A large cohort of 242 children who had been attending infant language units at 7 years of age were followed up in their final primary school year. A total of 200 (84 %) of the children were reassessed at 11 years of age on a wide battery of language and literacy measures and on a test of non-verbal ability, an autism checklist and a communications checklist. Educational placements were also recorded. Much of this data has previously been published in a British clinical journal (International Journal of Language and Communication Disorders, 36 (2), 207–220), but this report adds some new educational placements data and has been produced as part of this special issue.

In total, 89 % of children still scored below 1 sd on at least one test of language and the majority (63 %) scored poorly on 3 or more assessments, showing widespread difficulties. Compared to non-verbal abilities at 7 years of age, a large proportion of the cohort also performed poorly on performance IQ sub-tests (31 %). A further 10 children were found to score highly on a checklist for autistic symptoms. Thus only 115 (58 %) children could be said to meet the criteria for specific language impairment. A small group of 15 children appeared to have entirely resolved their difficulties. Educational placement data show that just over half of the group (111/200; 55.5 %) were attending mainstream school at 11 years, but of these, 82 children received additional support. Furthermore, in the UK Standard Assessment Tasks (government organised tests for children aged 11 years taken in English, Mathematics and Science), 130/200 (65 %) did not perform as expected for age. The outcomes and their implications for education and long-term impact are discussed.

INTRODUCTION

Specific language impairment (SLI) is a term currently used to describe children who have significant language difficulties without identifiable cause,
such as global delay, neurological impairment, physical disability, deafness or autistic spectrum disorder. Children with difficulties in learning language have been documented for around 100 years and are felt to represent about 7% of all children (Tomblin et al., 1997). However, there is a lack of longitudinal studies in this area. A substantial number of children who have completed long-term follow-up projects still experience explicit difficulties with language (Stothard et al., 1998; Johnson et al., 1999; Beitchman et al., 1994, 1996). Furthermore, even children with «resolved» language difficulties have been shown to be impaired in skills thought to underlie language ability, such as non-word repetition (Stothard et al., 1998; Conti-Ramsden et al., 2001; Bishop et al., 1996).

The paucity of longitudinal data also means that adequate educational placement provision may not be planned. It is a long-standing belief that SLI is a short-term and largely resolvable condition, and indeed many language units were initially set-up as «booster» placements with children attending for 1 or 2 years at the most. Thus, many areas of the UK do not provide specialist language-based resources after the primary years. Studies like those described above suggest that this is no longer acceptable.

The children featured in this report were recruited while attending language units in the UK when they were 7 years of age (Conti-Ramsden and Botting, 1999). This report documenting the language characteristics and educational placements of the same children now that they are 11 years old has been produced previously in more detail (Conti-Ramsden et al., 2001). In selecting the cohort on the basis of attending language unit, we attempted to take a clinical perspective on who was actively being considered as having SLI in the field, rather than imposing our own theoretical criteria for selection. However, at 7 years of age, this placement-based definition proved accurate when traditional discrepancy criteria were applied, and 85% of the sample would have met a priori criteria for SLI.

METHOD
Participants
A group of 242 children identified and recruited at 7 years were contacted again in their final primary school year (year 6) and invited to participate in the project. Initial selection at 7 years is described fully in Conti-Ramsden, Crutchley and Botting (1997), but was a random 50% sample of all year 2 children attending mainstream language units in the UK. Thus no specific «SLI» criteria were used at selection, except that those with known current hearing loss or major physical disability were excluded, as were those with definite diagnoses of autism or moderate learning difficulties. In total, 200 of the original 242 (83%) participated at this stage, 50 (25%) of whom were girls. Twenty-four children (12%) had exposure to languages other than English at home. The mean age of the children was 10:11 (sd = 5 months). Participants were assessed at school following parental consent.
Language Measures

Each child completed a battery of language tests. These were not intended to be exhaustive, but to represent important areas of language development using widely used assessments. All scores were transformed into centiles for age, where the 50th centile is a normative mean, the 16th represents 1 sd below the mean and the 2nd centile 2 sd below the mean. The following six measures were used (described more fully in the original article):

i) Test for Reception of Grammar (TROG; Bishop, 1982)
ii) Past tense task (PTT; Marchman, Wulfeck and Ellis-Weismer, 1999)
iii) Third-person singular task (TPS)
iv) British Picture Vocabulary Scale (BPVS-II; Dunn, Dunn, Whetton & Burley, 1998)
v) Expressive Vocabulary Test (EVT; Williams, 1997)
vi) CELF– Word Associations (Semel, Wiig and Secord, 1987)

General cognitive level

Wechsler Intelligence Scale for Children (WISC-III, Wechsler, 1992) short form
This consisted of the subtests: Block design, Picture completion, Vocabulary, Verbal Comprehension and Digit Span. The first two subtests were combined to form a short-form performance or non-verbal IQ, while the last three formed a short-form verbal IQ. The performance short form has been found to correlate well with a full IQ battery when used in other studies of cognitive ability and language (Sattler, 1974; Hohnen & Stevenson, 1999).

Wider impairments

Wechsler Objective Reading Dimensions (WORD; Wechsler, 1993)
Each child also completed the Basic Reading and Reading Comprehension sections of this assessment.

Children’s Communication Checklist (CCC, Bishop, 1998)
This recently designed teacher checklist has been shown by Bishop to differentiate between children with pragmatic language impairment and those with more typical SLI. The checklist consists of 9 subscales from which a composite «pragmatic impairment score» is derived. A score of 132 or less is used as a cut-off indicating pragmatic difficulties.

Childhood Autism Rating Scale (CARS, Schopler, Reichler, Devellis & Daly, 1980)
This is a scale of 15 items completed by teachers and covering a range of behaviours typical of autistic spectrum disorders (ASD), where a threshold of 30 indicates an autistic disorder.

RESULTS

Language impairment at 11 years
The number of children still experiencing some level of language impairment was examined. For all language tests, this was defined as a score below the 16th centile for age. In
total, 177/200 (88.5 %) children still had at least one low score in this way. The remaining 23/200 (11.5 %) children had no test scores below the 16th centile. Table 1 indicates the proportion of children with each number of tests below the clinical thresholds. Note that 53 % of the sample performed below 1 sd (16th centile) on three or more tests.

Table 1. Children with poor language scores in various numbers of tests.

<table>
<thead>
<tr>
<th>No. of tests &lt; 16th centile (1 sd)</th>
<th>No. (%) of children</th>
</tr>
</thead>
<tbody>
<tr>
<td>No tests</td>
<td>23 (11.5 %)</td>
</tr>
<tr>
<td>One test</td>
<td>24 (12 %)</td>
</tr>
<tr>
<td>Two tests</td>
<td>28 (14 %)</td>
</tr>
<tr>
<td>Three tests</td>
<td>31 (15.5 %)</td>
</tr>
<tr>
<td>Four tests</td>
<td>31 (15.5 %)</td>
</tr>
<tr>
<td>Five tests</td>
<td>28 (14 %)</td>
</tr>
<tr>
<td>All six tests</td>
<td>35 (17.5 %)</td>
</tr>
</tbody>
</table>

Non-verbal ability in children with language impairment
Of the 177 children with remaining language difficulties, 55 (31 %) had performance IQs below 70 (~2 sd from the population mean). This is a significant change from the 3 children reported to have non-verbal deficits at 7 years (Conti-Ramsden and Botting, 1999). None of the 28 children with no language impairment (LI) noted above had low non-verbal ability. However, a further 36 children (20 % of those with LI), 1 of whom had resolved language, had estimated performance IQ scores between 84 and 70 (~1 and ~2 sd from the mean). This left 86/177 (49 %) children who scored 85 and above on estimated performance IQ and therefore fell above ~1 sd from the population mean.

Autistic spectrum disorders (not including PLI without ASD)
In total, 10 children had high CARS scores out of the 116 collected (9 %). Seven of these were children with normal non-verbal IQ and language impairment. Three had language impairments and impaired Performance IQ (below 70).

Specific language impairment at 11 years
At 7 years of age, 84 % of our sample met traditional discrepancy criteria for SLI. Using the same criteria (IQ of 85 and 1 language test below 1 sd), this proportion fell at 11 years to 40 % (79/200) because of the increase in children whose PIQ scores were below this IQ cut-off. However, in the UK, a full scale IQ of 70 (2 sd from the mean) is used to define moderate learning difficulties (MLD) and gives a more accurate picture of global delay in an SLI population. Using this threshold, the children present as follows: Of the 200 children assessed, recall that 177 still had language impairments. Fifty-five of these children had performance IQs below 70 and a further 7 had high CARS scores, suggesting that they
may have autistic spectrum disorders. This left a total of 115 (58 %) children who could still be considered to have SLI. This group is described below as are those with language impairment and low PIQ scores, but normal CARS scores (n=52).

**SLI group**
The main characteristics of this group were as follows:
- Marked expressive vocabulary (and to a lesser extent, receptive vocabulary) difficulties
- Poor expressive and receptive grammar
- More than 75 % showing deficits in reading comprehension
- Thirteen percent of the group also had pragmatic language difficulties

<table>
<thead>
<tr>
<th>Language test</th>
<th>1 sd</th>
<th>2 sd</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expressive vocabulary:</td>
<td>94/114 (83 %)</td>
<td>44/114 (39 %)</td>
</tr>
<tr>
<td>Receptive vocabulary:</td>
<td>67/114 (59 %)</td>
<td>12/114 (11 %)</td>
</tr>
<tr>
<td>Expressive grammar: Past tense</td>
<td>70/110 (65 %)</td>
<td>30/110 (27 %)</td>
</tr>
<tr>
<td>Third person singular</td>
<td>64/112 (57 %)</td>
<td>17/112 (15 %)</td>
</tr>
<tr>
<td>Receptive grammar:</td>
<td>49/114 (43 %)</td>
<td>19/114 (17 %)</td>
</tr>
<tr>
<td>Word association:</td>
<td>31/114 (27 %)</td>
<td>13/114 (11 %)</td>
</tr>
<tr>
<td>Single-word reading:</td>
<td>79/114 (69 %)</td>
<td>25/114 (22 %)</td>
</tr>
<tr>
<td>Reading comprehension:</td>
<td>88/113 (78 %)</td>
<td>30/113 (27 %)</td>
</tr>
<tr>
<td>Pragmatic impairment:</td>
<td>13/ 91 (14 %)</td>
<td></td>
</tr>
</tbody>
</table>

**Children with language impairment and low IQ**
The main characteristics of this group were as follows:
- None had resolved language
- Three had high CARS scores and were therefore considered to have ASD.
- Expressive and receptive vocabulary were the poorest areas of language, but expressive and receptive grammar were also impaired, with virtually all the children in this group experiencing these difficulties.
- Reading was again poor, with nearly all children impaired at reading comprehension.
- A higher proportion of children were thought to have pragmatic language impairments
Children with resolved linguistic difficulties

The main characteristics of this group were as follows:

- Eight had low CCC pragmatic scores indicating a pragmatic language impairment without ASD or linguistic impairment (30% of 'resolved' group).
- 15 children had truly resolved their oral communication impairments (8% of the cohort).
- Some minor difficulties with reading even in the 15 ‘resolved’ children.

Children attending language units at 7 years: An overall breakdown at 11 years of age

Fig. 1 shows the different groups of children identifiable at 11 years of age. As described above, over half of the children still meet criteria for specific language impairment. However, by 11 years of age a significant proportion now have very low non-verbal IQ scores as well as language difficulties. Although about a quarter of children have pragmatic language impairments across the cohort, only 8 had these with no remaining linguistic problems and no autistic features, and only 10 children could be considered to have autistic spectrum disorders (as defined by the CARS). The majority of children in this last group were highly functioning individuals with no evidence of low non-verbal abilities. Finally, 20 children seem to have resolved all their oral communication difficulties (as measured by standardised tests).

<table>
<thead>
<tr>
<th>Language test</th>
<th>1 sd</th>
<th>2 sd</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expressive vocabulary:</td>
<td>50/52 (96%)</td>
<td>39/52 (75%)</td>
</tr>
<tr>
<td>Receptive vocabulary:</td>
<td>37/52 (72%)</td>
<td>11/52 (21%)</td>
</tr>
<tr>
<td>Expressive grammar:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Past tense</td>
<td>46/52 (89%)</td>
<td>19/52 (37%)</td>
</tr>
<tr>
<td>Third person sing.</td>
<td>37/51 (73%)</td>
<td>15/51 (29%)</td>
</tr>
<tr>
<td>Receptive grammar</td>
<td>35/52 (67%)</td>
<td>17/52 (33%)</td>
</tr>
<tr>
<td>Word association:</td>
<td>29/52 (56%)</td>
<td>16/52 (31%)</td>
</tr>
<tr>
<td>Single-word reading:</td>
<td>40/52 (77%)</td>
<td>13/52 (25%)</td>
</tr>
<tr>
<td>Reading comprehension:</td>
<td>50/51 (98%)</td>
<td>18/51 (35%)</td>
</tr>
<tr>
<td>Pragmatic impairment:</td>
<td>8/37 (22%)</td>
<td></td>
</tr>
</tbody>
</table>
Educational placement for children with SLI in school year 6

The majority of children in this study (111/200; 55.5%) were found to be attending mainstream school aged 11 years. In total, 82 (41%) children also received support of some kind within this setting. A significant minority of the group (27.5%) were still attending specialist language provision as they approached secondary school age (49 at language units, 6 at dedicated language schools). A smaller number of children (34/200; 17%) were attending special schools for other primary problems, e.g. those specialising in moderate learning difficulties or autism. Fig. 2 shows the relative proportions attending different educational placements.

Figure 1. Overall breakdown of types of difficulty across the entire cohort.

Figure 2. Proportion of children attending various educational placements at 11 years.
DISCUSSION

Language characteristics

Our study indicates that the difficulties experienced by those attending primary language units are not short-term in nature, but may persist well past middle childhood. In total, 177 (89 %) of our sample showed some language impairment at 11 years of age. A small proportion (10 children) had also developed behaviours more typical of ASD. Furthermore, the majority of children participating in this project were performing below 1 sd on 3 or more tests of language, and these difficulties were across different types of language areas. These data support other recent studies indicating the long-term nature of language impairment. Stothard et al. (1998) reported that 48 % of children with a pre-school history of language impairment still had severe difficulties at 15 years of age, and this proportion rose to 70 % of the children whose language impairment was still evident at 5–6 («persistent SLI»). A study by Johnson and colleagues (1999) has shown that 87 % of language-impaired children identified at 5 still showed some speech or language difficulty at 14 years of age.

Secondary impairments

A large proportion of children in this study performed poorly on non-verbal measures (i.e. WISC performance IQ). Fifty-two children (26 %) who participated (and showed no signs of autism) fell below the generous cut-off of 70 IQ points. Other studies (Stothard et al., 1998; Tomblin, 1992) have reported a similar decrease in non-verbal ability in children with language impairments. This may be due to real developmental lag in the clinical groups, or as Johnson and colleagues have shown, a general drop in IQ for both SLI and non-SLI populations. In our research, measures of non-verbal ability were also changed from the Raven’s coloured matrices (Raven, 1986) to a short form of the WISC III. The Raven’s involves more perceptual/logic skills with no time-based scoring, while the WISC requires both speed and memory skills. In recent years, there has been a series of investigations showing that these are the very areas of cognitive development that may also be impaired in children with SLI (e.g. Ellis-Weismer, Evans and Hesketh, 1999; Gathercole and Baddeley, 1990). The type of cognitive assessment therefore needs to be chosen and interpreted with care in longitudinal studies of this kind.

Secondly, literacy achievement in our sample of children was poor, with a significant proportion of the whole group falling below the normal range on single-word reading (67 %) and on a reading comprehension task (80 %). Stothard et al. (1998) reported similar results in 93 % of children with persistent SLI falling 3 years or more behind on a literacy score made up of the same two reading tests and a spelling assessment.

Intervention and education

This report also suggests that intervention may still be required by children with SLI as they move into secondary education. Over half of our sample were now attending main-
stream classes, although the majority of these individuals have additional (non-specialist) help in class. This is a slightly higher proportion receiving extra support compared to the findings of Stothard et al. (1998), who found that 50% of children with remaining difficulties at 15 years were in mainstream education with no support and a further 30% were attending mainstream classes with support. Johnson et al.’s (1999) study used a community sample, only 50% of which had ever received speech-language intervention.

Summary and conclusions
This longitudinal investigation shows that language impairment at 7 years of age is likely to persist into the late primary years. These difficulties are not confined to specific deficits, but occur for most children across a wide range of language skills and into literacy performance. As educational testing becomes more frequent in the UK, children with SLI are at considerable risk of academic failure. Speech and language therapy services, schools and families need to recognise the long-term and specialist needs of this large clinical population.

REFERENCES


Test for Reception of Grammar. Published by author at Man.Uni.UK


*British Picture Vocabulary Scale II*. NFER-Nelson: Windsor.


GATHERCOLE, S. AND BADDELEY, A. (1990)  

HOHNEN, B. AND STEVENSON, J. (1999)  


RAVEN, J. C. (1986)  
*Coloured progressive matrices*. HK Lewis: London.


*Clinical Evaluation of Language Fundamentals – Revised*. The Psychological Corporation: San Antonio, TX.


*Wechsler Intelligence Scale for Children - Third edition*. The Psychological Corporation : San Antonio, TX.

*Wechsler Objective Reading Dimensions*. Psy.Corp: San Antonio, TX.

WILLIAMS, K. (1997)  