Heterogeneity of Specific Language Impairment (SLI): Outcomes in Adolescence

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Children and young people with specific language impairment (SLI) represent a group of individuals who have deficits in language ability whilst “everything else” appears to be normal. That “everything else” includes, by definition, adequate input from the senses: normal hearing and normal/corrected vision. It also includes an adequate biological basis to develop language (they have no obvious signs of brain damage) and an adequate basis for learning, i.e., their nonverbal abilities as measured by IQ are similar to those of their peers of the same age. A desire to engage socially is also important: children and young people with SLI seek to interact socially with adults and peers and as such are not like children with autism who are not as socially engaged. This definition of SLI which is commonly in use has a number of key implications for our understanding of the impairment.

First, SLI is conceived as a primary difficulty with language. Indeed all young children who are likely to later have SLI are in the first instance late talkers in the non-technical sense. That is, the appearance of their first words is delayed compared to what is expected of most young children. Word combinations such as “want juice”, “bye-bye teddy” also appear at a later age than would be expected and this is true for children learning not just English, but any language. Generally, across languages, children with SLI are described as having more difficulty with talking (producing words) than with understanding what is said to them (comprehending language). Although difficulties with talking attract the most attention and can occur in isolation, many children present with difficulties in both talking and understanding. It is much more rare to see children
who have problems understanding what is said to them but can talk normally (except in the case of children with autism).

Second, in SLI this primary difficulty with language is assumed to hold the key to the explanation of why these children have difficulties. In other words, there is an assumption that the language deficit is a manifestation of something wrong with whatever the language learning mechanism may be. In the definition of SLI, other possible causes of a language difficulty are excluded: the child does not have hearing problems so the hearing is not causing the language difficulty. In the same vein, the child does not have learning difficulties so these can not be causing the language difficulty. The child appears to be social and want to communicate, so interpersonal, social difficulties can not be causing the language difficulty.

Third, in SLI this primary difficulty with language is assumed to be a defining characteristic that, if persistent, it stays with children as they grow into adolescence and young adulthood. We do not see in textbooks or manuals a change in the definition of SLI from childhood to adolescence, for example. Textbooks and manuals are likely to acknowledge that SLI is a developmental condition, that it can be persistent and stay with children as they grow up, and that it can be heterogeneous (a fancy word to say that variation is observed and you can have different types of language deficits in SLI). Yet, the current definition of SLI most commonly used is in a way static and does not explicitly tell us about what to expect as children with SLI grow up.

In this chapter we will examine precisely this issue: what are their developmental outcomes for adolescents with SLI and what do these outcomes tell us about the nature of
SLI itself? We will base our observations on our longitudinal investigation of SLI: the Manchester Language Study.

*The Manchester Language Study*

This investigation began with an original cohort of 242 children who represented a random 50% of all children attending year 2 (aged 7 years old) in language units across England. Language units in England are classes, usually one or two attached to mainstream schools, that offer specialist language environments for children with SLI. The staff:student ratio in these mixed-aged classes is high at one staff member for approximately 10 students. Staff include a specialist teacher and a classroom or speech therapy assistant as well as regular speech and language therapy input provided by a qualified therapist (for more information on language units and educational provision for children with SLI in England see Conti-Ramsden & Botting, 2000). Children reported by teachers to have frank neurological difficulties (brain damage), diagnoses of autism, known hearing impairment or general learning impairments were excluded. All children had English as a first language, but 12% had exposure to languages other than English at home. In our original sample, 53.1% of the participants came from households earning less than the average family wage for that year. The cohort has been assessed at 8 years of age (n=234), 11 years of age (n=200) and at 14 years of age (n=130). The 139 adolescents who agreed to participate at 16 years and that form the basis of the data to be discussed in this study, did not differ on any early variables of language, behaviour, cognition or social-economic status (SES) compared to those who did not participate. The adolescents showed a variety of different language profiles with the majority described as having both receptive and expressive difficulties.
At age 16 years, the Manchester Language Study expanded to include a comparison group of adolescents from a broad background who did not have a history of special educational needs or speech and language therapy provision. In total, 124 young people with normal language development (NLD) aged between 15 years 2 months and 16 years 7 months (mean age 15;11 years) agreed to participate. Census data as per 2001-2002 General Household Survey (UK Office of National Statistics) was consulted in order to target adolescents who would be representative of the range and distribution of households in England in terms of household income and maternal education. In post-hoc analysis, there was also no significant difference between NLD adolescents and adolescents with SLI in maternal education levels ($\chi^2(2)=1.756, p=.416$) or household income bands ($\chi^2(3)=4.391, p=.222$). There were also no significant differences in the proportions of girls in each group (SLI=42/139; NLD=47/124; Fisher’s exact $p=0.20$). Table 1 presents the characteristics of the adolescents with SLI and NLD adolescents in terms of their age, current language and cognitive functioning. Language and cognitive functioning are derived from standardized tests with a mean of 100 and a standard deviation of 15. Thus, a score between 85 and 115 (i.e. within one standard deviation of the mean) is indicative of normal performance as 68% of scores from typical adolescents would fall within this range. As can be seen from the results presented in Table 1, the group of adolescents with SLI had means below 85 on the three measures presented.

*From Language Units to Mainly Mainstream Context*

Recall that the adolescents were selected for participation in the study on the basis of their language unit attendance at 7 years. Language units or schools provide specialised teaching and speech and language therapy for individuals with a diagnosis of
a primary language disorder. Special schools generally cater for those with wider or more global impairments and mainstream schools cater for a wide variety of children including those with special educational needs. Figure 1 shows the individual stability and change in educational placement across the educational lifespan of these children. These data are discussed more fully in Durkin, Simkin, Knox & Conti-Ramsden (submitted).

At 11 years (secondary school entry), the majority (63%) were attending mainstream schools (47% with support; 16% without support). Around a fifth (19%) were attending special schools and 18% were attending language units/schools. At 14 years, the proportions in different educational placements remained similar to that at 11 years. In total, 62% were attending mainstream school (41% with support; 21% without support). Around one quarter (26%) were attending special schools and 13% were in language units/language schools. Finally at 16 years, 69% were attending mainstream school (45% with support; 24% without support). Around a quarter 24% were attending a special unit/school and only 7% were found to be attending a language unit/school. Therefore, at the end of compulsory schooling, three quarters of the adolescents (76%) were attending placements with some form of special educational support. They had all received a statement of special educational needs (SEN) at age 7 years and this figure remained high throughout secondary schooling; 79% at 11 years, 73% at 14 years and 71% at 16 years. This provides further evidence of the persisting difficulties of the large majority of adolescents with SLI (Stothard, Snowling, Bishop, Chipchase & Kaplan, 1998; Young et al., 2002). Thus, these data tell us that the majority of adolescents in our sample have continued educational needs throughout adolescence and that these needs are being met mainly in mainstream schools (with support) during secondary schooling.
Outcomes at 16 Years: Literacy, Academic Achievement, Friendships and Emotional Health

Given the definition of SLI currently in use, we would expect these adolescents to have selective impairments in language functioning. Any deficits outside the language system are frequently considered to be a causal consequence of impaired language development. In other words, we would expect there to be an association between the extent of the language difficulty and the extent of difficulties in related area of functioning. This would be the case if SLI is indeed primarily an impairment of language with “everything else” being normal. In this chapter we examine four such areas of related functioning: literacy, academic achievement, friendships and emotional health. The strength of the association between language and other areas of functioning can be examined in two ways: via correlations, which have values from 0 to 1, with values closer to 1 indicating a stronger association (the association can be positive, for example, as oral language ability increases so does a related area of functioning; or the association can be negative, for example, as oral language ability increases, the related area of functioning decreases); and via regression analysis whereby a number of potential influencing factors are examined and their associations are evaluated to determine what percentage of the variance is explained (to explain some area of functioning fully, one needs to explain 100% of the variance. Oral language, for example may explain a proportion of the variance observed in reading ability. In order to interpret the findings below, it is important to note that in complex behaviours there is no expectation that 100% of the variance will be explained).
Literacy outcomes. Recent evidence increasingly suggests that children with SLI are likely to experience literacy problems (e.g. Catts, 1991; Catts, Fey, Tomblin, & Zhang, 2002; Conti-Ramsden, Donlan, & Grove, 1992; Snowling, Bishop & Stothard, 2000) and children who have reading problems, i.e. dyslexia, are likely to experience difficulties with oral language skills beyond the area of phonology (Joanisse, Manis, Keating, & Seidenberg, 2000; McArthur, Hogben, Edwards, Heath, & Mengler, 2000). The literature suggests there is an overlap of about 50%. As noted by Snowling and Hulme (this volume), literacy builds on a foundation of oral language skills. Decoding skills are closely related to phonological abilities, whereas reading comprehension is more closely allied to non-phonological language skills (Bishop & Snowling, 2004). Thus, it is not surprising that the results of a number of studies suggest an association between reading skills and the language profiles of children with SLI. Some investigators have focused on global measures such as the severity of the language impairment. Children’s level of performance on standardised tests of language expression (talking) and language understanding have been found to be closely associated with reading achievement (e.g., Bishop & Adams, 1990; Tallal, Dukette, & Curtiss, 1989; Wilson & Risucci, 1988). Furthermore, Bishop (2001) argues that the risk of developing literacy difficulties increases with the number of impaired language domains the child experiences, i.e. language expression and language understanding. In this extensive twin study involving 8 year olds, Bishop found that 29% of children with SLI who were impaired in one language domain had difficulties with reading. In contrast, a much larger proportion of children with SLI (72%) who were impaired in two language domains had difficulties reading.
Thus, there appears to be substantial evidence to suggest that children with SLI are likely to experience reading difficulties at school age. In addition, it appears that children with SLI who have severe impairments or impairments in more than one domain of language appear to be at higher risk of developing reading difficulties.

We investigated two different types of reading outcome: reading accuracy and reading comprehension (see also Botting, Simkin, & Conti-Ramsden, 2006). Reading accuracy refers to the ability to decode what the words are, for example to read them out loud. Reading comprehension is about understanding what has been read, for example to answer some questions about a story. Interestingly, reading accuracy and reading comprehension have been shown to be dissociated in the development of some atypical populations. This includes those with dyslexia, whose decoding/accuracy skills tend to be poorer than comprehension skills (Bishop & Snowling, 2004) and poor comprehenders who (by definition) show average reading accuracy in the context of poor text comprehension (Cain & Oakhill, 1996). These different reading outcomes may also show different rates of impairment in children with SLI. In our study of 16 year olds and in line with previous research (Snowling et al., 2000), we found that adolescents with SLI had more difficulties with reading comprehension than with reading accuracy (see Table 2 for details). We then examined predictors of reading outcome. How much do concurrent language skills predict reading outcome? How does concurrent language fare as a predictor in relation to other factors such as nonverbal IQ?

Our results suggest that language expression and language understanding were associated with reading accuracy and reading comprehension. Language was the strongest predictor,
explaining 30% of the variance, with nonverbal IQ also influencing these outcomes. Thus, the predictor variables were, in order, language followed by nonverbal IQ.

There was evidence of variability in literacy outcomes, i.e. heterogeneity within our sample of adolescents with SLI. In addition to the information illustrated above in table 2, the box below illustrates the fact that we find, amongst young people with a history of SLI, a proportion of adolescents that are competent readers.

- Approximately one quarter of the young people had reading accuracy and comprehension scores above 1SD

In summary, these results show that joint impairment of language understanding and production in SLI is associated with outcome in literacy skills at 16 years of age, i.e., even when IQ is controlled for, concurrent language skills have an important predictive contribution to reading skills at 16 years. Tests involving structural aspects of language/syntax, both in the expressive and language understanding domains, are the
most implicated in this association. A number of studies have shown an association between oral language skills and reading comprehension. Similarly to the present study, Tallal, Curtiss and Kaplan (1988) and Wilson and Risucci (1988) found that spoken language comprehension deficits predicted later reading difficulties in children with SLI. However, although our results are in line with this conclusion, the present study indicates that expressive language skills also show associations with reading comprehension ability and thus also supports studies in which mean length of utterance (MLU) has been found to be a predictor of reading ability in children with SLI (e.g. Bishop & Adams, 1990). At the same time, it must be noted that regardless of relative language ability, this population of young people are at very great risk of reading impairment in adolescence: 75% of our participants showed reading difficulties. Only a relatively small minority of ‘competent readers’ were found in our group, demonstrating a strong association between oral language skills and literacy abilities in adolescence. In terms of competent readers, it was found that 63% had age appropriate concurrent language scores as measured by the Clinical Evaluation of Language Fundamentals (CELF-R, Semel, Wiig & Records, 1987). The remainder had language difficulties that were nearly all expressive in nature (as measured by the Recalling Sentences subtest).

*Academic achievement.* The National Curriculum states which subjects are studied in schools and also divides them into age groups called Key Stages. At each Key Stage, all children in state schools will study certain subjects, following the requirements of the National Curriculum. Key Stage 4 (KS4) subjects are studied in school years 10-11 when children are between 14 and 16 years old. KS4 examinations were completed by participants at around 16 years of age. These are national examinations, usually General
Certificates of Secondary Education (GCSE) but also vocational examinations such as General National Vocational Qualifications (GNVQ). GCSE grades are awarded from A* (highest level) to G (lowest level). National Qualifications Framework (NQF) Level 2 is the expected level for adolescents at 16 years of age and is equivalent to GCSE grades A*-C or GNVQ Intermediate. NQF Level 1 is equivalent to GCSE grades D-G or GNVQ Foundation. NQF entry level is below level 1. The number of entry level qualifications was also collected for the adolescents at this stage. Entry level qualifications are suitable for learners for whom achievement at GCSE is an unrealistic target. Figure 2 presents the highest academic qualification level achieved at 16 years (for further details see Conti-Ramsden, Durkin, Simkin & Knox (submitted)).

Forty four percent of young people with SLI obtained at least one of the expected Level 2 qualifications, although twice the NLD group achieved this (88%). None of the NLD adolescents left school with only entry level qualifications but this was true of 19% of the adolescents with SLI. A small proportion (11%) of the NLD adolescents gained only Level 1 qualifications, with a third of the language impaired sample having this as their highest educational level. We then examined predictors of academic achievement. How much do concurrent language skills predict academic achievement? How does language fare as a predictor in relation to other factors such as nonverbal IQ? Our results suggest that spoken language abilities (expression and understanding of language) as well as literacy skills (reading) were associated with academic achievement, explaining 27% of the variance. But, unlike literacy skills, language was not the strongest predictor, this was nonverbal IQ. There was also an influence of maternal education, but this was a
smaller contribution than language and literacy. Thus, the predictor variables were, in order, nonverbal IQ, language and literacy, and maternal education.

There was also evidence of variability in academic achievement. The box below illustrates the fact that we find a proportion of adolescents with SLI that are performing as well as peers academically. Interestingly, it was found that of those young people with age appropriate academic attainment, around 2/3 had normal range language skills while around 1/3 showed problems with expressive language skills.

- Approximately one sixth of the adolescents performed academically as expected for their age (national figures; five or more passes A*-C, Ofsted 2005).

In summary, this report illustrates the heterogeneity of SLI in that a wide range of educational outcomes were found amongst our sample. Our data reflects the full range of findings reported in the literature previously: from good outcomes equivalent to comparable typically developing peers, to poor outcomes with few or no qualifications obtained at the end of compulsory education. Language skills do play a role in this outcome but not as strongly as other areas of functioning such as nonverbal IQ. Recall
from the participant description that, as a group, the adolescents with SLI had, overall, low mean nonverbal IQ at 16 years. This suggests that in adolescence, SLI is associated with lower nonverbal IQ (see also Botting, 2005) and it is this ability that is more closely linked to academic achievement than the severity of the language impairment per se.

As an aside, it is of interest to note that our sample were entered for GCSE examinations or their equivalent in 2004 and 2005, virtually 10 years on from the last previous relevant study in this area (Snowling, Adams, Bishop & Stothard, 2001), and 20 years on from the studies carried out in the 1980s (Clegg, Hollis & Rutter, 1999; Haynes & Naidoo, 1991; Mawhood, Howlin & Rutter, 2000). Although there is heterogeneity in attainment, our findings suggest an improvement in academic achievement in young people with SLI. We found that the majority of adolescents with a history of SLI are obtaining some academic national qualifications at the end of compulsory secondary education.

Friendships. Durkin and Conti-Ramsden (in press) describe friendships as being a vital dimension of child development. They are key markers of the selectivity of interpersonal relations, providing social and cognitive scaffolding (Hartup, 1996), serving variously as sources of support and information as well as buffers against many of life’s problems, with enduring implications for self-esteem and wellbeing (Hartup & Stevens, 1999; Shulman, 1993). Children and adolescents without friends, or with poor friendship quality, are at risk of loneliness and stress (Bagwell et al., 2005; Hartup & Stevens, 1999; Ladd, 1990; Ladd, Kochenderfer, & Coleman, 1996).

Friendship relations are complex and this reflects in part the ways in which they interweave with other developmental processes, such as developing interpersonal and
communicative skills, increasing social cognitive competence and changing personal needs. For example, very young children form friendships largely on the basis of proximity and shared activities; during middle childhood friendships involve greater levels of interchange and awareness of individual attributes; and in adolescence many people seek via friendships to satisfy psychological needs for intimacy, shared outlooks and identity formulation (Buhrmester, 1990, 1996; Hartup & Stevens, 1999; Parker & Gottman, 1989; Steinberg & Morris, 2001).

We examined friendship quality in our sample of adolescents with SLI and their NLD peers at age 16 years. We asked them a series of questions regarding friends and acquaintances, for example, how easy do you find to get on with other people? If you were at a party or social gathering, would you try to talk to people you had not met before? Based on a number of questions we devised a scale ranging from 0 to 16 points, with scores closer to zero representing good quality of friendships. Adolescents in the SLI group ranged from 0 to 14 points while adolescents in the NLD group had scores between 0 to 2. Overall as a group, adolescents with SLI were at risk of poorer quality of friendships.

We then examined predictors of friendships. Our results suggest that spoken language abilities (expression and understanding of language) as well as literacy skills (reading) were associated with friendship quality. But language was not the strongest predictor, these were difficult behaviour and prosocial behaviour. We found that, in the sample as a whole, language and literacy measures accounted for an additional 7% of variance. Thus, language ability is predictive of adolescents’ friendship quality when other behavioural characteristics known to be influential in peer relations (problem
behavior, prosocial behavior) are controlled for, but its overall influence is small. There was also a small influence of nonverbal IQ. Thus, the predictor variables were, in order, difficult behaviour, prosocial behaviour, language and literacy, and nonverbal IQ.

There was also evidence of variability in friendship quality, i.e. heterogeneity within our sample of adolescents with SLI. The box below illustrates the fact that we find a large proportion of adolescents with SLI that have good quality of friendships. In Durkin and Conti-Ramsden (in press) factors that potentially distinguish between those with good quality of friendships (60%) and those with poor quality of friendships (40%) are examined in detail. Briefly, the findings suggest a marked developmental consistency in the pattern of poor language for the poor friendships group across a 9 year span, from 7 to 16 years of age.

- Nearly two-thirds of adolescents with SLI have good quality of friendships.

Specific language impairment itself appears to be a risk factor for poorer friendship development. It is known to be associated with social problems in childhood and adolescence, and it is reasonable to assume that these bear on peer relations and
friendship development. At the same time, there are individual differences in the nature and severity of problems experienced. Although we found that the group of participants with SLI as a whole scored less favorably on our measure of friendship quality, they also showed considerable within-group heterogeneity, and many (60%) had good scores with about 40% having poor quality of friendships. These data taken together suggest that poor quality of friendships in SLI, although related to poor language, may not be simply a consequence of the severity of the language problem experienced but is an additional difficulty present in SLI particularly evident during adolescence.

Emotional health. There have been some studies examining quality of life and psychiatric outcomes in young people with SLI (Cantwell & Baker, 1987; Beitchman et al., 2001; Clegg, Hollis, Mawhood & Rutter, 2005). Beitchman and colleagues followed up a group of children with SLI from 5 to 19 years and throughout this period they assessed them for the presence of possible psychiatric difficulties. They found that children with SLI were at greater risk of having attention deficit hyperactivity disorders (Beitchman et al., 1996) and later had higher rates of anxiety disorders (Beitchman et al., 2001), aggressive behaviour (Brownlie et al., 2004) and increased substance abuse (Beitchman et al., 2001). Clegg and colleagues (2005) followed a cohort of children from 4 years to mid adulthood and found an increased risk of psychiatric impairment (compared to both peers and siblings), particularly concerning depression, social anxiety and schizoform/personality disorders. Other studies have examined language in populations referred primarily for psychiatric difficulties. Cohen and colleagues (1998) for example, found a higher than expected rate of undiagnosed language impairment (40%) in their clinic sample. In contrast, however, it needs to be noted that a recent study
on SLI (Snowling, Bishop, Stothard, Chipchase & Kaplan, 2006) did not identify increased risk of emotional disorders at all. Thus, still relatively little is known about the long-term emotional health outcomes for children with SLI. Therefore, we investigated the occurrence of emotional symptoms such as anxiety and depression in our cohort at 16 years of age (Conti-Ramsden & Botting, under review).

As can be seen from Table 3, adolescents with SLI had higher scores for both anxiety and depression. In addition, the proportion of adolescents scoring above the clinical threshold was larger in the SLI group as compared to the NLD group for both anxiety (12% vs. 2%) and depression (39% vs. 14%).

We then examined predictors of emotional health. Our results suggest that there were virtually no associations between language ability and the development of emotional health symptoms. Examination of earlier factors (at 7 years) suggests that those with emotional problems at 7 years also show increased anxiety at 16 years. Earlier language once again showed remarkably few associations. Thus language was not a predictor of emotional health in adolescents with SLI.

There was also evidence of variability in emotional health symptoms, i.e. heterogeneity within our sample of adolescents with SLI. The box below illustrates the fact that we find, amongst children with SLI a large proportion of adolescents that have adequate emotional health.
Nearly two-thirds of adolescents with SLI have little anxiety or depression symptoms.

In summary, the results of the above investigation raise a number of key issues which relate to the risk of emotional health symptoms in young people with SLI. Firstly, our data show a clear increased risk for this population as they near adulthood compared to peers. This finding replicates other studies that have shown raised prevalence of psychiatric difficulties in those with communication impairments (e.g., Clegg et al., 2005) and increased language impairment in children referred psychiatrically (e.g., Cohen et al., 1998) and reviews affirming the association (Toppelberg & Shapiro, 2000). Beitchman and colleagues (2001) in particular found increased anxiety in a similar cohort with SLI at 19 years of age. The association has often been assumed to be causal in that either long-term language impairment may lead to (or exacerbate) wider difficulties, or that psychiatric impairment may constrain communication skill. However, apart from the fact that those with SLI have increased symptoms, surprisingly few clear associations exist between language and the development of emotional health symptoms. This is similar to the findings of Clegg and colleagues (2005) who also failed to find a clear
relationship between the two. The lack of association with language scores thus makes it more difficult to interpret the relationship between having poor language and emotional health difficulties as a directly developmentally causal one: that is having ongoing poor communicative experiences do not appear to ‘make you’ increasingly depressed or anxious per se. Rather, the association appears to be with SLI itself, with the disorder. Thus, other factors are likely to play a role in making some individuals more vulnerable.

From our own work we suggest these can range from family history of anxiety and depression (Conti-Ramsden & Botting, under review) to environmental factors such as being bullied (Knox & Conti-Ramsden, in press). Interestingly, poor quality of friendships do not appear to be strongly associated with mental health difficulties. We found that in our sample, only 7% of adolescents showed difficulties in both friendships and mental health; 32% showed difficulties with friendships in the context of adequate mental health and 4% had the reverse pattern. 57% of the sample did not show difficulties in either area.

*What do Outcomes in Adolescence Tell Us About the Nature of SLI?*

The findings presented briefly above point to the heterogeneity in outcomes in SLI. This heterogeneity is present both within SLI, that is, across individuals: different adolescents have different types of difficulties of different severity, as well as within an individual: there appears to be variation in the constellation of difficulties an adolescent may experience and in the severity of these difficulties. In a large sample as ours, we see a wide variation in outcomes: from competent readers to very poor readers; from good academic achievement to significantly poor educational outcomes at the end of secondary schooling; from those enjoying good quality of friendships to those with difficulties
developing such relationships; from those experiencing anxiety and/or depressive symptoms to those having adequate emotional health. Interestingly, in terms of co-occurrence, it was found that 8% of adolescents had no difficulties in any of the four areas, while 5% had difficulties in all four areas. Most adolescents (41%) had difficulties in two areas, 32% had difficulties in three areas and 14% had isolated difficulties in one area. Of those with difficulties in two areas, the most common pattern was to have literacy and academic difficulties together (90%). Of those with difficulties in three out of the four areas, the most common pattern was to have literacy, academic and friendship difficulties (86%). Finally, of those adolescents with difficulties in just one area, the most common was to have isolated academic difficulties (63%).

Parents and practitioners will recognize this “variability” or “heterogeneity” as things being messy in SLI. They are. Heterogeneity translates to issues being more complex in practice. It is harder to predict from the individual’s language problem other likely associated difficulties. Associations vary from very strong associations between language and literacy to virtually no association between language and emotional health. Yet, very importantly, the risk of poor outcomes in all the domains discussed above is strongly associated with SLI itself. Group status is crucial and is always a predictor of outcomes in SLI, at least in the outcomes examined above. In contrast, language abilities may be important for some outcomes but not for others, and are sometimes a strong predictor of some outcomes but not at other times in relation to other outcomes. This relationship between outcomes, language and SLI is illustrated in the box below.
The concern that SLI is not a pure disorder of language is not a new idea (e.g. Leonard 1987; 1991; 1998). What is perhaps debated but less well established is the suggestions that we want to make here: that at least some of the associated difficulties present in SLI are not directly related to the language difficulties present in SLI. We argue that the heterogeneity observed in the outcomes of adolescents with SLI, both within and across individuals, is a reflection of SLI being more than a language problem. The evidence points to a need to redefine SLI. First, SLI is a developmental disorder for which language is a primary manifestation in early childhood. It is the case that there are a number of children (and not such a small number, 5 to 7% is the estimated incidence amongst 5 year olds, Tomblin et al., 1997) of pre-school age who present with primary language problems with other areas of development apparently intact. The issue is that
this profile of SLI does not remain this way for long for a large proportion of children as they grow up. Other areas of functioning show deficits, including areas which can not be related directly to language *per se*. SLI has associated difficulties which become more evident with development, only some of which are related to the severity and type of language problem experienced. Second, in SLI the primary difficulty with language is assumed to hold the key to the explanation as to why these children have these difficulties with language and other areas. The evidence presented in this chapter in terms of outcomes at 16 years suggests that factors other than difficulties with language may well be crucial in understanding the range of deficits that individuals with SLI experience throughout their childhood and adolescence. Finally, in SLI the primary difficulty with language is assumed to be a defining characteristic that if persistent, stays with children as they grow into adolescence and young adulthood. This may well be the case for some individuals. The key issue raised by the findings reported above is that other areas of functioning may well be at least as bad (or worse) as the language deficit at 16 years. Thus for adolescents with SLI, language may no longer be a primary deficit nor the most important for realizing optimal outcome.
Author Note

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References


Table 1

*Who are we talking about?: Participant descriptives (means and standard deviations)*

<table>
<thead>
<tr>
<th></th>
<th>Age</th>
<th>Nonverbal</th>
<th>Talking (Language expression)</th>
<th>Understanding (Language comprehension)</th>
</tr>
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<tbody>
<tr>
<td>SLI</td>
<td>15;10 (0;5)</td>
<td>84.1 (18.8)</td>
<td>74.1 (11.0)</td>
<td>83.9 (16.9)</td>
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<tr>
<td>NLD</td>
<td>15;11 (0;4)</td>
<td>99.9 (15.8)</td>
<td>97.2 (15.0)</td>
<td>99.5 (13.2)</td>
</tr>
</tbody>
</table>
Table 2

*Reading abilities in adolescents with SLI at 16 years*

<table>
<thead>
<tr>
<th></th>
<th>Mean (SD) standard score</th>
<th>Percentage falling below 1SD from mean for age</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Reading accuracy</strong></td>
<td>83.4 (17.8)</td>
<td>49%</td>
</tr>
<tr>
<td><strong>Reading comprehension</strong></td>
<td>75.7 (14.3)</td>
<td>74%</td>
</tr>
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</table>
Table 3

Anxiety and depression scores (M, SD) for adolescents with SLI and NLD adolescents

<table>
<thead>
<tr>
<th></th>
<th>Anxiety</th>
<th>Depression</th>
</tr>
</thead>
<tbody>
<tr>
<td>SLI</td>
<td>10.3 (6.1)</td>
<td>7.6 (5.5)</td>
</tr>
<tr>
<td>NLD</td>
<td>7.0 (4.0)</td>
<td>3.7 (4.2)</td>
</tr>
</tbody>
</table>
Figure 1

*Educational placements during schooling for adolescents with SLI*

![Diagram showing educational placements for adolescents with SLI at ages 7, 11, 14, and 16 years.]
Figure 2

*Highest academic qualification level achieved at 16 years*