent. Children with poor comprehension of language are more likely to be referred to psychological, psychiatric or audiological services (Tomblin, 1996; Tomblin *et al.*, 1997). Thus, such children can be underrepresented in studies that recruit from services related to speech and language therapy (such as language units).

Language and literacy in children with SLI

The ability to read is a fundamentally important skill. Since most education is largely dependent on the ability to read, a problem in this area is likely to cause wider disruption. Although some earlier studies describe children with SLI who do not show later reading problems (eg, Richman *et al.*, 1982; Silva *et al.*, 1985), a number of recent studies that have followed up children with SLI into school age have reported atypically high proportions of reading problems (eg, Catts, 1991; Catts *et al.*, 2002; Stothard *et al.*, 1998; Snowling *et al.*, 2000). This variety of findings observed is more likely due to the heterogeneity of SLI and the different cohorts and methodologies used in the studies than any real range of options. Overall, current research suggests that children with SLI are vulnerable to difficulties in successfully making the transition from oral to written language.

Why may this be the case? A number of predictors of reading difficulties have been examined. In particular, investigations have attempted to associate problems in reading skills with oral language variables. Some studies have proposed that the severity of language disability (measured in terms of performance on standardized tests of receptive and expressive language) is closely associated with reading achievement (eg, Bishop and Adams, 1990; Tallal *et al.*, 1989). Other studies have examined specific aspects of language or have examined the cumulative effects of impairments in different areas of language functioning on reading ability. Tallal *et al.* (1988) found that deficits in spoken language comprehension predict later reading difficulties in children with SLI. This was thought to reflect limitations in overall language knowledge. Some researchers however, have emphasised the use of language production measures. Bishop and Adams (1990), for example, conducted a study assessing language and literacy skills in eight and a half-year olds whose language development had been impaired at four years of age. Children with problems in vocabulary and/or syntax along with phonology were found to be more likely to experience reading problems than those with phonological problems only. Bishop (2001) suggests that the risk of developing literacy difficulties increases with the number of impaired language domains that the child experiences ie, receptive language, expressive language and sound articulation. It was found that 29% of children with SLI who had impairment in one language domain had difficulties with reading compared with 72% who were impaired in two language domains and 89% who had impairment on all three domains. Farmer (1996) examined predictive factors of later basic reading and reading comprehension in a sample of children with SLI. It was found that children who were successful in acquiring decoding skills were characterized by good recall of sentences but difficulty with story telling. For reading comprehension, sentence recall was found to act as a good predictor indicating that multi-word expression and working memory are important factors.

Interestingly, ability to retell a story was also found to be a good single predictor, suggesting that expressive ability is also important in assessing reading outcomes in children with SLI.

Numerous studies have also suggested a link between measures of phonological processing and reading ability in children (O'Connor and Jenkins, 1999; Uhry, 1993). For the most part, studies have focused primarily on phonological awareness (frequently reported as the strongest correlate of reading). Interestingly, Catts *et al.* (2001) included measures of phonological processing alongside measures of receptive and expressive language in their epidemiological study involving 604 kindergarten children. In their investigation they found that language measures, such as sentence imitation, accounted for some variance in reading skill at Grade 2 that phonological processing could not predict. These data emphasize the potential link between oral language abilities and reading skills.

Thus, it is likely that appraisal of the reading ability of subgroups of children with SLI could contribute to this area as these children have aspects of language differentially affected. With the above in mind, the present study examines the associated literacy abilities of three subgroups of children with a history of SLI: Expressive-SLI, Expressive/Receptive-SLI and Resolved-SLI. For the purposes of the present study, SLI was defined as impaired language (below 1 SD from the mean) in the context of normal nonverbal abilities (a standard score of 80 or above). Specifically, the present study addresses the question of whether 11-year old children with a history of language impairment show different literacy profiles dependent on their pattern of current language impairment. The present study focused on 11-year old children who in the UK are attending Year 6, the last year of primary education. This was thought to be a particularly interesting developmental point in the transition from primary schooling to the demands of secondary education.

Method

Sample

The participants were originally part of a wider study, the Conti-Ramsden Manchester Language Study (Conti-Ramsden and Botting, 1999a, b; Conti-Ramsden *et al.*, 1997). This original cohort was recruited from 118 language units attached to English mainstream schools identified through the ICAN listing (1994); a list of specialist language placements in the UK. As far as possible, all language units in England catering for Year 2 children were contacted and any centres enrolling children with global delay or hearing impairments were excluded. The remaining language units were asked to provide the number of Year 2 children attending for at least 50% of the week. It was established that across England approximately 500 children fitted these criteria. All language units enrolling Year 2 children were asked to participate and two schools declined this invitation. Subsequently, approximately half of the eligible children in each unit were sampled. A random selection procedure resulted in an initial randomised study cohort of 242 children. The age range was 7;5 years to 8;9 years and consisted of 186 males and 56 females (females forming 23.1% of the cohort). The age range was slightly wider than expected as it included some children who had been kept back one school year.

This initial cohort was reassessed in the final year of primary education (Year 6). Twelve children could not be traced and for 30 children parental consent was not given to take part at this stage. The remaining 200 children participated in the study. The age range at this stage was 10;1 years to 11;10 years and consisted of 150 males and 50 females (females forming 25% of the total). This sample represented 83% of the initial cohort studied by Conti-Ramsden and colleagues. It is important to note that while this sample is likely to be representative of children with SLI attending language units, it may not be representative of the general population of children with SLI.

Subgroup formation criteria

From these 200 children, three subgroups were identified for the present investigation. These consisted of a subgroup of children with only expressive language problems (henceforth 'E-SLI'), a subgroup with both expressive and receptive language problems (henceforth 'ER-SLI') and also a group who at age 11;0 years appeared to have a normal profile on standardized tests assessing expressive and receptive language (henceforth 'Resolved-SLI'). Although the Resolved-SLI group will be referred to as a separate 'subtype' of SLI for ease of expression, strictly the children in the group were selected because they did not present with current SLI, although as specified above all cases had a history of special educational provision for children with language impairments.

Subtypes were identified according to strict expressive and receptive language criteria. All children selected met standards for normal non-verbal IQ of 80 or above (equivalent to >9th centile/ < 1.3 SD from the normative mean) on the Wechsler Intelligence Scale for Children (WISC-III; Wechsler, 1992). Standardized language tests used for group selection were the Test for Reception of Grammar (TROG; Bishop, 1982) which is a measure of language comprehension and Clinical Evaluation of Language Fundamentals-Revised: recalling sentences subtest (CELF-rs; Semel *et al.*, 1987) which is a measure of language expression. There were several reasons for selecting the TROG to measure language comprehension. Importantly, no expressive speech is required from the respondent. Also, test sentences may be repeated in specific circumstances within the procedure of the test, minimizing the likelihood of errors arising from inattention or memory deficits. Further, the measure uses restricted, simple vocabulary in test sentences, to minimize the likelihood of failure due to the child simply not knowing the meaning of individual words (vocabulary cards allow the tester to check comprehension of the nouns, verbs and adjectives used in the TROG in case of doubt). The CELF-rs subtest was selected to measure expression through direct elicited imitation. This particular test was selected to measure multi-word expression at sentence level to complement the TROG test. Both tests have the advantage of standardization available for normally developing children of the same age.

Three graded cut-off points were selected to represent different magnitudes of discrepancy from average population performance, namely the 2.5th, 10th and 16th centiles. These are equivalent to approximately 2 SD, 1.25 SD and 1 SD below the population mean respectively. These are not intended as diagnostic measures but rather a means of describing or categorising outcome on measures of language and literacy. The first (least severe) cut-off level is below the 16th centile, which is equivalent to 1 SD below the population mean. Wiig *et al.* (1992) have suggested this cut-off score for interpretation of

the Clinical Evaluation of Language Fundamentals-P (CELF-P). The second cut-off level is that below the 10th centile, which equates to 1.25 SD below the population mean. Fey (1986), Lee (1974) and Rizzo and Stephens (1981) have suggested this level for establishing impairment. The third (most severe) cut-off is a score below the 2.5th centile, which is equivalent to 2 SD below the population mean. This has been recommended by Bloom and Lahey (1978). Each of these three cut-off levels will be examined in the present study as an indication of impairment for the standardized language and literacy tests administered. The 'normal range' is thus defined as a test score falling above all cut-off levels, which here is above the 16th centile. Note that this does not equate to expected average performance for age, which is the 50th centile. Rather it represents the lower end of a normal range of ability for a specific chronological age range.

Using standardized language tests of comprehension and production, language criteria for the E-SLI subgroup ($n = 30$) was a receptive score within the normal range but an expressive score in the impaired range. In practice, comprehension scores for all children in this subgroup were above the 37th centile (well within the normal range) and all expressive scores fell below the 10th centile (well within the impaired range). Language criteria for the ER-SLI subgroup ($n = 32$) were both receptive and expressive language scores within the impaired range. In practice, all children's scores were at or below the 10th centile (more than 1.25 SD below the population mean). Finally, language criteria for the Resolved-SLI subgroup ($n = 28$) were both receptive and expressive scores within the normal range. In practice, the comprehension scores were all above the 37th centile and expression scores were all equal to or above the 16th centile.

A substantial proportion of children from the initial cohort did not meet the criteria for the present study. Of the 200 children, 110 were not included. Eighty-six were discounted because they obtained a performance IQ score of less than 80 on the WISC-III. The reading ability of this group measured in centiles was low on both single word reading ($M = 12.2$, SD = 15.9) and also reading comprehension ($M = 4.9$, SD = 4.7) at 11 years. Of the remaining 24 children, one had good expressive skills (CELF-rs centile = 70th) but poor comprehension (TROG centile=2.5th). Recall that our sample was drawn from language units. It is possible that this may have produced recruitment bias against the profile of 'receptive-SLI', as it has been noted that such children may be more likely to be referred to psychology, psychiatry or audiology services and thus receive a different type of diagnosis (Tomblin, 1996; Tomblin *et al.* 1997). The other children did have expressive problems (<6th centile on CELF-rs) but had scores ranging from 10th to 25th centile on the TROG. It was felt that these comprehension scores were neither low enough to include them in the ER-SLI group nor high enough to include them in the E-SLI group. The object was not to classify all the children in the cohort but rather to create clear groups by not including those with borderline scores.

Table 1 below presents the characteristics of the three subgroups of children with SLI selected for the present study.

Table 1 Descriptive characteristics and subgroup membership language criteria scores for the E-SLI, ER-SLI and Resolved-SLI subgroups

	E-SLI (n = 30)	ER-SLI (n = 32)	Resolved-SLI (n = 28)
Mean age	11;0	10;11	10;11
Sex (m/f)	23/7	26/6	22/6
TROG centile score			
M (SD)	55.9 (22.6)	4.7 (3.5)	65.1 (27.4)
Range (IQR)	37.5–95 (23.8)	0.5–10 (6.1)	37.5–99 (57.5)
CELF-rs centile score			
M (SD)	4.4 (2.9)	2 (2.2)	40.5 (20)
Range (IQR)	1–9 (3.25)	1–9 (1)	16–91 (25)
WISC-III PIQ score			
M (SD)	103.87 (17.32)	97.41 (12.95)	108.39 (16.9)
Range (IQR)	82–146 (30)	82–131 (49)	85–139 (31.5)

Test battery

Non-verbal IQ

1) Wechsler Intelligence Scale for Children-III: picture completion subscale (WISC-III-pc; Wechsler, 1992). This test comprises a set of pictures of common objects and scenes. Each one is missing an important part that the child is required to identify. Responses are scored as correct or incorrect. The test has a split-half reliability of 0.76 for children aged 11 years.
2) Wechsler Intelligence Scale for Children-III: block design subscale (WISC-III-bd; Wechsler, 1992). This is a set of printed two-dimensional geometric patterns that the child is asked to replicate using two-colour cubes. The child's responses are timed and scored as correct or incorrect. The test has a split-half reliability of 0.84 for children aged 11 years.

The 'short form' WISC-III performance scale score was calculated using the picture completion and block design subscale scores. These were combined to form an estimated composite performance or non-verbal IQ score. This performance 'short form' has been found to correlate well with the full IQ battery and has been used in other studies of cognitive ability and language (eg, Sattler, 1974; Hohnen and Stevenson, 1999).

Subgroup language criteria tests

1) Test for Reception of Grammar (TROG; Bishop, 1982). This is a multiple-choice test designed to assess oral comprehension of syntax. The child is shown four pictures while a sentence is read aloud by the examiner. The child is then required to select the picture that is represented by the sentence. Sentences begin simply and progress to more complex grammatical structures. The items cover a range of grammatical knowledge and responses are scored as correct or incorrect. Raw scores are transformed into age-adjusted centile ranges. For ease of statistical comparison, in the present study these ranges were transformed further into centile midpoints for that range. Reliability coefficients are not reported for this age group.

2) Clinical Evaluation of Language Fundamentals-Revised: recalling sentences subscale (CELF-rs; Semel *et al.*, 1987). This is a test designed to assess recall and reproduction of surface structure as a function of syntactic complexity. The child is required to repeat sentences of increasing complexity given verbally by the tester. A score for each item is awarded on the basis of the number of mistakes made. Coefficient α, estimated from control data, was 0.80 for children aged 11 years.

Literacy assessments at 11 years

Wechsler Objective Reading Dimensions: basic reading subscale (WORD; Wechsler, 1993).

1) Basic reading: The child is required to read aloud a series of printed words out of context to assess word-reading ability. The test has a split-half reliability of 0.94 for children aged 11 years.
2) Reading comprehension: This is a series of printed passages and orally presented questions designed to tap skills such as recognizing stated detail and making inferences. The child reads a passage and is then verbally asked a question by the tester. The test has a split-half reliability of 0.90 for children aged 11 years.

It is important to note here that the terms 'literacy skills' and 'reading skills' are used synonymously throughout the present paper.

Relative subgroup ability on diagnostic language measures

For all statistical analyses, *z*-scores were used. Percentile scores are presented in tables for ease of interpretation. Univariate ANOVA revealed a main effect of group on both TROG ($F(2, 87) = 89.28$, $P < 0.001$) and CELF-rs ($F(2, 87) = 165.58$, $P < 0.001$) scores. *Post hoc* analysis (Tukey HSD) revealed the E-SLI subgroup scored significantly better than the ER-SLI subgroup on the comprehension measure ($P < 0.001$) but not the measure of expression ($P > 0.05$). The E-SLI and Resolved-SLI subgroups were significantly different on the measure of expression (with the Resolved-SLI subgroup scoring higher ($P < 0.001$)) but not the measure of comprehension ($P > 0.05$). The Resolved-SLI subgroup scored significantly higher than the ER-SLI subgroup on both comprehension ($P < 0.001$) and expression measures ($P < 0.001$). Univariate ANOVA revealed a main effect of group on nonverbal IQ (WISC-III PIQ) $F(2, 87) = 3.711$, $P < 0.05$). *Post hoc* analysis (Tukey HSD) revealed no difference between the E-SLI and ER-SLI subgroups ($P > 0.05$) or between the E-SLI and Resolved-SLI subgroups ($P > 0.05$). The Resolved-SLI subgroup scored significantly higher than the ER-SLI subgroup on nonverbal IQ. It is important to note nonetheless, that all children in the subgroups had nonverbal IQ within the normal range as this was part of the criteria for subgroup membership.

Results

Reading abilities of subgroups of children with SLI

Table 2 shows the mean and SD percentile scores for each of the three subgroups on WORD basic reading and reading comprehension subtests at age 11 years.

For both reading measures, the Resolved-SLI subgroup scored highest, followed by the E-SLI subgroup and finally the ER-SLI subgroup. Visual inspection of the mean group data (Table 2) suggests the Resolved-SLI subgroup had means for both reading measures within the normal range (above the 16th centile) while both the E-SLI and the ER-SLI subgroups had means for reading abilities below the 16th centile (or in the case of E-SLI single word reading around the 20th centile).

Univariate ANOVA revealed a main effect of subgroup for single word reading ($F(2, 86) = 22.291$, $P < 0.001$) and also for reading comprehension ($F(2, 84) = 22.193$, $P < 0.001$). *Post hoc* analysis (Tukey HSD) of group for single word reading revealed significant differences between all three

Table 2 Mean reading test centile scores at 11 years by subgroup

	E-SLI	ER-SLI	Resolved-SLI
Single word reading			
M (SD)	20.3 (24.3)	7.7 (10.6)	42.9 (31.5)
Range (IQR)	1–73 (40.0)	1–47 (6.8)	4–94 (61.5)
Reading comprehension			
M (SD)	13.4 (16.0)	6.8 (10.0)	35.0 (24.1)
Range (IQR)	1–63 (13.0)	1–39 (6.5)	1–70 (50.3)

subgroups. Both the E-SLI subgroup ($P < 0.001$) and the ER-SLI subgroup ($P < 0.001$) scored significantly lower than the Resolved-SLI subgroup. The ER-SLI subgroup scored significantly lower than the E-SLI subgroup ($P < 0.05$).

Post hoc analysis (Tukey HSD) of group for reading comprehension revealed a similar pattern to the one seen for single word reading with significant differences between all three subgroups. Both the E-SLI subgroup ($P < 0.001$) and the ER-SLI subgroup ($P < 0.001$) scored significantly lower than the Resolved-SLI subgroup. The ER-SLI subgroup scored significantly lower than the E-SLI subgroup ($P < 0.05$).

It is important to note that subgroup means somewhat mask the large within-group variation observed in this study. Table 2 reveals the heterogeneity in reading skills apparent across all three subgroups of children.

Levels of difficulty

In order to further examine within group variation, the proportion of children within each subgroup scoring below predetermined cut-off levels was examined. Tables 3 and 4 indicate how many children in each subgroup were and were not experiencing difficulties with literacy at three cut-off points based on the measures used in this study, ie, what proportion of children fell above the 16th centile, between the 16th and the 10th centiles, between the 10th and the 2.5th centiles, and below the 2.5th centile.

Comparable patterns for the distinct typologies can be seen in both single word reading and reading comprehension. This is not surprising as these skills are highly correlated in all three subgroups of children (Pearson correlations,

Table 3 Proportions of subgroups above and below cut-offs at 11 years on single word reading test

Single word reading centile range	E-SLI		ER-SLI		Resolved-SLI	
	n	%	*n*	%	*n*	%
Above 16th centile	10	33.3%	4	12.5%	21	75.0%
Between 16th and 10th centile*	2	6.7%	3	9.4%	2	7.1%
Between 10th and 2.5th centile*	15	50.0%	12	37.5%	5	17.9%
Below 2.5th centile	3	10.0%	13	40.6%	0	0 %

*This represents below the 16th centile but above the 10th centile, and, below the 10th centile but above the 2.5th centile, respectively.

Table 4 Proportions of subgroups above and below cut-offs on reading comprehension test at 11 years

Reading comprehension centile range	E-SLI		ER-SLI		Resolved-SLI	
	n	%	*n*	%	*n*	%
Above 16th centile	8	26.7%	4	12.5%	20	71.4%
Between 16th and 10th centile*	2	6.7%	3	9.4%	0	0%
Between 10th and 2.5th centile*	17	56.7%	11	34.4%	7	25.0%
Below 2.5th centile	3	10.0%	14	43.8%	1	3.6%

*This represents below the 16th centile but above the 10th centile, and, below the 10th centile but above the 2.5th centile, respectively.

E-SLI $r = 0.794$, ER-SLI $r = 0.642$, Resolved-SLI $r = 0.609$). What is of particular interest is that all three subgroups showed a proportion of children who appeared to have difficulties with reading. Thus, a quarter to a third of the Resolved-SLI group of children (25% single word reading and 29% reading comprehension) had difficulties with reading. Two-thirds to three-quarters of the E-SLI subgroup of children also experienced difficulties with reading (67% single word reading and 73% reading comprehension). For the ER-SLI subgroup of children, the majority of children experienced difficulties with reading (88% for both single word reading and reading comprehension).

Furthermore, comparisons across the E-SLI and ER-SLI subgroups using Fisher's exact tests revealed significantly more ER-SLI children had severe literacy difficulties (below the 2.5th centile ie, below 2 SD from the mean). This was the case for both single word reading ($P = 0.008$) and reading comprehension ($P = 0.004$). This suggests that if severity of SLI is conceptualised as breadth of problems in terms of language domains affected (ie, E-SLI less severe than ER-SLI), then severity of SLI appears to be linked to severity of reading difficulty.

Discussion

The present study is consistent with the results of a number of other studies of children with a history of SLI in finding that such children experience difficulties in reading (word reading and reading comprehension). The present study suggests that this is particularly the case in middle childhood, during the important transition between primary and secondary education in the UK.

Subgroups of SLI and literacy skills

An important question to be addressed by this study is whether patterns of selective or joint impairment of language comprehension and production in SLI are associated with differences in literacy skills. In terms of reading skills concurrent with language skills at age 11 years, the findings indicate that children who display language impairment in the domain of expressive language (E-SLI subgroup) and those who display impairments on both comprehension and expression (ER-SLI subgroup) also demonstrate concurrent reading difficulties in both single word reading and reading comprehension. A different pattern was observed for the Resolved-SLI subgroup. These children, whose overt language impairments in expression and comprehension of language have been shown by the tests employed in the present study to have been resolved by age 11 years, demonstrated significantly better reading skills at this time than the E-SLI and the ER-SLI subgroups.

What is of particular interest is that within all three subgroups of children with a history of SLI there was a proportion of children who were experiencing concurrent reading difficulties in both decoding and comprehension. Interestingly, Stothard *et al.* (1998) and Snowling *et al.* (2000) found that even those children who appear to have 'resolved' their language difficulties may experience literacy difficulties later in development. Thus, our results are more in line with Scarborough and Dobrich's (1990) proposal of illusory recovery for children with a history of SLI. What the present study further suggests is that those children with a history of SLI who have resolved language difficulties at 11 years have a lesser risk of developing concurrent problems with reading than those children who exhibit language difficulties at 11 years. Interestingly, demonstrable language problems with either expressive aspects of language (E-SLI) or both expressive and receptive aspects of language (ER-SLI), increase substantially the risk for difficulties in reading. Where types of language impairment appear to have an influence is in the proportion of children presenting severe reading difficulties in decoding and comprehension. Our data demonstrated significant differences between the E-SLI versus ER-SLI subtypes. These results suggest that difficulties with different aspects of language (expressive alone versus a combination of expressive and receptive difficulties) may have multiplicative rather than additive impact on reading difficulties in middle childhood.

It is important to consider the use of a single test to assess language comprehension and expression in the present study. Bishop (1997) suggests that as comprehension is multifaceted and involves a host of subskills, it is not possible to summarise a child's 'receptive language level' in terms of a score on a single test. Impairments of comprehension may be missed, due, in part, to the

considerable variation in type of receptive language difficulties. Thus, children in our E-SLI subgroup may have had difficulties in other areas of comprehension not tapped by the TROG. Consequently, it needs to be noted that in the present study the expressive/receptive distinction between subgroups may have not been as marked as it could have been had we used a number of tasks to tap comprehension abilities in our subgroups with impairments. Further, the single expressive test used (CELF recalling sentences) is reliant on auditory processing and short term auditory memory which is often a problem aspect for children with SLI.

Concluding remarks and practical implications

Overall, the present study indicates that a history of SLI may be an important factor in the development of literacy difficulties with reading. This investigation also underlines the known relationship between decoding skills in reading and comprehension skills in reading. These skills are highly correlated in all our three subgroups of children, emphasizing the importance of continued intervention in both these types of skills. Importantly, the present study suggests that concurrent language difficulties at 11 years increase the risk of difficulties in reading, in particular the presence of both expressive and receptive language problems. Given that the Resolved-SLI subgroup had less severe literacy problems than the E-SLI and ER-SLI subgroups in turn, a possible explanation is that, as SLI is remediated over time, whether to a single less pervasive modality or to functioning within the norm, the literacy skill bootstraps behind it. This may suggest that intervention with the central linguistic skill is an important factor.

Despite the fact that the present study did not involve intervention, it would appear important to monitor and, if necessary, target for reading intervention, those children with observable language difficulties at 11 years. Further we would argue that it is important to be particularly vigilant regarding those children with apparently resolved language difficulties as somewhere between one in four and one in three of these children is likely to present with difficulties with reading and thus are put at continuing risk for later academic failure.

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