Health Technology Assessment 2007; Vol. 11: No. 25

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July 2007

Health Technology Assessment
NHS R&D HTA Programme
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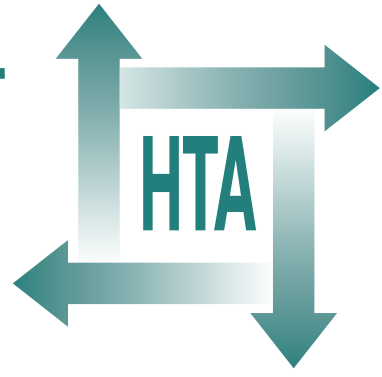

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A randomised controlled trial and economic evaluation of direct versus indirect and individual versus group modes of speech and language therapy for children with primary language impairment

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Declared competing interests of authors: none

Published July 2007

This report should be referenced as follows:

Boyle J, McCartney E, Forbes J, O'Hare A. A randomised controlled trial and economic evaluation of direct versus indirect and individual versus group modes of speech and language therapy for children with primary language impairment. *Health Technol Assess* 2007;**11**(25).

Health Technology Assessment is indexed and abstracted in *Index Medicus*/MEDLINE, *Excerpta Medica*/EMBASE and *Science Citation Index Expanded (SciSearch®)* and *Current Contents®*/Clinical Medicine.

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The research reported in this monograph was commissioned by the HTA Programme as project number 99/36/04. The contractual start date was in April 2002. The draft report began editorial review in December 2005 and was accepted for publication in January 2007. As the funder, by devising a commissioning brief, the HTA Programme specified the research question and study design. The authors have been wholly responsible for all data collection, analysis and interpretation, and for writing up their work. The HTA editors and publisher have tried to ensure the accuracy of the authors' report and would like to thank the referees for their constructive comments on the draft document. However, they do not accept liability for damages or losses arising from material published in this report.

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ISSN 1366-5278

Published by Gray Publishing, Tunbridge Wells, Kent, on behalf of NCCHTA.
Printed on acid-free paper in the UK by St Edmundsbury Press Ltd, Bury St Edmunds, Suffolk.

Abstract

A randomised controlled trial and economic evaluation of direct versus indirect and individual versus group modes of speech and language therapy for children with primary language impairment

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Objectives: To compare language outcomes following direct individual therapy [speech and language therapist (SLT) working individually with a child], indirect individual therapy [speech and language therapy assistant (SLTA) working individually with a child], direct group therapy (SLT working with a small group of children) and indirect group therapy (SLTA working with a small group of children) for primary school-age children with persistent primary receptive and/or expressive language impairment relative to a comparison group receiving current models and levels of SLT service.
Design: The trial had a 2 × 2 factorial design (direct/indirect versus individual/group therapy) together with a control group that received existing levels of community-based speech and language therapy and served as a comparator for the economic analysis. All postintervention language outcome measures were blind assessed. A short-run economic evaluation across the four different modes of therapy was carried out using the primary outcome measure. A comparable method was used for estimating the costs of providing services in the community for children allocated to the control group.
Setting: Research intervention took place in school settings in Scotland, with some of the children randomised to group therapies transported to join a group in a different school.
Participants: Children aged between 6 and 11 years, attending a mainstream school, with standard scores on the Clinical Evaluation of Language Fundamentals (CELF-3^{UK}) of less than –1.25 SD (receptive and/or expressive) and non-verbal IQ on the Wechsler Abbreviated Scale of Intelligence (WASI) above 75, and no reported hearing loss, no moderate/severe articulation/phonology/dysfluency problems or otherwise requiring individual SLT work. Informed, written parental consent was required.
Interventions: A therapy manual was constructed that provided a range of procedures and activities for intervention in areas identified by a search of the research and professional literature for examples of language therapies of proven effectiveness. SLTs planned activities for children seen by therapists and SLTAs, using the manual.
Main outcome measures: Primary outcome measures were standardised scores on tests of expressive and receptive language. Secondary outcome measures were scores on a test of receptive vocabulary, together with questionnaire, rating scale and focus group data from parents, teachers, project SLTs and SLTAs, and an audit of therapy sessions.
Results: There was no evidence that the five modes involved in the project were different at the onset in terms of primary outcome measures, although there were significant gender differences. The results from both the intention-to-treat analyses of the outcomes from the 161 children randomised who met the eligibility criteria and the protocol analyses of the outcomes from the 152 children for whom postbaseline data were available revealed that there were no significant postintervention differences between direct and indirect modes of therapy on the one hand, or between individual and group modes on the other on any of the primary language outcome measures. However, there was evidence of some benefits from direct therapy from an SLT in secondary

outcome measures. Intervention delivered three times a week for 30–40 minutes over a 15-week period also yielded significant improvements in age-corrected standardised scores for expressive language, although not for receptive language, relative to those receiving community-based SLT services. Children with specific expressive language delay were more likely to show improvement than those with mixed receptive–expressive difficulties, and non-verbal IQ was not a significant moderating variable. The within-trial economic evaluation identified indirect therapy, particularly indirect group therapy, as the least costly of the modes investigated in the study, with direct individual therapy as the most costly option.

Conclusions: SLTAs can act as effective surrogates for SLTs in the delivery of services within primary schools to children with primary language impairment who do not to require the specialist skills of an SLT. Generalising the central estimates of the relative cost of different therapy modes to other educational/health systems is possible, but the precise differences reported in resource use need to be qualified by the level of programme intensity and other characteristic features of education and therapy services that may differ from those observed in this trial. Further research is needed into effective interventions for receptive language problems and also investigations of the efficacy of the relationship between dose and treatment effect in both expressive and receptive language. Research is also needed into models of integrative service delivery, cluster models of delivery via integrated community schools, and the involvement of class teachers, classroom assistants and parents/carers. There is also a need for studies to identify the characteristics of children who are most likely to succeed with indirect intervention approaches, and also to evaluate alternative methods of working with those who may benefit from different modes. Finally, research to refine the therapy manual would also be helpful.

Contents

Glossary and list of abbreviations

Technical terms and abbreviations are used throughout this report. The meaning is usually clear from the context, but a glossary is provided for the non-specialist reader. In some cases, usage differs in the literature, but the term has a constant meaning throughout this review.

Glossary

British Picture Vocabulary Scale (BPVS) A standardised test of receptive vocabulary.

Clinical Evaluation of Language Fundamentals (CELF) A standardised test of expressive and receptive language.

Direct therapy Therapy delivered by a qualified speech and language therapist.

Dysfluency Condition where speech is produced with hesitations or repetitions, such as interrupt the flow of speech.

Effect size An estimate of the magnitude of treatment effect.

Effectiveness The extent to which intervention results in favourable outcomes under everyday conditions. Contrasted with efficacy, which refers to change under controlled conditions.

ELKAN A training programme for speech and language therapy assistants and others working with children with language difficulties.

Expressive language The language produced by a speaker.

Focus group A discussion-based group interview.

Group therapy Therapy delivered to a small group.

Indirect therapy Therapy delivered by other than a qualified speech and language therapist, and in this study, delivered by a speech and language therapy assistant.

Individual therapy Therapy delivered on a one-to-one basis.

Intention-to-treat (ITT) The ITT analysis here is based on all the outcomes of all eligible children randomised to conditions irrespective of whether they participated in the intervention programme or whether postbaseline measures are available.

Morphology The rules governing the combination of the smallest units of language, such as word endings and inflections.

Phonology The organisation of sounds and the rules regulating that usage.

Pragmatics Those aspects of meaning controlled by the ways in which language is used in relation to the perspectives of a speaker and listener.

Primary language impairment (PLI) Significant difficulties in syntax, morphology, phonology, semantics and/or pragmatics which cannot be accounted for in terms of non-verbal ability, hearing impairment, behaviour or emotional problems or neurological impairments.

Protocol analysis Here, an analysis of outcomes for the children for whom postbaseline measures are available.

Randomised controlled trial An experimental approach wherein subjects are randomly assigned to either a treatment or a non-treatment group.

Receptive language Language heard and understood by a listener. Sometimes referred to as verbal comprehension.

continued

Glossary *continued*

Root mean square error of approximation A measure of statistical goodness of fit, where a value of 0 denotes exact fit and values of 0.08 or less indicate a reasonable error of approximation.

Semantics The meanings of words both in isolation and in subsets and combinations.

Syntax The ways in which words are combined to form phrases, sentences and subclauses.

Therapy Outcome Measure A metric developed for the evaluation of outcomes from speech and language therapy intervention.

Therapist versus Assistant The percentage of therapy delivered by a speech and language therapist rather than a speech and language therapy assistant.

List of abbreviations

ANCOVA	analysis of covariance
ANOVA	analysis of variance
BPVS	British Picture Vocabulary Scale
CELF	Clinical Evaluation of Language Fundamentals
CEW	common English words
CFI	Comparative Fit Index
CI	confidence interval
CM	comprehension monitoring
CS	colourful sentences
df	degrees of freedom
G	grammar
GM	grammar markers
IEP	individual education plan
IQ	intelligence quotient
ITT	intention-to-treat
LS	learning strategies
N	narrative
NA	not applicable
NVIQ	non-verbal intelligence quotient
O	other
PCT	primary care trust
PLI	primary language impairment
PPCPQ	Parent Perception of Children's Progress Questionnaire
PRV	personally relevant vocabulary
QTE	quantile treatment effect
RCSLT	Royal College of Speech and Language Therapists
RCT	randomised controlled trial
RMSEA	root mean square error of approximation
SD	standard deviation
SLI	specific language impairment
SLT	speech and language therapist/therapy
SLTA	speech and language therapy assistant

continued

List of abbreviations *continued*

SNA	special needs assistant
T1	baseline assessment
T2	postintervention assessment
T3	12-month follow-up assessment
TLI	Tucker–Lewis index
TOM	Therapy Outcome Measure
VD	vocabulary development
WASI	Wechsler Abbreviated Scale of Intelligence
WTE	whole-time equivalent

All abbreviations that have been used in this report are listed here unless the abbreviation is well known (e.g. NHS), or it has been used only once, or it is a non-standard abbreviation used only in figures/tables/appendices in which case the abbreviation is defined in the figure legend or at the end of the table.

Executive summary

Background

Some 30–60% of children with primary language impairment (PLI) that cannot be accounted for in terms of non-verbal ability, behaviour or emotional problems, hearing or neurological impairments may experience difficulties in school achievement or social, emotional or behaviour problems that persist to adolescence and beyond. Children with PLI that persists to school age provide a stable basis for determining the relative effectiveness of modes of speech and language therapy and their cost-effectiveness.

Objectives

This trial aimed to address the following research questions.

- How do direct individual therapy [speech and language therapist (SLT) working individually with a child], indirect individual therapy [speech and language therapy assistant (SLTA) working individually with a child], direct group therapy (SLT working with a small group of children) and indirect group therapy (SLTA working with a small group of children) compare with regard to the language outcomes for primary school-age children with persistent primary receptive and/or expressive language impairment relative to a comparison group receiving current models and levels of SLT service?
- What is the evidence for long-term benefits for such children from their therapy at 12 months' follow-up?
- How do the four intervention approaches compare in terms of cost?

Methods

Design

This randomised controlled trial had a 2 × 2 factorial design (direct/indirect versus individual/group therapy) together with a control group that received existing levels of community-based speech and language therapy and served as a comparator for the economic analysis. All postintervention language outcome measures were blind assessed. A short-run economic evaluation across the four different modes of therapy was carried out using the primary outcome measure. A comparable method was used for estimating the costs of providing services in the community for children allocated to the control group.

Setting

Research intervention took place in school settings, with some of the children randomised to group therapies transported to join a group in a different school.

Participants

Participants were identified by community speech and language therapy services in Glasgow, Edinburgh and the Lothians. They were initially assessed by members of the project team and thereafter by SLTs blind to intervention mode. Children met the following eligibility requirements:

- age between 6 and 11 years
- attending a mainstream school
- standard scores on the Clinical Evaluation of Language Fundamentals (CELF-3^{UK}) of less than –1.25 SD (receptive and/or expressive) and non-verbal IQ on the Wechsler Abbreviated Scale of Intelligence (WASI) greater than 75, and no reported hearing loss, no moderate/severe articulation/phonology/dysfluency problems or otherwise requiring individual SLT work
- informed, written parental consent.

Intervention

A therapy manual was constructed that provided a range of procedures and activities for intervention in areas identified by a search of the research and professional literature for examples of language therapies of proven effectiveness. SLTs planned activities for children seen by therapists and SLTAs, using the manual.

Main outcome measures

Primary outcome measures of the study were standardised scores on tests of expressive and receptive language. Secondary outcome measures were scores on a test of receptive vocabulary, together with questionnaire, rating scale and focus

group data from parents, teachers, project SLTs and SLTAs, and an audit of therapy sessions.

Results

There was no evidence that the five modes involved in the project were different at the onset in terms of primary outcome measures, although there were significant gender differences. The results from both the intention-to-treat analyses of the outcomes from the 161 children randomised who met the eligibility criteria and the protocol analyses of the outcomes from the 152 children for whom postbaseline data were available revealed that there were no significant postintervention differences between direct and indirect modes of therapy on the one hand, or between individual and group modes on the other on any of the primary language outcome measures, after adjustment for the effects of severity of language impairment at pretest. However, there was evidence of some benefits from direct therapy from an SLT in secondary outcome measures. Parents and teachers were positive about the children's progress and their experience of the project. All four intervention modes were acceptable to parents and schools.

Intervention delivered three times a week for 30–40 minutes over a 15-week period also yielded significant improvements in age-corrected standardised scores for expressive language, although not for receptive language, relative to those receiving community-based SLT services. Children with specific expressive language delay were more likely to show improvement than those with mixed receptive–expressive difficulties, and non-verbal IQ was not a significant moderating variable.

The within-trial economic evaluation identified indirect therapy, particularly indirect group therapy, as the least costly of the modes investigated in the study, with direct individual therapy as the most costly option. This is unsurprising given the differences in the ratio of trained professional staff to children and in the cost of labour between different staff grades. However, these cost differences should not be overinterpreted as these estimates were based on the pattern of resource use inherent in the trial design with allowance for how the different modes of therapy could be delivered in practical settings.

Conclusions

Implications for healthcare

Well-trained, well-supported and well-motivated SLTAs can act as effective surrogates for SLTs in the delivery of services within primary schools to children with PLI who do not to require the specialist skills of an SLT. Generalising the central estimates of the relative cost of different therapy modes to other educational/health systems is possible, but the precise differences reported in resource use need to be qualified by the level of programme intensity and other characteristic features of education and therapy services that may differ from those observed in this trial.

Recommendations for research

- There is a need for further research into effective interventions for receptive language problems and also for investigations of the efficacy of the relationship between dose and treatment effect in both expressive and receptive language.
- There is also a need to investigate models of integrative service delivery, for example, the partnership between SLTs and schools, cluster models of delivery via integrated community schools, and the involvement of class teachers, classroom assistants and parents/carers.
- There is a need for studies to identify the characteristics of children who are most likely to succeed with indirect intervention approaches, and also to evaluate alternative methods of working with those who may benefit from different modes.
- Finally, research to refine the therapy manual would also be helpful.

Chapter 1
Introduction

Objectives

This trial aimed to address the following research questions.

- How do direct individual therapy [speech and language therapist (SLT) working individually with a child], indirect individual therapy [speech and language therapy assistant (SLTA) working individually with a child], direct group therapy (SLT working with a small group of children) and indirect group therapy (SLTA working with a small group of children) compare with regard to the language outcomes for primary school-age children with persistent primary receptive and/or expressive language impairment relative to a comparison group receiving current models and levels of SLT service?
- What is the evidence for long-term benefits for such children from their therapy at 12 months' follow-up?
- How do the four intervention approaches compare in terms of cost?

Children with primary language impairment

Speech and language delays are among the most common developmental problems of childhood, affecting some 6% of children overall,[1] although estimates of prevalence range from 1 to 15%, depending on the criteria used to define such delay, the age of the children, where the survey was carried out and the sample used.[2] While some of these children may have language delay that is secondary to conditions such as autism, hearing impairment or more general developmental disabilities, others have a primary delay that cannot be accounted for in terms of non-verbal ability, hearing impairment, behaviour or emotional problems or neurological impairments.[3,4] Children with primary language impairment (PLI) may have significant difficulties in one or more of the following areas of language:[5]

- *syntax*: the ways in which words are combined to form phrases, sentences and subclauses
- *morphology*: the rules governing the combination of the smallest units of language, such as word endings and inflections
- *phonology*: the organisation of sounds and the rules regulating that usage
- *semantics*: the meanings of words both in isolation and in subsets and combinations
- *pragmatics*: those aspects of meaning controlled by the ways in which language is used in relation to the perspectives of a speaker and listener.

Children with PLI thus form a heterogeneous group,[6] and there is little agreement on the aetiology of the condition, with support for a wide range of underlying mechanisms, such as specific deficits in grammatical structure,[7–9] in phonological working memory,[10–13] and in perceptual processing,[3,14–19] or more general processing limitations, such as overall speed of processing,[20,21] or in the capacity of working memory.[22,23] However, there is widespread agreement on multiple risk factors such as chronic otitis media, genetic factors, socio-economic status and oral–motor difficulties, which may act in a cumulative fashion to increase the probability of its likelihood and severity.[24,25]

Studies indicate that language impairment may have adverse effects on school achievement[26–32] or be associated with social, emotional or behaviour problems.[33–39] These problems may be more pronounced for children with secondary impairments.[40,41] Bishop and Edmundson[40] found that of their overall sample of 88 language impaired children only 11% who had secondary language impairment had positive academic outcomes a year later while, in contrast, 44% with specific language delay were functioning well a year later. Children with PLI can also have long-term difficulties which persist to adolescence and beyond,[42,43] with some 30–60% experiencing continuing problems in reading and spelling. Findings from a recent study carried out in the UK, which followed up 71 of Bishop and Edmundson's language-impaired preschoolers to adolescence,[42] reveal that the children whose preschool language problems had resolved by school entry did not differ in the main from controls on tests of vocabulary or language comprehension at 15–16 years of age (and thus could not be regarded

as being language impaired in terms of spoken language), although they performed significantly more poorly than the controls on tests of literacy and phonological processing. However, the children with unresolved specific language impairment at school entry had ongoing and significant problems in both spoken and written language. Children with difficulties extending across receptive language appear to be at particular risk of persistent problems,[1,40,44,45] with reduced remission rates of only 20–30%. Appendix 1 provides case descriptions for specific expressive PLI and for mixed receptive–expressive PLI to illustrate the nature of the presenting problems.

However, despite the relative stability of language problems in the school years, primary speech and language impairment is characterised by high rates of spontaneous remission in the preschool years,[44–48] with average remission rates of around 50–60% for children aged between 2 and 3 years with expressive language delay.[1] Age is a particularly strong predictor of progress, for if specific language problems resolve by $5\frac{1}{2}$ years then subsequent literacy problems and persistent oral language difficulties are unlikely, but if the problems persist to $5\frac{1}{2}$ years then problems in reading comprehension are highly probable.[28]

It is clear, therefore, that the uncertain case status of preschool children with PLI poses problems for cost–benefit analyses of the effects of language impairment and the outcomes of treatment.[49] In contrast, children of school age with PLI constitute a population with more persistent problems and clearer case status, which can provide a more stable estimate of what the long-term costs of PLI are likely to be.

The context for intervention

Many school-age children with language impairments are enrolled in mainstream schools, in line with principles of social inclusion[50] and policy guidance.[51,52] Best practice models involve their language needs being met by collaborative work between education staff and SLTs.[53–55] There is recognition that many opportunities arise within the classroom to develop children's language skills in an appropriate social setting, particularly as the school curriculum aims to foster talking and listening skills, and allows generalisation of learning.

Direct and indirect modes of therapy are used in mainstream settings. Some aspects of language difficulty such as phonological disorder and dysfluency receive direct SLT intervention when no other individual has the necessary technical skills to provide appropriate therapy, but other aspects of language may be worked on by less specialist personnel. SLT services are encouraged to explore skill-mix and to work through classroom staff and/or SLTAs.[54] Despite commitment to the principles of mainstream education, the SLT profession recognises strains on the resources and organisation of SLT services in delivering services to children in geographically distant mainstream schools.[56]

Group modes of service delivery are affected by the number of children with PLI in individual mainstream schools and there have been moves to group schools into 'clusters' for the purpose of SLT service delivery, to share SLT (and other) resources[57,58] and to allow group therapy. Marvin reviews potential benefits of groups, including increased opportunities for social exchange, increased peer support with resulting increased self-esteem, and the prevention of overdependence on adults.[59]

The policy context

SLTs in the UK are largely employed as allied health professionals within the NHS, with SLT listed as a 'shortage occupation',[60] with an acute shortage of suitably qualified and skilled workers in the UK resident population. SLTs' fitness to practise is regulated by the Health Professions Council (HPC), and their work within schools therefore crosses public sectors. Services aim to integrate delivery in the belief that children's needs can best be met by planned, cross-professional approaches rather than independent initiatives. This is endorsed by the SLT professional body, the Royal College of Speech and Language Therapists (RCSLT), which states that SLT services in mainstream schools aim to "provide speech and language therapy assessment and intervention for children with speech and language difficulties as an integral part of their school life, ensuring that speech and language therapy input is part of a total programme for a child".[54]

Government policy similarly stresses service integration, and also capacity improvement. In England and Wales the Health Act 1999[61] set up a 'duty of partnership' among public services, with integration further stressed in the green paper 'Every child matters',[62] currently being implemented in England (and with some

alterations in Wales[63]). This paper lists improvement of SLT service to children as a specific aim, as despite increasing SLT training places by 31% between 1998/99 and 2002/03,[64] capacity constraints remain, leading to long waits for some children in accessing service. Increased investment in children's services is to be used to build capacity in specialist interventions such as SLT[65] and one mechanism is via training paraprofessionals.[66] Subsequent policy[67] further develops the theme of local partnerships and integrated provision for children, encouraging primary care trusts (PCTs) to work in partnership with local authorities to create joint commissioning children's trusts, specifically recommending that PCTs assess provisioning and resourcing of child health services, including speech and language therapy.[68]

In Northern Ireland a review undertaken by the Commissioner for Children and Young People[69] in response to complaints about lack of provision and long waiting lists found 186.71 whole-time equivalent (WTE) SLTs working with children and young people,[69] supported by 24.95 WTE assistants,[69] and overall capacity problems were raised.

In Scotland, work specifically considering SLT work in schools[70,71] has been subsumed within policies of interagency collaboration,[72,73] and policy on the education of children with additional learning needs[74] (including language learning difficulties) directs education authorities to request help from 'appropriate agencies' including SLT services to carry out educational functions.[74] It suggests that an SLT might become the named professional coordinating and managing a child's statutory coordinated support plan.[75] A review of SLT service provision for children[76] undertaken in 2002 (with some data missing) found that 520.84 WTE SLTs worked with the child population of Scotland, including preschool children, supported by 68.6 WTE SLT support workers, giving a range of 7.42–14.13 SLTs per 100,000 mainland population.

Modes of service delivery in schools

Large-scale studies of SLT services in schools have been carried out in Scotland[71] and England and Wales[58,77] commenting upon modes of delivery. Reid and colleagues[78] noted that SLTs in mainstream primary schools in Scotland reported a range of collaborative practices, with 95% working indirectly at times to achieve therapy goals, including work with school staff, parents and others. This was in addition to much direct face-to-face work with children withdrawn from the classroom: 98% of children received some or all of their therapy in this way. Typical caseloads were around 60, with 90% having caseloads of between 22 and 127 children. A recent survey of five SLT managers covering services in west and central Scotland[79] asked specifically about mode of delivery to children with PLI who met the entry criteria for the present study. All five services offered three modes: direct individual, direct group and indirect individual via education staff. Four services also offered indirect group therapy via education staff: no information was sought about the use of SLT assistants. Decisions on delivery mode were based in three services on individual child and SLT factors, a fourth integrated targets into a child's individual education plan (IEP), and the fifth reported limited consistency of approach. It is known that children in the project cities of Glasgow and Edinburgh may also receive indirect therapy.

In England and Wales a joint Department of Health/Department for Education and Employment (now Skills) working group[58] was convened to advise on the principles of SLT service planning and delivery to schools, supported by a research study into existing SLT provision[58] and a study of provision for children with specific language impairment (SLI).[77] Law and colleagues found that 57% of SLT services responding managed over half their caseloads in educational settings and undertook much indirect work via class teachers and assistants, either SLT assistants funded through the health service, or classroom and special needs assistants funded through education.[80] SLTs adopted a 'consultant' model with non-professional assistants, transferring enough knowledge to allow them to deliver therapy tasks. Indirect work was in part a response to high demands for service:[58] Lindsay and colleagues, who found similar practices, questioned whether consultation approaches had become the method of choice for professional or pragmatic reasons.[81] Law and colleagues reported a consensus figure of around 40 children as a desirable caseload for an SLT working in schools, but most SLTs were handling much larger numbers.[82] There was also acceptance that the pool of SLTs available for work across the UK was too small.[83]

SLT assistants

One specific indirect mode in schools involves delivery by SLT assistants, employed by NHS trusts. The term 'assistant' is used by RCSLT to cover all support workers who do not hold SLT professional qualifications and who work under

the direction of a qualified clinician.[84] RCSLT has developed frameworks detailing the roles of assistants[85] and standards to assist local services in their training and employment. These clarify the working relationship between SLT and SLTA as:

> "The qualified SLT holds the ethical and legal 'Duty of Care' for the patient/client and consequently for the standard of duties delegated to a support practitioner. All clinical decisions concerning the client are therefore the responsibility of the qualified SLT, including client selection for therapy, admission to the caseload and discharge from the service. An SLT must always be responsible for the work undertaken by an SLT support practitioner".[86]

Several educational programmes at further education level are being developed for support workers across the UK,[87] but no statutory qualification exists. Regulation of SLTAs along with other healthcare workers is being considered and consultation has been completed on the topic.[88,89] No formal outcome has been issued in England and Wales, and a short-life working group is meeting in Scotland to consider the issues further. Overall numbers of SLT support staff, including assistants, increased in England from 288 WTE in 1995 to 438 in 2002,[90] and NHS policy is committed to a health workforce where support staff extend their skills to undertake work previously carried out by regulated professionals.[91,92] Further increases in the ratio of SLT assistants to SLTAs are anticipated across the UK.

The focus on indirect work

Within the UK, therefore, two strands converge that will tend to increase the amount of SLT work carried out indirectly for children with PLI in mainstream schools. One is the recognition that many opportunities arise within the classroom to develop children's language skills in an appropriate social setting, particularly as the school curriculum aims to foster talking and listening skills. Working indirectly through classroom staff maximises the opportunities for language learning available to children with difficulties, and allows generalisation of learning.

There is also the practical consideration that the relatively low numbers of SLTs in the UK could not deliver a direct service to the large number of children who might wish to access it, and that other modes of delivery are needed. This has led to the development of indirect work through various types of assistants, with both health and education services following this route to meet the needs of children with additional learning needs, including language learning needs. Research across the UK would suggest that indirect work through school staff, including classroom assistants, and SLTAs is now a routine matter for SLT services, although other modes are also employed.

Research evidence from intervention studies

Although children with speech and language delay currently attract most of the NHS's investment in speech and language therapy,[93] there are few controlled studies of the efficacy of treatment for this population.[20,49,94] As Pearson notes,[95] there are two central questions for purchasers with regard to the organisation and delivery of speech and language therapy services for children: Is individual therapy as effective as group therapy? Is therapy delivered by qualified SLTs more effective than that delivered by non-specialists, such as parents, SLTAs or teachers? To these, we can add a third: Is there a dose–response relationship, such that intensive therapy (e.g. two or three times a week) is more effective than weekly, or less frequent, therapy?

A systematic review co-authored by the first author of this report[49] identified no randomised controlled trial (RCT) studies which addressed the first of these questions comparing the efficacy of individual versus group therapy with regard to children with primary delay in the 0–7 years age range, although two controlled UK studies report the effectiveness of two group direct sessions per week[96] and three group indirect sessions per week[97] for the communication skills of children attending nurseries in areas of social disadvantage. The more recent systematic review carried out by Law and colleagues[94] reported three RCTs that met their inclusion criteria and compared the outcomes from individual therapy with those from group therapy. The findings revealed no differences between individual and group therapy in regard to the outcomes for articulation for 240 children aged between 8 and 12 years with mild or moderate speech difficulties in the case of the study carried out by Sommers and colleagues,[98] and no difference in the outcomes for expressive vocabulary in Wilcox's study of 20 preschool children in the age range 1–4 years.[99] Barratt and colleagues[100] compared preschool children who were randomly allocated to either an intensive individual therapy or a once-weekly session of group therapy. The results revealed that intensive

individual therapy yielded greater gains in expressive language, but there was no difference between the conditions in outcomes for receptive language over a 6-month period. However, there was no untreated control group, so it is unclear to what extent the gains reported were the result of maturation.

With regard to the 6–11 years age range, intervention studies reveal the effectiveness of both individual and group interventions, with standardised effect sizes ranging from +0.80 to +2.50 for outcomes relative to untreated controls. Wilcox and Leonard[101] found that direct, individual, clinician-administered intervention increased the production of correct question-asking forms by 12 children with specific expressive language delay. Methany and Panagos[102] in an RCT study similarly found that direct, individual programmes improved the expressive syntax and articulation of 16 language-delayed children with an average age of 6 years. Tallal and colleagues[103] also found that the comprehension of 11 language-delayed children with an average age of 7 years 5 months improved significantly in response to training using an interactive, adaptive computer program incorporating acoustically modified speech.

In the case of group-based intervention, Hyde Wright[104] reported the effectiveness of a group-based approach to teaching word-finding strategies to four pupils (average age 8 years) with marked difficulties in verbal naming and retrieval of words. Hirschman[105] has also suggested the effectiveness of group-based approaches for improving the sentence structure of children with primary delay aged between 9 and 11 years using meta-linguistic training. But a controlled study carried out in the UK by Johnson and Thomas[106] is of particular relevance to the present proposal, as it confirms the effectiveness of group-based intervention delivered by SLTAs under the direction of an SLT. This study involved 50 children in mainstream primary schools with language delay (age range 5 years 1 months to 11 years 2 months, mean 7 years 6 months), 30 in a treatment group and 20 controls receiving routine clinic-based speech and language therapy where appropriate, but no school-based therapy. The results revealed that the children in the intervention group made highly significant progress over the three school terms of the project; for example, average increases in standard scores of up to 16 on norm-referenced tests such as the Clinical Evaluation of Language Fundamentals (CELF)-R, corresponding to standardised effect sizes of +1.85). Further, direct comparisons of the outcomes for the intervention and control groups also yielded standardised effect sizes of +1.05 [95% confidence interval (CI) +0.45 to +1.65] on the Bus Story Test,[107] a test of narrative skills that has been widely used as a predictor of persistent language delay.[40]

The second question, whether direct (i.e. SLT administered) therapy is more effective than indirect therapy, was addressed in the systematic review noted above.[49] The interpretation of the outcomes for treatment of articulation/phonology and receptive language difficulties in the 0–7 years age range is problematic on account of the small number of studies involved, the small sample sizes and, in the case of articulation/phonology, a confounding of study design with the direct/indirect treatment variable for norm-referenced measures and the use of non-standard treatments. The data set for treatment of expressive language difficulties was somewhat larger, consisting of 14 studies, three of which directly compared direct and indirect treatment,[108–110] which revealed no difference in the outcomes between clinician-administered and parent-administered intervention. A meta-analysis of the criterion-referenced outcome measures for expressive language (the largest set of comparable data) yielded an overall average standardised effect size of +0.94, with no significant difference between direct (+0.85) and indirect (+1.03) treatment ($p > 0.10$), representing a considerable degree of normalisation. The results from this meta-analysis were comparable to those reported by Nye and colleagues,[111] which included outcomes from 61 studies involving children with primary delay and those with secondary impairment, and those of Law and colleagues.[94]

However, note that the median number of sessions of direct treatment required to achieve this level of outcome was around 24 sessions of between 30 and 40 minutes, over a 4–5-month period, which is somewhat more intensive than the level of treatment more routinely provided by community services in the UK.[112]

No economic analyses were provided by the authors of the studies included in the systematic review or in the additional data set of studies of children in the 6–11 years age range with primary language delay, but two US studies have examined this issue for children with 'moderate' speech disorders.[113,114] Eiserman and colleagues report a cost per service hour of US$64 for direct

treatment and $31 per hour for home-based parent training, based on 1987/88 data.[114] No comparable cost-effectiveness studies of children in the primary school age range have been carried out in the UK, although Gibbard and colleagues[115] reported on the cost-effectiveness of indirect intervention delivered by parents under the direction of SLTs for 3-year-olds with expressive language delay over a 6-month period relative to 'general care' by an NHS trust speech and language therapy service. Their results revealed that at the end of the 6 months, children receiving the parent-based intervention achieved higher scores adjusted for the effects of age and severity of impairment, although the average treatment costs incurred by the trust for this model based on eight children in a group were somewhat higher per child (£96.00 compared with £80.83 for the general care model). The authors note, however, that the costs of the parent-based model could be further reduced to £81.18 per child by increasing the numbers of parents and children attending fortnightly meetings with speech and language therapists from eight to ten.

The third question, of whether intensive therapy is more effective, has been under-researched, and the systematic review was unable to identify any controlled studies that systematically compared the effects of intensity of treatment for children with PLI in the 0–7 years age range.[49] However, Boyle and colleagues,[97] in a study of 207 children attending nurseries in areas of social disadvantage, found that three sessions per week of small group activities for 20–30 minutes per session over 12 weeks yielded significant outcomes in information-related talk relative to a historical non-treatment control group ($p < 0.05$), whereas the outcomes for two sessions per week failed to reach significance ($p > 0.1$).

In a recent RCT study of the effectiveness of speech and language therapy for young preschool children under the age of 3 years,[112] Glogowska and colleagues found advantages of therapy ($n = 71$) over a 'wait and see' control group ($n = 88$) only for auditory comprehension scores and phonology, although similar numbers of children in each of group continued to have marked clinical problems at 12 months' follow-up. However, the treated children were seen for 47 minutes once per month over an 8–9-month period, on average, which may reflect a shortfall in the intensity of treatment required for more marked progress.

As we have seen, while there is evidence within the broad range of children with language delay for the effectiveness of both individual and group approaches to therapy, there have been no direct comparisons between them. Further, although there is evidence indicating that direct and indirect approaches to therapy yield comparable outcomes for expressive language, there is a dearth of data regarding outcomes for other areas of language, most notably receptive language, and there have been no economic analyses for PLI. The intensity of intervention has not been adequately investigated and there is also a lack of follow-up studies of controlled intervention trials.

Attempts to provide purchasers with answers to these questions, particularly regarding cost-effectiveness, require a controlled trial. However, the rates of spontaneous remission in preschool children observed in the natural history studies discussed above are problematic for such a trial, as they would tend to inflate the observed effect sizes and thus overestimate the effectiveness of any treatment, particularly given follow-up intervals of around 12 months. Further, a low level of intensity of treatment may also underestimate the possible effectiveness of a given treatment, as in the case of twice-weekly sessions in the Boyle study.[97]

For these reasons, there is a need to investigate the outcomes following intervention for children aged between 6 and 11 years with PLI, where it is more likely that language delay will be persistent and less likely to resolve spontaneously.[40] Note that although there have been few studies that directly compare the outcomes of intervention for children with PLI with those for children with secondary language impairment associated with more general cognitive difficulties, those that have been conducted report similar results across the two groups.[116,117]

Chapter 2

Method

This chapter follows the revised Consolidated Standards for Reporting Trials (CONSORT) framework[118] for reporting an RCT, together with additional information recommended in the reporting of intervention studies with children with PLI.[94]

Study design

The study design was an RCT with a 2 × 2 factorial design (direct/indirect versus individual/group therapy), together with a control group who received existing levels of community-based speech and language therapy and served as a comparator for the economic analysis.

Participants

The participants in the study were children with PLI,[4] attending mainstream primary schools in either Glasgow or Edinburgh, the two sites for the trial. The eligibility criteria for inclusion in the study were that the children should be aged between 6 and 11 years; have a standard score (i.e. corrected for age) on the CELF-3^{UK} receptive and/or expressive language scales[119] of less than –1.25 standard deviation (SD); have a non-verbal intelligence quotient (IQ) on the Wechsler Abbreviated Scale of Intelligence (WASI)[120] of greater than 75; and have no reported hearing loss, no moderate/severe articulation/phonology/dysfluency problems or otherwise require specialist SLT skills. Informed, written parental consent was also a requirement for inclusion.

Studies of children with primary language delay reveal that these children cannot be regarded as comprising a homogeneous group in terms of presenting problems.[121] Some may have co-occurring receptive and expressive language difficulties, while others may have specific expressive delays. The criteria for eligibility above thus include both mixed receptive and expressive language problems as well as more specific expressive problems and the far less common specific receptive problems.[2]

Studies using psychometric criteria for eligibility for inclusion in efficacy studies commonly use a range of cut-offs of between –2 and –1 SD,[1] reflecting underlying prevalence rates ranging from 2.28 to 15%. However, the use of highly conservative cut-off points can be problematic when applied to a mainstream school population, as many of the children with the lowest scores will be placed outside mainstream education, in special schools or language units.[122] For this reason, a cut-off of below –1.25 SD was selected; this corresponds to the bottom 10% of the population, and has received support from distinguished researchers in this field such as Tomblin and colleagues.[123]

Participants were referred to the project by local speech and language therapy services, paediatricians or local authority educational psychologists in Glasgow and Edinburgh. All of the children were known to speech and language services.

Speech and language services in Glasgow and Edinburgh

The Yorkhill NHS PCT speech and language therapy service in Glasgow receives some 2400 paediatric referrals in a 12-month period for children of all ages, and in autumn 2005 had an 'active' caseload (children seen by the service) of 810 children aged between 6 and 11 years (not all of whom had PLI). The Edinburgh and Lothians NHS trust speech and language therapy service receives around 970 paediatric referrals in a 12-month period and in autumn 2005 had a total caseload of 1270 children aged 6–11 years, not all with PLI and not all of whom were receiving intervention.

Research SLT/SLTAs

The project was staffed by five qualified SLTs and five graduate SLTAs under the supervision of the research fellow, a qualified SLT who served as the trial coordinator.

Interventions

Research intervention took place in school settings, with some of the children randomised to group therapies transported to join their group in a different school.

Intervention goals and activities

Research literature

A search of the research literature was undertaken for examples of language therapies of proven effectiveness, using search strategies based on the most recent systematic literature review available of language treatment efficacy in children up to 7 years[49] and extending the search through the age range 6–11 years. A search of the four major databases relevant to the study (MEDLINE, PsyInfo, ERIC and Linguistics and Language Behaviour Abstracts) yielded four published controlled studies of intervention, and a further unpublished research study was identified[106] giving results pertaining to indirect therapy, but no details of therapy activities.

All five studies targeted expressive language, with three using direct individual modes. Only the study by Johnson and Thomas[106] also reported outcomes for receptive language. Full details of these studies may be found in the paper by McCartney and colleagues.[135] The five studies involved a total of 139 children in the 6–11 years age group and demonstrated significant and substantial outcomes. All but two studies relied on criteria referenced rather than standardised measures. The small number of studies, their varied language targets, the small number of children involved and the lack of standardised measures indicated a severe limitation in the body of effective language therapies published, but suggested that therapy could be effective in developing aspects of syntax and vocabulary.

Professional literature

The limited amount of research literature uncovered meant that examples of effective language therapy below the highest level of evidence were sought in the professional literature. This grey literature consists of textbooks and non-indexed materials, and supplies evidence of a lesser order of validity,[125] but, given the limited amount of high-level evidence available, was accessed as reflecting existing standard practice[126] among SLTs. Therapies with detailed procedures and activities and comments on effectiveness were sought via a library search of textbooks, and relevant papers, project reports, course handouts and booklets were collected from the main organisations concerned with therapy in schools in the UK: the Association for All Speech Impaired Children (AFASIC), Invalid Children's Aid Nationwide (I-CAN), the National Association of Professionals Concerned with Language Impairment in Children (NAPLIC) and the RCSLT, and also from the American Speech, Hearing and Language Association (ASHLA) as an up-to-date overview of current therapy practice.

Case studies on vocabulary learning[127] confirmed the benefits of teaching elaboration and retrieval strategies for vocabulary development, and case work and a review[128,129] gave further information on sentence development therapies. A cohort study[130] based on the work of Dollaghan and Kaston[131] helped school pupils with language impairment to monitor their comprehension. Work on children's narrative abilities[132] developed via a pilot project in mainstream primary schools in Stockport, UK,[133] had resulted in a pack of activities and ideas from Shanks and Rippon.[134] These therapies, therefore, had empirical support for effectiveness, albeit short of controlled intervention studies, and provided details of the materials and activities carried out with children.

Published therapy materials

A considerable amount of published language therapy material is available for schoolchildren and a search of publishers' catalogues produced a range of materials freely available for reproduction that gave further insight into current therapy practice. The value of such material was informally validated in meetings with referring SLTs in Glasgow and Edinburgh, who gave their views on its usefulness.

Language therapy in the manual

The language content of the research therapy was determined using the results of these searches, and the research SLTs decided on the following main areas of language intervention.

- *Comprehension monitoring*: adapted from the work of Johnson[130] and designed to help children to identify speaker and listener aspects of successful comprehension, and to seek clarification when they did not understand.
- *Vocabulary development*: comprehending, learning and using words relating to concepts relevant in schools, and teaching children self-cueing

strategies to help them to retrieve new vocabulary items. Following research findings,[104,127] the approach included reflecting on phonological and semantic aspects of target words and using memory and rehearsal techniques. Vocabulary from the maths and literacy curriculum, school topic vocabulary and words relating to concepts, questions and directions were used to focus word learning, but the emphasis was on child self-reflection and the development of independent strategies for learning words.
- *Grammar*: teaching age-appropriate understanding and use of grammar. A list of grammar markers was collated, to be taught in salient contexts following the work of Fey and Proctor–Williams.[128] Bryan's work on 'colourful semantics'[129] was adapted to provide activities highlighting the relationships that underlie syntactic structures.
- *Narrative therapy*: teaching comprehension and use of narrative, based on the work of Shanks and Rippon using materials from their activities pack.[134]

A straightforward therapy manual[135] explaining and interpreting these areas was written to be intelligible to the research SLT assistants, cross-referred to sources, with a list of suitable published materials and activities included for each language area.[135] Examples of the material in the manual are shown in Appendix 2.

Descriptions of interventions: the therapy process

Recruitment of SLTAs

Non-verbal IQ measures were undertaken by the research team, including SLTAs, under the supervision of the research psychologist. Because the test publisher required non-qualified staff who collect data for IQ assessments to have a degree in psychology, SLTAs were recruited who met this criterion. They also had experience of working with children: one as a qualified nursery nurse, three as classroom assistants, and one as an unqualified teacher and pupil counsellor for children with behavioural problems in a European country. Before starting intervention they undertook in-service training provided by the research team and ELKLAN training[136] (a recognised 2-day training course for SLTAs), observed local SLTAs at work and were trained to carry out assessments. As intervention began they were introduced to the therapy manual[135] and given a copy to use throughout.

Developing therapy protocols

The care aim was habilitative. The children's language impairments were broadly specified by the eligibility criteria but specific language needs were predicted to vary, and language therapy had to be sufficiently flexible to adapt to each child's needs while being specified sufficiently carefully to provide comparable child experiences, and to allow future research replication. The competing requirements of flexibility and replicability were tackled by the research SLTs spending the first months of the project writing a therapy manual[137] to specify rules and procedures to be followed, and decision-making criteria to guide practice. It offered opportunity for modification and elaboration within the overall package, and placed relatively few constraints on SLT/As while allowing an overall similarity of approach. Further details of the process of constructing therapy protocols may be found in the paper by McCartney and colleagues.[135]

The dimensions used to specify intervention followed the four components identified by Carroll.[138]

1. *Structural* aspects of treatment, in terms of the frequency and duration of sessions, here prescribed by the research design.
2. *Boundaries* of treatment, specifying what intervention is expected to occur, and what would be discouraged. These were again set by the project design, with intervention focused on language therapy and limits resulting from the use of assistants. Children were excluded from the project if their primary type of communication difficulty suggested that they could not reasonably be randomised to work with an assistant, and there could be no research intervention that required specialist SLT skills. This precluded work on phonology, dysphagia, dysfluency, alternative/augmentative communication, pragmatics and other complex aspects of communication pathology.
3. *Goals* of therapy and the *processes* used to reach them. The overall goal was language gain, with specific goals and language targets for each child. Assessment information gained on entry to the project was used to suggest intervention targets, and the literature searches outlined above gave details of the therapy processes to be used.
4. *Active ingredients* or unique features of interventions through which effects are expected to occur. There are benefits to identifying 'active ingredients' in complex interventions in order to distinguish essential

elements from those unrelated to treatment effects, but the paucity of high-quality literature available as in the present study means that theoretical principles, modelling and qualitative research may be needed to identify them.[139]

The principal decisions taken in developing the manual were therefore concerned with components 4 and 5, determining the areas and activities of therapy, and deciding on and listing 'active ingredients'.

Deciding amongst language goals

The assessments undertaken on admission to the study were CELF-3^{UK},[140] British Picture Vocabulary Scale (BPVS) II,[141] and CELF parental and (where possible) teacher observational rating scales.[142] A criterion was chosen of a relevant CELF subtest score at 6 or below as giving evidence of eligibility for an intervention area. Thus, eligibility for comprehension monitoring was assessed as any CELF receptive subtest score at 6 or below or a standard score of 80 or below on BPVS II (i.e. the 10th centile). Any CELF expressive subtest score at 6 or below gave evidence of potential eligibility for vocabulary development. In addition, note was taken of any pre-existing IEP or SLT targets in relevant areas, parental and teacher comments on the CELF questionnaires, the optional CELF rapid automatic naming subtest and CELF item analyses.

An informal narrative sample (personal recount and fictional story) was tape-recorded at assessment, to give information on functional communication and allow a syntactic error analysis[143] to be made. This was backed up by observations of grammar errors in free speech, and indicated potential eligibility for grammar therapy. An episode analysis of the narrative sample could be undertaken to determine needs for intervention in that area. A BSc Honours student project[144] compared linguistic information obtained from the narrative sample to that obtained on the CELF-3^{UK} for the first 16 children (13 boys, three girls) for whom assessment results were available and showed that the narrative samples provided information on grammatical errors that was not supplied by the CELF-3^{UK} and which was relevant in planning intervention.

Where a child had more than one eligible language area (as was common), a sequence was suggested, as follows.

- It was assumed that comprehension monitoring was a fundamental coping strategy, important for classroom success, and so this would be the first area of therapy for the majority of children. It would also serve as an 'ice-breaker' in getting to know project children.
- Vocabulary development grows throughout the primary school years, and most language-impaired children require strategies for learning and retrieving new words. It was considered that vocabulary development would be important for most children, and would be undertaken just after comprehension monitoring. Its importance relative to grammar would vary from child to child.
- Spoken grammar errors were developmentally inappropriate, were noticeable and might serve to particularise a child, and were unlikely to be dealt with other than by grammar therapy. Grammar would normally be a priority for children showing marked difficulties, to be worked on in parallel with or instead of vocabulary development.
- Narrative development depends partly on the use of relevant vocabulary and grammar, and is also tackled to some extent in the Scottish literacy curriculum. It was expected that narrative would be tackled when grammar was sufficiently well developed, and for many children word-knowledge would take precedence.

The manual was therefore indicative but not prescriptive about sequences of intervention. It was also recognised that factors other than assessment results could influence decisions: child factors such as concentration and motivation, and existing therapy targets, parent or school priorities, and perhaps individual SLT preferences. For children in groups common therapy aims would be sought. Detailed target setting within therapy areas was therefore decided on by SLTs for each child at the start of the intervention period, and reviewed as progress was made. 'Probes' consisting of short unaided language tasks that could be carried out by an SLT or SLTA were written into the manual to help to monitor children's progress towards therapy targets.

Determining 'active ingredients'

The therapy team discussed 'active ingredients', using brainstorming techniques and consulting recent UK models of the therapeutic process. These stress the creation of a facilitating

environment with respect for the child where the communication context is suitably adapted. This 'artistry' aspect of intervention is variously described as the philosophy level of therapy,[145] as characteristic of an effective and empathic practitioner[146] and as an aspect of emotional literacy.[147] Discussion resulted in the consensus that for therapy to work it should develop a child's ability to reflect on language, provide information on appropriate language formulations and encourage the child to take responsibility for change. Therapy would therefore involve:

- the formation of a strong therapeutic alliance between the SLT/A and child, focused on the alleviation of communication problems
- encouragement of child self-reflection and self-monitoring
- repeated exemplification and practice of language features in a motivating context.

These active ingredients were developed into 'golden rules' to guide the implementation of therapy activities, and a set of suggestions for setting up a 'communication-friendly' classroom to be given to class teachers. The golden rules contained guidance on explaining tasks, setting up 'fun' therapy, giving systematic feedback, helping child comprehension and using appropriate adult language levels and question forms. Specific techniques to re-enforce child talk and self-reflection were listed. Advice for teachers on creating a communication-friendly classroom involved adapting and extending guidance issued by the Scottish Office Education and Industry Department,[148] supplemented with suggestions and specific ideas to meet the needs of individual children.

A draft version of the manual was sent out to consultants in the SLT and primary teaching fields for comment, and adopted for the research intervention with minor additions and amendments.

Objectives

The objectives of the study were to determine the relative effectiveness of the four modes of therapy and also to determine their cost-effectiveness. On the basis of the existing research literature,[49,94] it was hypothesised that there would be no difference between the direct and indirect modes, and that there would be short-term benefits of intervention relative to the control group which would be unlikely to be sustained over time in the absence of ongoing intensive therapy. In the absence of relevant data from the literature, no specific hypotheses were made regarding individual versus group modes.

Outcome measures

Primary outcome measure

Standardised scores on the CELF-3^{UK} (receptive, expressive and total) are the primary outcome measure of the study. The CELF-3^{UK} was selected because of:

- its up-to-date UK standardisation (2000)
- its attractiveness to children in the 6–11 years age range
- its high levels of reliability and sensitivity (reliability coefficients ranging from 0.85 to 0.95 and standard errors of measurement ranging from 0.70 to 1.15)
- the receptive language and expressive language subscores and total scores, which are appropriate not only for evaluating individual progress but also for measuring between-group differences.[149,150]

Secondary outcome measures

Secondary outcome measures consisted of:

- standardised scores on the BPVS II, a norm-referenced test of receptive vocabulary
- questionnaires for parents and teachers, piloted with parents and teachers not otherwise involved with the study, to identify issues of concern to parents and also criteria for acceptability of intervention and satisfaction with outcomes
- qualitative data from a focus groups of parents and teachers regarding the process of intervention
- a questionnaire for project SLTs and SLTAs reporting on contact with schools and families
- parental and teacher observational rating scales linked to the CELF-3
- a binary outcome measure: showed progress postintervention/did not show progress postintervention
- outcomes of aims from therapy plans/details of therapy sessions
- Enderby's Therapy Outcome Measures (TOM),[151] selected to provide standardised information about change of case status.

As not all participating children had IEPs, these could not be used as a secondary outcome measure as envisaged in the original proposal.

Further details about the instruments used may be found in Appendix 3.

Sample size

Based on a conservative effect size of +0.80, power of 0.80 and two-sided tests,[152] 50 children in each group would provide sufficient power to detect a main treatment effect size of $d = +0.40$, the difference between direct and indirect intervention observed in the meta-analysis[49] if pooled across the group and individual therapy conditions, and a 2×2 interaction effect of $d = +0.50$. The target sample size for the study was thus 250 children (50 in each condition), comprising 150 from Glasgow and 100 from Edinburgh, with half of the children to be treated in a 19-week intervention period (excluding school holidays) from 27 August 2001 to 28 January 2002 (phase I), and the remainder from 4 February 2002 to 27 June 2002 (phase II).

Approval by education departments

The study was approved by the directorate of the education departments in Glasgow and Edinburgh.

Ethics

Ethical approval for the study was provided by the Lothian Health Board Paediatrics/Reproductive Medicine Research Ethics Sub-Committee, the NHS Greater Glasgow Health Board Yorkhill NHS Trust Research Ethics Committee and the Department of Psychology, University of Strathclyde Ethics Committee. The project Data Monitoring and Ethics Committee, chaired by Professor Robin Prescott, University of Edinburgh, also monitored the progress of the study.

Randomisation

Eligible children were randomly allocated to one of the five conditions of the study, stratified by city, Glasgow or Edinburgh.

Sequence generation, allocation concealment and implementation

The project statistical consultant used random numbers to generate random sequences of 1–5 corresponding to the five conditions of the project, stratified by city. These were placed in sealed envelopes which were numbered in sequence by the trial coordinator. Each sealed envelope was opened in this sequence by the project secretary once parental consent for an eligible child had been obtained. The child was then allocated to the condition indicated by the number inside the envelope.

Blinding

All preintervention assessments were carried out by project SLTs or SLTAs before randomisation to one of the conditions in the study. All postintervention assessments were carried out by qualified SLTs who were not otherwise involved with the study and were blind to the children's therapy allocation.

Statistical methods

Preintervention and postintervention and follow-up scores on the primary and secondary outcome measures for the direct versus indirect and group versus individual factors were analysed using analyses of covariance (ANCOVAs) with an α of 0.05, with pretest scores as a covariate to control for the effects of severity of impairment. Logistic regression was carried out on the data from the binary outcome measure and the data from the parental questionnaires were analysed qualitatively and quantitatively, using contingency table analyses. All analyses were carried out on the basis of intention to treat (ITT),[153] with additional analyses of the outcomes for the participants who completed therapy programmes, 'protocol analyses'. Subgroup analyses, comparing the outcomes for children with specific expressive language impairment with those with mixed receptive–expressive language impairment, were also planned.

Economic evaluation

The economic evaluation was based on consideration of the short-run and longer run primary language and resource consequences following different modes for therapy and comparison with the control group receiving community SLT services. A short-run cost-effectiveness analysis was carried out using the change in total CELF-3^{UK} total language score as the outcome measure. All analyses were carried out using Stata Statistical Software, release 9

(StatCorp, 2003), and SPSS version 13. Analyses across all five therapy modes, and between the possible two-way choices were performed with appropriate statistical tests for significance where required. Inspection of the changes in primary outcomes made between baseline and postintervention assessment (T1–T2) and at 12 months follow-up (T3) was used to ascertain the feasibility and utility of undertaking the longer run analysis.

Chapter 3

Results: participant flow and compliance with the therapy manual

Recruitment

In total, 260 children were referred to the project, 145 from Glasgow and 115 from Edinburgh. Sixty-five of the parents did not return consent forms, and the remaining 195 were assessed for eligibility, as shown in *Figure 1*. Thirty-two children were excluded for the reasons given in *Figure 1* and 163 were randomised.

One child randomised to the control group and one randomised to the indirect group mode had WASI IQ scores of 75, one point too low in either case. They are excluded from further analysis, although the child in the indirect group mode continued to receive the therapy provided under duty of care. The remaining 161 children met the eligibility criteria and were subject to the ITT analysis. Of these, 152 children completed all T1–T2 assessments, and participated in their randomly allocated mode of therapy: these formed the data set for the protocol analysis.

Recruitment of eligible children was thus 64.4% of the required sample size of 250 from the power calculation. With the 130 randomised to the four treatment conditions, the observed power for a main treatment effect size of $d = +0.40$ was 0.62, and for an interaction effect of $d = +0.40$ was 0.44. A main effect of $d = +0.50$ and a 2×2 interaction effect of $d = +0.60$ could be detected with power of 0.80.

Deviations from the protocol

There was no stratification by age or gender owing to delays in the recruitment of participants. These delays also resulted in a reduction of the number of weeks over which therapy was offered to the children from the planned 19 to 15.

Planning specific intervention activities

Information on how SLTs organised the planning and delivery of therapy was obtained from formal interviews with the research SLTs, and is amplified in the recent paper by McCartney and colleagues.[124] Each research intervention child received around 20 hours of language therapy delivered three times weekly in 30–40 minute sessions in school settings over a 15-week period. The period October–February comprised phase I of the project, and the period February–June phase II, with each child seen during the course of one phase only. Individual SLTs and SLTAs saw up to nine children in each phase, except for a short period at the end of phase I, when it rose to 11 for some individuals. Time was set aside in each phase for SLTs and SLTAs to plan. In phase I four SLTs had one day per week available for SLT/A liaison, and to plan for their own and their SLTAs' caseloads. The fifth SLT had 1.5 days.

In phase II the figures were 0.5 days for four SLTs and one day for the fifth. One SLT mentioned that after-school time was also available if necessary.

All SLTs agreed at interview that this time had been adequate. One commented that when a number of new children began therapy at the same time planning time became more pressurised, but two noted that planning time was generous. All pairs used planning time to set, list and prioritise therapy targets for children; to suggest activities for each target, and to discuss whether a target had been met. Three SLTs commented on changes that took place as intervention progressed: as SLTAs became more confident and experienced, the planning time per language target was reduced and/or SLTAs made more suggestions. All SLTs also found time to plan their own therapy, although three noted some strain at busy periods as new children came into the project.

Preliminary audit

A preliminary audit of intervention areas and targets was undertaken for the first set of children entered into direct therapy around 6 weeks after the start of the intervention period, as an initial check on compliance with the manual.[135]

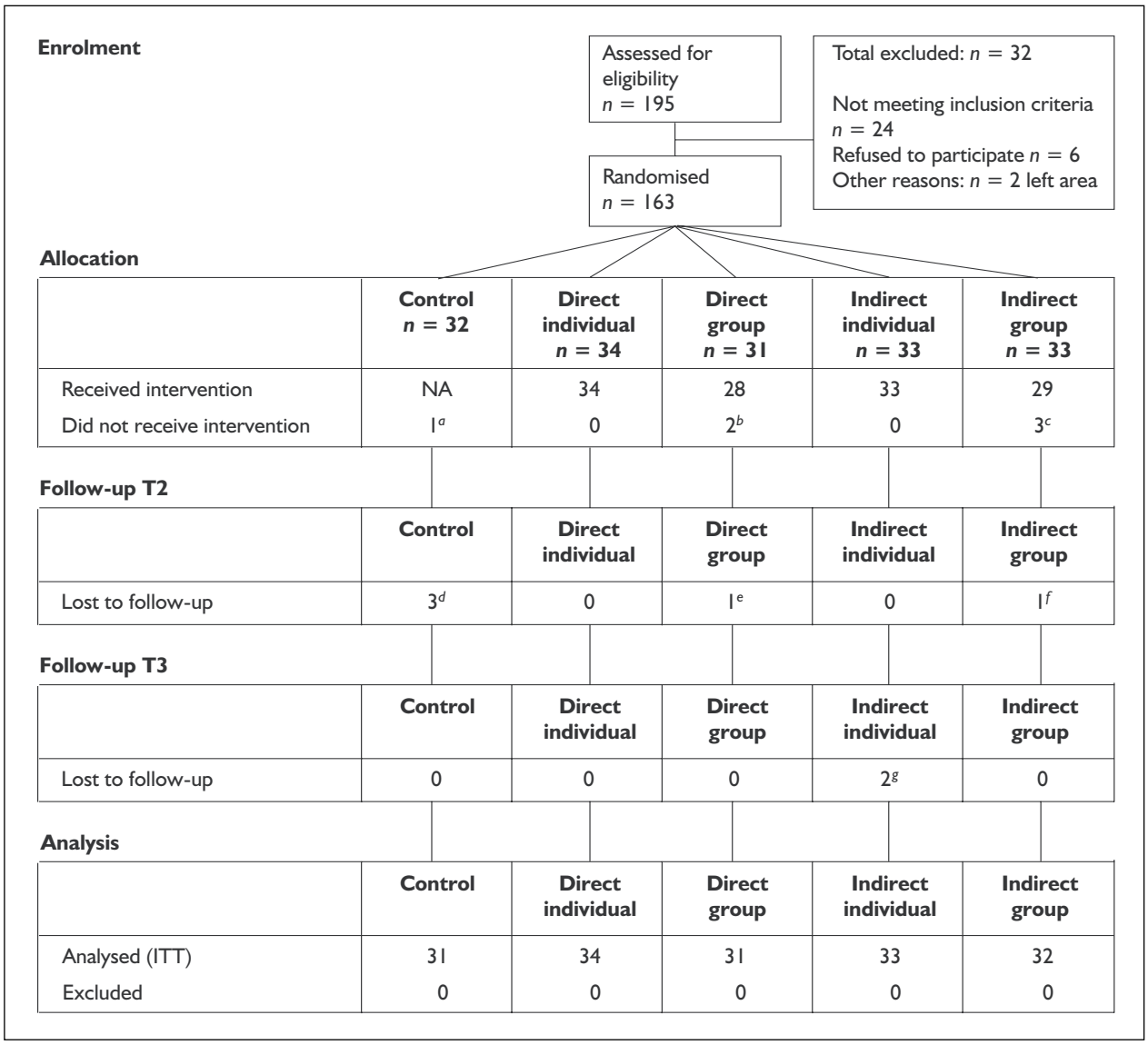

FIGURE 1 *Flow of participants through the trial. Reasons:* [a] *one child randomised with IQ = 75, one point too low;* [b] *two children could not be grouped owing to age (offered limited individual therapy as part of duty of care, but not further included in the study);* [c] *two children could not be grouped owing to age (offered limited individual therapy as part of duty of care, but not further included in the study); one child randomised with IQ = 75, one point too low;* [d] *two children were withdrawn from T2 assessments by parents and one child left the area;* [e] *one child was withdrawn from T2 assessment by parent;* [f] *one child was withdrawn from T2 assessment by parent;* [g] *two siblings were withdrawn by parent from follow-up assessments.*

At the point of audit 30 children were receiving direct therapy, having completed varying numbers of sessions depending on when they joined the project, 18 individually and 12 in groups of three to five. All met the project entry criteria, and the group had the following characteristics: 23 boys, seven girls; age range 6 years 3 months to 10 years 4 months; WASI[154] mean 90, SD 10, range 76–120; BPVS II mean 86, SD 9, range 60–108; CELF-3^{UK} receptive mean 74, SD 8, range 64–80; CELF-3^{UK} expressive mean 68, SD 5, range 64–83; CELF-3^{UK} total mean 69, SD 5, range 64–80. Four children had expressive language problems, with CELF receptive scores above the cut-off point of 81; the other 26 had mixed receptive–expressive problems.

Twenty-nine of the 30 children received comprehension monitoring as the first part of their intervention. The remaining child's SLT had also tried to begin therapy in this area, but had changed immediately as the child could not cope with the ideas presented.

Twenty-nine children were 'eligible' for comprehension monitoring on the suggested criterion of at least one CELF-3^{UK} receptive subscore of 6 or below. The remaining child was also introduced to comprehension monitoring for the first three therapy sessions despite relatively good receptive language skills, to 'break the ice'. All five research SLTs felt that comprehension monitoring provided opportunities to form good relationships with children, and to explain what therapy entailed and how 'good listening' worked. It also provided a pro-social and facilitative environment for forming relationships in groups.

Sixteen of the 18 individual children had then moved on to vocabulary development therapy; all met the eligibility criterion. One child had moved on to grammar therapy and the last to narrative. This reflects the wide range of work encompassed by vocabulary development therapy, and as anticipated a large number of children required intervention in this area.

Research SLTs were also thinking ahead and planning future areas of work. Fourteen of the 18 individual children had outline plans to complete therapy in three of the four areas in total, three children for two areas and one child for all four areas.

SLTs had also constructed group aims from the manual. All three groups had completed comprehension monitoring and were working on vocabulary, differentiating tasks for children, and two were planning to move on to aspects of grammar. Thus, two groups were planning to work on three major therapy areas, and one group within two. In groups pragmatic aspects of language may assume importance, and one child was receiving additional reminders about turn-taking skills that were not specifically addressed in the manual. Otherwise, for the 30 children audited, SLTs had been able to select language areas, set targets and select activities from the manual, and were undertaking intervention that they felt met the children's therapy needs.

In designing the therapy protocol, it became clear that there was an overall lack of evidence on therapy effectiveness for this population of children, and that reliance had to be placed on the professional literature and professional opinion. However, the audit showed that the manual provided a useable guide to therapy which, when tested against the first set of children to receive direct therapy, suggested interventions, activities and materials with which research SLTs felt comfortable. Predictions about the major areas of language need had been borne out, and no substantial additions or deletions were required. It proved possible to record the therapy undertaken by each research child, and to form a sound basis for discussion among SLTs and between SLT/A pairs. Replicable therapy procedures were thus detailed, children received comparable therapy experiences and compliance with the protocol was monitored.

Compliance with the therapy manual

Case notes were written by the relevant SLT/A for each session carried out with each child throughout the intervention period. These were audited to determine the number of sessions that each child had undertaken, the content of sessions and how far SLT/As had complied with the intervention detailed in the therapy manual. Results are presented as numbers, with percentages rounded to the nearest whole number in parentheses.

The children

In total, 4727 therapy sessions took place with the 124 children receiving research intervention (*Table 1*). Some session notes were incomplete for five children receiving indirect group therapy in Edinburgh, hence the content of some sessions held with this group was not verified. The group has therefore been omitted from the content analysis.

Number of sessions per child

Children were to receive 45 sessions of therapy, scheduled three times per week for 15 weeks. Where a session could not be held because of SLT/A factors (such as illness) the project attempted to reschedule the session. Where a child did not attend it was not always possible to catch up with the sessions, although efforts were made to offer as many sessions up to the target number

TABLE 1 *Mode of therapy (n = 124)*

	Direct	Indirect	Total
Individual	34 (27%)	33 (27%)	67 (54%)
Group	28 (23%)	29 (23%)	57 (46%)
Total	62 (50%)	62 (50%)	124 (100%)

of 45 as was feasible. Variation in sessions attended is therefore mainly due to child absence from school or to the effects of school holidays in the summer term.

The mean number of sessions held per child was 38.12 (SD 5.28, range 13–45). Identical numbers of children were seen by SLTs and assistants ($n = 62$) and there was no significant difference between the number of sessions delivered by SLTs (mean 37.79, SD 5.63) and SLTAs (mean 38.45, SD 4.93).

Content analysis of sessions

A content analysis of session reports written by the SLT or SLTA who delivered the session was undertaken, categorising therapy sessions by the language areas worked on within each session. More than one area of language could be worked on in any session. Categorisation of data, as shown in *Table 2*, was directly from the SLT/A's records, and was checked for accuracy of coding by two researchers.

Language categories

The four main language intervention areas detailed in the therapy manual were used. Comprehension monitoring (CM), vocabulary development (VD), grammar (G) and narrative (N) were used to classify therapy content, with vocabulary development divided into two subcategories, personally relevant vocabulary (PRV) and common English words (CEW); and grammar was also divided into two subcategories, grammar markers (GM) and colourful sentences (CS). In addition, two categories were added: learning strategies (LS), where work took place on general language learning principles and strategies; and other (O), for activities recorded in case notes that were not included in the therapy manual. These categories were defined as follows.

- ***Comprehension monitoring (CM)***: work on any aspect of comprehension monitoring.
- ***Vocabulary development (VD)***:
  - ***personally relevant vocabulary (PRV)***: work on a target word or words personally relevant to the child, for example relating to a school topic. Common English words, such as mathematical vocabulary, were not included under this heading.
  - ***common English words (CEW)***: target words such as concept, question and relational words that appeared within the therapy manual; and common English words such as nouns, verbs, adverbs and adjectives.
- ***Grammar (G)***:
  - ***grammar markers (GM)***: therapy targets focusing on the understanding and use of grammatical markers as detailed in the therapy manual.
  - ***colourful sentences (CS)***: therapy targets focusing on the understanding and use of sentence structures using colourful sentences as detailed in the therapy manual.
- ***Narrative (N)***: therapy targets developing narrative as detailed in the therapy manual. Where the target was orientated to narrative but involved developing, for example, the use of question words to support narrative development, this was categorised under narrative. However, if specific question forms were targeted without reference to the development of narrative, this was categorised under common English words.
- ***Learning strategies (LS)***: this category comprised work during the session that specifically focused the child on the development and use of language learning strategies; for example, explaining how semantic and phonological features of words could be accessed to help word learning. Where such learning strategies were used to develop a specific target word or words they were not categorised under this heading, but in the appropriate vocabulary development category.
- ***Other (O)***: targets worked on during a session that were not included in the therapy manual and could not be otherwise classified.

Content analysis of therapy sessions

Sufficient data were available to ascertain the number of sessions containing work in the four main language areas for all 124 children, but incomplete session notes for five children in indirect group intervention in Edinburgh prevented more detailed analysis into subcategories. Subcategory analysis of session content is therefore based on the remaining 119 children, who undertook 4538 therapy sessions.

Content analysis

The number of sessions that included each subcategory was analysed for the 119 children and 4538 sessions for which complete data were

TABLE 2 *Number (%) of 124 children receiving intervention in the four main language areas, and number (%) encountering two or more main language areas*

Area of language used	Number of main areas of language used
Comprehension monitoring: 121 (97)	Two areas: 6 (5)
Vocabulary development: 124 (100)	Three areas: 68 (55)
Grammar: 114 (92)	Four areas: 50 (40)
Narrative: 57 (46)	

TABLE 3 *Total number (%) of sessions including each subcategory; and mean, SD and range of sessions undertaken by individual children for each subcategory*

Area of language		
Comprehension monitoring: 527 (12) Mean 4.43, SD 1.92, range 0–10	Personally relevant vocabulary: 49 (1) Mean 0.41, SD 1.51, range 0–11	Common English words: 2627 (58) Mean 22.08, SD 6.61, range 6–36
Grammar markers: 1395 (31) Mean 11.72, SD 8.92, range 0–33	Colourful sentences: 83 (2) Mean 0.70, SD 2.27, range 0–14	Narrative: 507 (11) Mean 4.26, SD 5.72, range 0–23
Learning strategy: 653 (14) Mean 5.49, SD 5.24, range 0–24	Other: 212 (5) Mean 1.78, SD 2.75, range 0–21	

available, as shown in *Table 3*. Sessions could contain more than one subcategory, so percentages do not total 100.

For sessions for which detailed content analysis could be completed there was no significant difference between the number of sessions delivered by an SLT (mean 37.79, SD 5.63) or an SLTA (mean 38.51, SD 5.09) ($F_{1,115} = 0.369$, $p = 0.545$), or to individuals (mean 38.04, SD 6.06) or groups (mean 38.25, SD 4.36) ($F_{1,115} = 0.033$, $p = 0.856$). Univariate analyses of variance (ANOVAs) by therapy condition were carried out to explore direct and indirect, individual and group modes as independent factors for subcategorised language areas. Significant differences were found between direct and indirect modes for CM, PRV, CEW and LS and O subcategories (all F-values > 4.23, all p-values < 0.042). There was also a significant difference between individual and group modes for the O subcategory ($F = 6.235$, $p = 0.014$). Remaining subcategories and the number of main areas of language used did not reach significance. However, the interaction between direct individual and indirect group modes in respect of CEW reached significance ($F = 11.267$, $p = 0.001$).

With regard to the main effects, significant differences were in favour of SLTs undertaking more sessions containing the language subcategory PRV ($F_{1,117} = 4.116$, $p = 0.045$) and LS ($F_{1,117} = 15.05$, $p < 0.0001$). Assistants undertook more sessions on CM, which was used as an ice-breaker at the start of therapy ($F_{1,117} = 5.256$, $p = 0.024$); and in the case of the interaction for CEW there was a difference between modes, with SLTs carrying out more sessions focusing on CEW for grouped children than SLTAs ($F_{1,50} = 27.146$, $p = 0.0001$), with no difference for individual sessions ($F_{1,65} = 0.008$, $p = 0.929$). In the case of the O subcategory, non-manual activities were used more often in the individual mode than in the group mode ($F_{1,117} = 6.338$, $p = 0.013$).

Compliance

Since there was no significant difference in the total number of sessions delivered by SLTs and SLTAs, it would appear that where individuals differed they did so by varying the number of subcategories included within a session. This is an option more readily available to experienced practitioners, who have a range of techniques available, and can change quickly if a child's response suggests an alteration of task. Within this project it would on the whole be SLTs who had such flexibility, and who could plan and respond flexibly within a session. Assistants undertook more sessions on CM that occurred at the start of a child's intervention as part of a scripted 'getting-to-know-you' period, and may have required

longer to complete this phase. SLTs carried out twice as many sessions containing consideration of general language learning strategies as assistants, suggesting a greater focus on teaching children principles of language learning to help them to become more independent. It may be that some such areas of work are harder to transfer to assistants, and that less flexibility of response is attainable with indirect therapy. The wider use of activities classified as 'other' that were not in the manual in the individual modes may in turn reflect a greater degree of flexibility inherent in one-to-one work with children, and there was no difference between the SLTs and the assistants in terms of the use of these activities ($F < 1$, $p > 0.382$). Overall, however, the differences between SLTs and SLTAs were small and the overlap great, with only a few more language categories being worked on within any session. The absence of a marked difference in outcomes between children seen by SLTs and SLTAs suggests that the differences noted are not sufficient to effect changes in language scores.

Compliance with therapy as detailed in the manual was high, with only 212 (4.67%) of the 4538 sessions for which content analysis was possible recording activities categorised as other, i.e. not appearing in the manual. This suggests that the therapy manual provided a reasonable basis on which to plan and carry out therapy activities.

All language areas detailed in the manual were used. CM was intended to be an activity that most children would undertake, to be used as an ice-breaker. This proved to be the case, with 97% of children undertaking CM for a small number of sessions. All children received some work on VD, mostly on CEW, and over 90% on aspects of grammar, mostly GM. Narrative was considered likely to be a language target undertaken if grammar and vocabulary were sufficiently developed to support the development of story-telling, as skills in these areas are needed for successful narrative output. Narrative was the language area used with fewest children (46%).

Most of the therapy undertaken was on VD, which all the children undertook, and within this on CEW, which was listed in over half of therapy sessions analysed. These words occur frequently within the language of school and are fundamental to expressing many propositions and meanings, which may account for their prominence in therapy.

Individual child factors and other unknown variables will have affected the SLT's choice of therapy targets and tasks, and the content analysis can only summate the outcome of these decisions. Record-keeping within sessions was, however, sufficiently detailed to allow analysis of content to take place, and the therapy intervention appears to have been successfully manualised.

Chapter 4

Results: primary and secondary language outcomes for T1–T3

Overview

To minimise the bias that can arise from withdrawal or dropout, primary and secondary language outcome measures from the 161 eligible participants recruited to the study were analysed by means of ITT analyses.[153] Nine children were withdrawn by their parents after randomisation, and a further two were withdrawn from the 12 months' follow-up assessment having participated in the previous two assessments, making 11 in total. The procedures used to deal with the missing data that resulted were as follows:

- Four missing T1 preintervention BPVS II scores where children failed to cooperate with the task were imputed by means of expectation maximisation (SPSS, 2002).
- Missing postintervention scores for all language outcome measures at both T2 and T3 for nine children who were withdrawn from the study (three children in the control group, three in the direct group therapy mode and three in the indirect group therapy mode) were replaced by their preintervention baseline equivalents.
- Finally, missing language outcome scores at the T3 12 months' follow-up for a further two children (twins who were both randomised to indirect individual therapy) were replaced by their T2 postintervention equivalents.

The data for 152 participants who completed the study protocol were also analysed separately. These 'protocol' analyses excluded the nine children withdrawn before the commencement of therapy and for whom postintervention language measures could not be obtained, but included those four children who received therapy whose T1 BPVS II scores were imputed and the two children who received therapy whose T3 scores were estimated.

The means and standard errors for T1–T3 for each of the language outcome measures for the 161 participants for each therapy mode for T1–T3 which formed the basis of the ITT analyses are shown in *Figures 2–4*. The means and standard deviations for the language outcome measures and

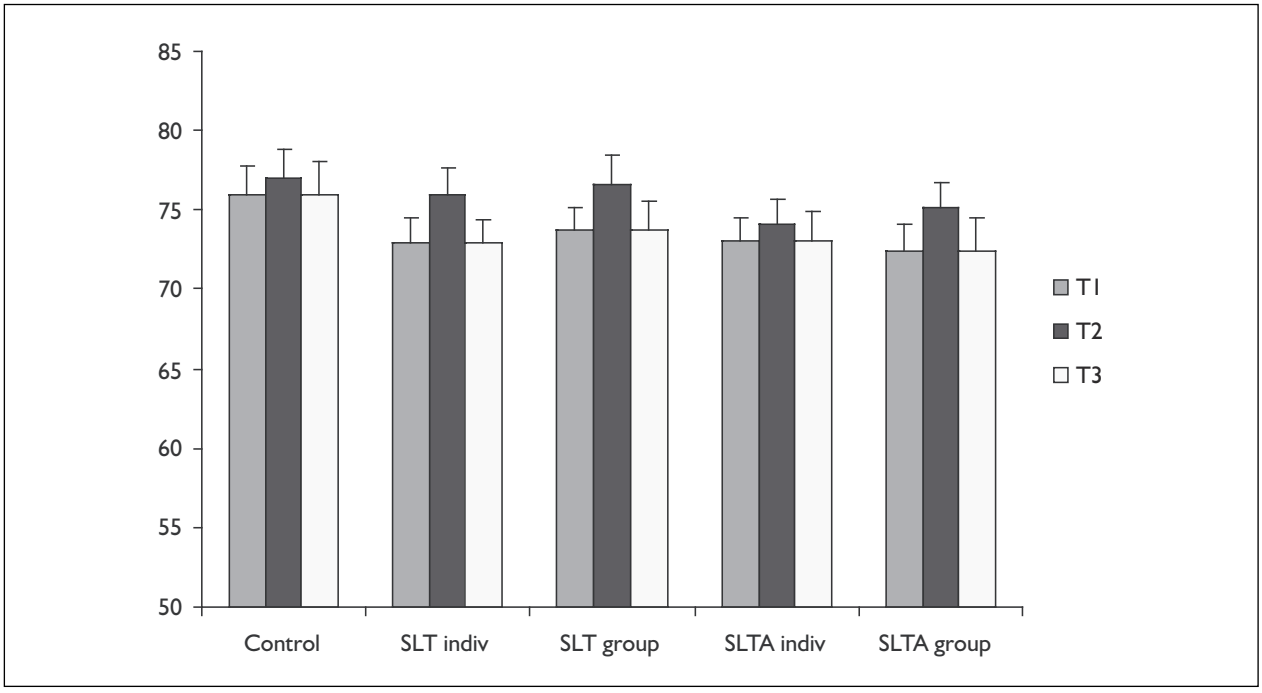

FIGURE 2 *CELF-3 receptive language scores T1–T3: means and standard errors by condition*

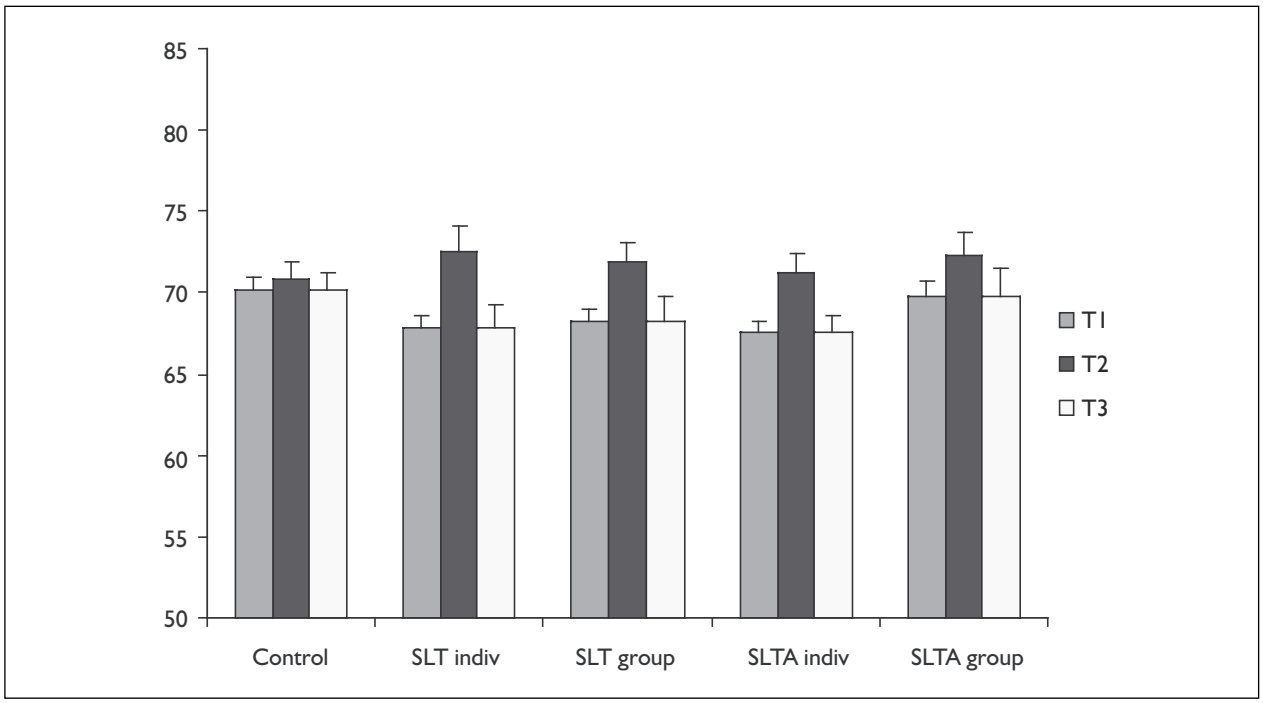

FIGURE 3 *CELF-3 expressive language scores T1–T3: means and standard errors by condition*

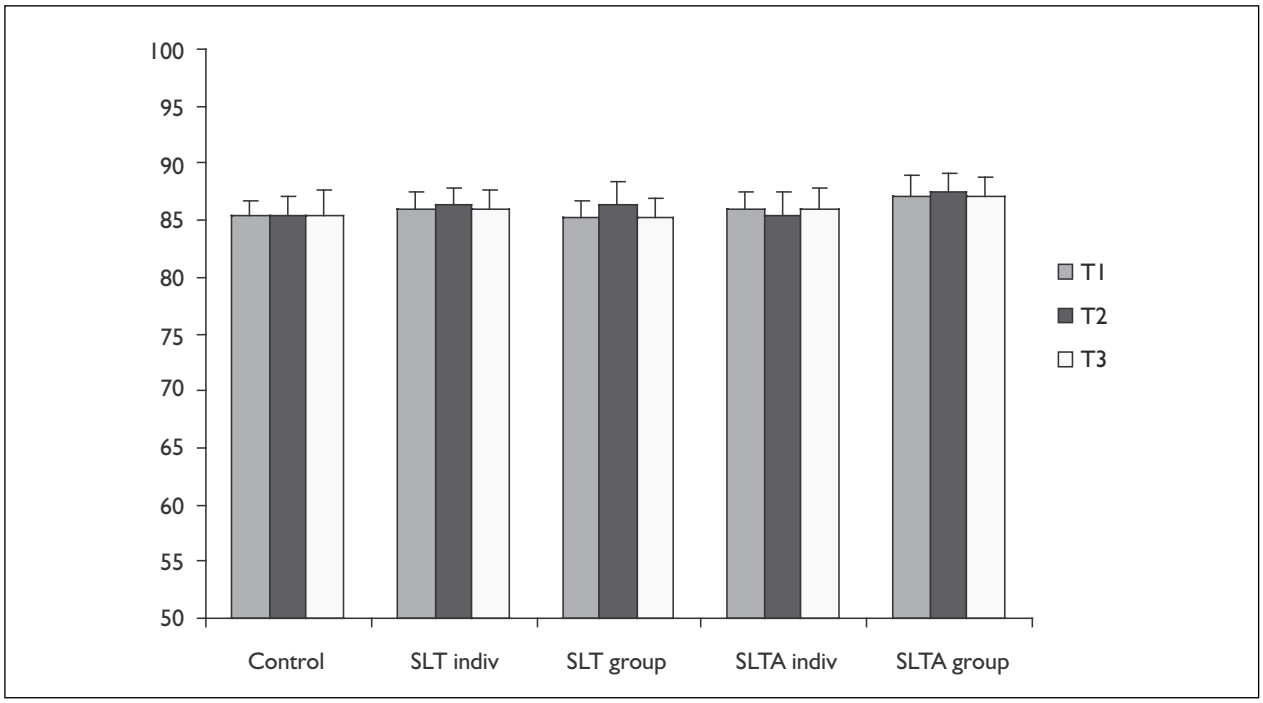

FIGURE 4 *BPVS receptive vocabulary scores T1–T3: means and standard errors by condition*

the WASI IQ scores for the 161 participants for each therapy mode for T1–T3 are shown in *Table 4*.

These data reveal that at the beginning of the study, all participants had marked problems in expressive language, with an age-corrected standard score range of 64–81 on the CELF scale.

The CELF receptive language standard scores at T1 range from 64 to 104, and explain the larger standard deviation relative to that observed in the case of the expressive language scale.

This is due to the fact that 75 of the participants had specific expressive language problems, with

TABLE 4 *Descriptive statistics for therapy modes T1–T3: ITT analysis*

	Mean baseline scores (SD) at T1					Mean post-treatment scores (SD) at T2				Mean follow-up scores (SD) at T3			
Outcome measure	**CELF rec**	**CELF exp**	**CELF tot**	**BPVS II**	**(WASI)**	**CELF rec**	**CELF exp**	**CELF tot**	**BPVS II**	**CELF rec**	**CELF exp**	**CELF tot**	**BPVS II**
Therapy mode													
Control	76.00	70.16	70.58	85.45	90.94	77.03	70.84	71.26	85.39	76.19	71.81	70.97	84.74
(*n* = 31)	(10.01)	(4.57)	(6.56)	(7.37)	(10.13)	(10.00)	(5.96)	(7.14)	(9.35)	(11.36)	(6.05)	(8.48)	(12.71)
Direct individual	72.91	67.82	68.71	86.00	89.65	75.91	72.59	72.03	86.29	75.06	71.68	70.88	86.79
(*n* = 34)	(9.64)	(4.27)	(6.05)	(7.98)	(9.45)	(10.08)	(9.01)	(9.04)	(8.78)	(8.36)	(8.80)	(7.75)	(10.11)
Direct group	73.74	68.23	68.58	85.13	90.97	76.55	71.87	72.65	86.42	76.77	74.00	73.35	84.94
(*n* = 31)	(8.10)	(4.45)	(4.88)	(9.22)	(13.12)	(10.81)	(6.45)	(8.03)	(10.75)	(9.91)	(8.50)	(8.98)	(9.49)
Indirect individual	73.09	67.55	67.70	86.00	90.24	74.15	71.24	70.15	85.48	76.64	71.36	71.21	85.18
(*n* = 33)	(8.24)	(4.05)	(5.21)	(8.56)	(12.23)	(9.03)	(6.95)	(7.38)	(10.91)	(10.65)	(6.08)	(7.61)	(10.37)
Indirect group	72.44	69.78	69.59	87.03	89.09	75.22	72.34	71.03	87.47	75.97	72.97	72.56	85.81
(*n* = 32)	(9.26)	(5.42)	(6.47)	(10.82)	(11.98)	(8.59)	(7.75)	(7.17)	(9.34)	(11.91)	(9.63)	(9.31)	(9.96)

exp, expressive language; rec, receptive language; tot, total.

TABLE 5 *Gender balance and preintervention scores across conditions*

Variable/outcome measure		Control (*n* = 31)	SLT individual (*n* = 34)	SLT group (*n* = 31)	SLTA individual (*n* = 33)	SLTA group (*n* = 32)	Significance levels
Gender	M	27	23	27	20	18	$\chi^2_{df4} = 13.20$,
	F	4	11	4	13	14	$p = 0.010$
Mean CA (months)		97.00	91.21	91.97	98.12	96.37	$F_{4,156} = 1.09$,
SD		14.83	17.34	15.46	19.40	18.09	$p = 0.365$
Range		73–127	72–126	72–135	72–135	72–137	
Mean WASI IQ		90.94	89.65	90.97	90.24	89.09	$F_{4,156} = 0.16$,
SD		10.13	9.45	13.12	12.23	11.98	$p = 0.958$
Range		76–121	76–121	76–132	76–124	77–123	
Mean BPVS SS		85.45	86.00	85.13	86.00	87.03	$F_{4,156} = 0.21$,
SD		7.37	7.98	9.22	8.56	10.82	$p = 0.932$
Range		67–98	65–108	60–106	67–102	64–112	
Mean CELF rec		76.00	72.91	73.74	73.09	72.44	$F_{4,156} = 0.75$,
SD		10.01	9.64	8.10	8.24	9.26	$p = 0.560$
Range		64–99	64–104	64–90	64–98	64–101	
Mean CELF exp		70.16	67.82	68.23	67.55	69.78	$F_{4,156} = 2.16$,
SD		4.57	4.27	4.45	4.05	5.42	$p = 0.076$
Range		64–79	64–77	64–80	64–77	64–81	
Mean CELF tot		70.58	68.71	68.58	67.70	69.59	$F_{4,156} = 1.11$,
SD		6.56	6.05	4.88	5.21	6.47	$p = 0.354$
Range		64–87	64–88	64–82	64–84	64–89	

F, female; M, male; SS, standard score.

overall functioning in receptive language above the 10th percentile for their chronological age (indexed on an equally weighted composite of the CELF receptive language scale and the BPVS II receptive vocabulary scale at T1, with a standard score of 81 or less representing a problematic level of functioning), while the remaining 86 had mixed receptive/expressive problems, with delay in both language domains. Comparisons between these two groups revealed that those with specific expressive language problems had significantly higher mean WASI standard scores (92.09 versus 88.48, $F_{1,160} = 4.17$, $p = 0.043$), and CELF expressive language scores (70.45 versus 67.14, $F_{1,160} = 23.34$, $p < 0.0001$), as well as significantly higher CELF receptive language scores (80.59 versus 67.52, $F_{1,160} = 173.16$, $p < 0.0001$) and BPVS II scores (91.80 versus 80.81, $F_{1,160} = 102.66.16$, $p < 0.0001$).

It should be noted that as the CELF scales were used to determine eligibility with a maximum standard score of 81 used as a cut-off, their score ranges are smaller than those for the WASI (76–132) and the BPVS II (60–112).

Preintervention scores across conditions

One-way ANOVAs were carried out to explore whether there were any differences between the five conditions in the study in regard to preintervention (T1) scores and age balance. Gender balance was assessed by means of χ^2 analyses. Details of these analyses are shown in *Table 5*.

There was no evidence that the five groups involved in the project at the onset were different in regard to the chronological age of the participants, their non-verbal cognitive ability scores (WASI), receptive vocabulary (BPVS II), receptive language (CELF-3^{UK} rec), expressive language (CELF-3^{UK} exp) and the CELF-3^{UK} composite total language score (CELF-3^{UK} tot) (all p-values > 0.076). However, there were significantly more boys than girls in the study ($\chi^2_{df4} = 13.20$, $p = 0.010$), reflecting the underlying gender imbalance in language impairment, which is well documented in the literature. There were no significant differences in

TABLE 6 *Details of the average number of therapy sessions provided by project/community SLT services and test–retest intervals*

	Control (*n* = 28)	Direct individual (*n* = 34)	Direct group (*n* = 28)	Indirect individual (*n* = 33)	Indirect group (*n* = 29)
T1–T2					
Mean no. sessions	8.11	37.29	38.39	38.82	38.03
SD	13.38	6.71	3.97	5.31	4.52
Range	0–59	13–45	28–44	24–45	28–45
T2–T3					
Mean no. community SLT sessions	6.15	5.00	3.52	4.21	9.14
SD	5.77	5.92	3.94	5.03	21.04
Range	0–20	0–23	0–14	0–24	0–115
T1–T2					
Test–re-test interval (completed months)	5.75	6.35	6.96	6.48	7.49
SD	1.88	1.20	2.28	1.18	1.80
Range	2–9	5–9	3–12	5–12	3–12
T2–T3					
Test–retest interval (completed months)	12.14	12	12	12.13	12.03
SD	0.36	0.25	0.47	0.34	0.33
Range	12–13	11–13	10–13	12–13	11–13

the proportions of boys to girls in the direct individual, indirect individual or indirect group therapy conditions ($\chi^2_{df2} = 0.93$, $p = 0.637$), but there were more marked gender imbalances in the case of the control condition and the direct group therapy condition, with significantly fewer girls than in the other three groups combined ($\chi^2_{df1} = 7.01$, $p = 0.008$ in both cases).

Number of therapy sessions provided T1–T3

Details of the number of therapy sessions provided to the 152 children in the protocol analysis group by the project or by community SLT services are shown in *Table 6*.

T1–T2

Over the academic year 2002/03, which covers the T1–T2 period, the 28 control group children received an average of 8.11 (SD 13.38) sessions from their community-based speech and language services. There was a significant difference between the two cities in the number of sessions offered to the children in the control group (medians of 0 and 11 for Glasgow and Edinburgh, respectively, Mann–Whitney $U = 51$, $z = -2.138$, exact $p = 0.047$, two-tailed test). Half of the children ($n = 14$) did not receive any SLT/A services over the academic year. Of the control group children who received sessions over the T1–T2 period, 11 received their sessions from SLTs only (seven in individual settings and four in mixed individual and group settings) and three received sessions from SLTs and SLTAs. Those who received sessions had an average of 16 sessions (SD 15.17, range 1–59, median 13), equivalent to some five or six sessions over the 15-week intervention period delivered by the project, reflecting an intervention mode that works with schools to support children in their classrooms. However, one child received 59 sessions, which is considerably more than any of the other children in the study.

The children receiving therapy from the project received an overall mean of 38.12 sessions (SD 5.28, range 13–45) from either an SLT or an assistant, with no significant difference between the four intervention modes in regard to the number of sessions ($F_{3,120} = 0.491$, $p = 0.689$). Of these 124 children, 14% ($n = 17$) attended fewer than 33 sessions, that is, less than 75% of the maximum number of sessions held. Only one child attended fewer than 50% of the maximum number of sessions held.

T2–T3

Over the course of the T2–T3 period, no child received therapy from the project. Overall, the 152 children in the protocol analysis received a

mean of 5.49 sessions (SD 10.53, range 0–115), from community-based speech and language services, with no significant differences between the five conditions in the number of sessions ($F_{4,147} = 1.47$, $p = 0.216$). Thirty-six of the children (five from the control group, ten from the direct individual group, nine from the direct group mode, nine from the indirect individual group and three from the indirect group mode) did not receive any therapy over the T2–T3 period. A comparison between the numbers of children receiving/not receiving sessions revealed no significant difference between the five conditions ($\chi^2_{df4} = 5.34$, $p = 0.257$).

Of the 116 children who received sessions, one child was placed in a language unit and received 115 sessions. The remaining 115 children received an average of 6.26 sessions (SD 5.34, range 1–26), with no significant differences between the five conditions in the number of sessions ($F_{4,110} = 1.02$, $p = 0.398$). Ninety-two children received sessions from an SLT, while a further 23 received their sessions from an SLT and also from an assistant. A comparison between the numbers of children receiving sessions from an SLT versus those from an SLT and an SLTA revealed no significant difference between the five conditions ($\chi^2_{df4} = 3.95$, $p = 0.413$).

Test–retest intervals

Table 6 also provides information about test–retest intervals across the five conditions. The average T1–T2 interval was 6.59 months (SD 1.76, range 2–12 months) and there were significant differences between the conditions in regard to this ($F_{4,151} = 4.15$, $p < 0.003$), the largest being 1.74 months between the control group and the indirect group mode. Bonferroni-adjusted multiple comparisons of the between-condition T1–T2 intervals revealed a consistent underlying pattern. There were no significant differences between the control group and the direct individual and indirect individual conditions (all p-values > 0.05) in test–retest interval, but the interval was significantly shorter in the case of the control group than in the direct group and indirect group conditions (all p-values < 0.05). Further, the test–retest interval for the direct individual condition was also significantly shorter than that for the indirect group mode ($p < 0.05$). However, there were no between-group differences in the T2–T3 follow-up period (overall mean 12.06 months, SD 0.35, range 10–13 months) ($F_{4,145} = 1.18$, $p = 0.322$).

Effects of direct versus indirect and individual versus group language therapy

Primary and secondary language outcome measures

The results from the CELF-3^{UK} (primary outcome measure) and the BPVS II (a secondary language outcome measure) were used to examine the differential effectiveness of the four modes of intervention, direct versus indirect, and individual versus group therapy. The outcomes ANOVAs revealed no differences between these groups in regard to the number of project therapy sessions ($F_{3,120} < 1$), but small but consistent between-group differences in the test–retest intervals ($F_{3,120}) = 2.84$, $p < 0.041$), with the retest period being 1 month longer on average in the case of the group therapy conditions.

In view of significant correlations between preintervention and postintervention scores for these outcome measures (all r-values > 0.430, all p-values < 0.0001), 2×2 ANCOVAs for each of the four language outcome measures were used to compare the four modes of project therapy. In the light of the relatively small number of participants involved, the details of the analyses reported here are based on main effects only to maximise the statistical power of the analyses, as the power of an interaction is lower than that for a main effect[152] and none of the interactions approached statistical significance (all F-values < 0.191, all p-values > 0.663). ITT analyses were carried out, based on the data from the 130 eligible children randomised to a treatment condition. In addition, protocol analyses were carried out on the data from the 124 children for whom postintervention scores were available. The independent variables in these analyses were the main effects of direct versus indirect and individual versus group modes of therapy, the dependent variable was the standardised age-corrected 'blind' assessed T2 score, and the corresponding standardised T1 score was used as a covariate. The protocol analyses also added T1–T2 test interval as a further covariate in view of the between-condition differences noted above. (Six of the children in the ITT analyses had postintervention scores imputed and hence had no associated test–retest intervals.)

The extent to which between-group differences were evident or any changes sustained at 12 months' follow-up was examined by means of 2×2 ANCOVAs with the same independent variables as above, but standardised age-corrected

'blind' assessed T3 score as the dependent variable, and the corresponding standardised T2 score as a covariate. In view of the low level of variability shown in *Table 6*, T2–T3 test interval was not used as a covariate. However, the number of community speech and language therapy sessions received by the children over the T2–T3 period was included as a covariate in the protocol analysis. The results of these analyses are summarised in *Table 7*.

All of the T1 and T2 score covariates were significantly associated with their corresponding T3 dependent variables (all F-values > 27.98, all p-values < 0.0001). However, the systematic, but small, between-group differences in T1–T2 test–retest interval and also the number of sessions of community speech and language therapy received over the T2–T3 period both failed to account for significant levels of variance (all F-values < 1.254, all p-values > 0.265 in the case of the test–retest interval, and all F-values < 3.15, all p-values > 0.078 in the case of the number of community therapy sessions).

After adjustment by covariates, the results from both the ITT and protocol analyses revealed no significant differences between direct/indirect therapy or individual/group therapy in regard to postintervention outcomes on the CELF-3^{UK} receptive language, CELF-3^{UK} expressive language or the BPVS II scores at either T2 (all F-values < 1.01, all p-values > 0.364) or T3 follow-up (all F-values < 3.00, all p-values > 0.086).

The adjusted mean outcome scores for all of the language measures at T2 favoured direct treatment by an SLT, and ranged from 0.51 in the case of the BPVS II, to 1.29 in the case of the CELF-3^{UK} receptive language scale. However, the 95% confidence intervals reveal considerable variability, ranging from 4.28 points in favour of treatment from an SLT in the case of the CELF-3^{UK} receptive language scale to 2.30 points in favour of an SLTA in the case of the BPVS II.

Similar variability was observed in the comparison between individual versus group therapy at T2, with adjusted mean differences ranging from some 0.80 points in favour of individual therapy in the case of the CELF-3^{UK} expressive language scale, to 1.56 in favour of group therapy in the case of the CELF-3^{UK} receptive language scale in the protocol analyses. This level of variability was mirrored in the 95% confidence intervals, which ranged from 3.38 points in favour of individual therapy in the case of the CELF-3^{UK} expressive language scale to 4.64 points in favour of group therapy in the case of the CELF-3^{UK} receptive language scale.

The pattern of results was again variable in the case of the adjusted T3 scores and their associated confidence intervals. The data from the CELF-3^{UK} expressive language scale and the BPVS II in both ITT and protocol analyses favoured direct treatment by an SLT, with adjusted means ranging from +0.35 to +0.50. However, the adjusted mean scores for the CELF-3^{UK} receptive language scale, ranging from 1.08 to 1.38, favoured indirect treatment. A similar pattern was observed in the case of the comparison between individual and group therapy, with the adjusted mean scores for the BPVS II of some 1.40 favouring individual therapy, while the adjusted mean scores for the CELF-3^{UK} receptive language (in the case of the protocol analysis) and the expressive language scale (in both analyses), ranging from 0.22 to 2.14, favoured group therapy. However, only the adjusted mean difference between individual and group therapy for expressive language at T3 was greater than the 1.80 standard score points required to exceed the margin for psychometric test–retest error for the measures used.[155]

In summary, the results reveal that while some of the participants made sizeable shifts in their adjusted scores at T2 and T3, these were not systematically associated with any of the specific therapy modes here. The sample size was sufficient to detect standardised effects (adjusted for the covariate) of 0.40 and 0.39 for the CELF-3^{UK} receptive language at T2 and T3 respectively, of 0.45 and 0.41 for the CELF-3^{UK} expressive language at T2 and T3, and 0.38 and 0.35 for the BPVS II, with power of 0.80. It is possible, therefore, that the failure to recruit the sample size required by the initial power calculation may have reduced the sensitivity of the analyses so that clinically important effects have not been detected. However, inspection of the standardised effect sizes (Cohen's d) and 95% confidence intervals for each of the main effects at T2 and T3, derived from a series of one-way ANCOVAs with adjustment for the corresponding covariate[156] and shown in *Table 8*, reveals that the overall effect sizes observed are small (all $\leq$+0.15 for the ITT analyses) and none exceeds the margin for test–retest error on the language measures used here. Assuming power of 0.80, some 699 participants per group would be required to detect between-group differences of this order at conventional levels of statistical significance. It is unlikely, therefore, that the sample size in the present study was sufficiently

TABLE 7 *Results from ANCOVAs of the effects of direct versus indirect and individual versus group speech and language therapy on postintervention and follow-up language scores*[a,b]

Therapy mode	Outcome measure	$F_{1,126}$	p	Adjusted mean difference[c]	95% CI for difference
ITT					
Direct vs indirect therapy	CELF-3^{UK} rec T2	0.739	0.392	+1.247	–1.62 to +4.12
	CELF-3^{UK} rec T3	0.868	0.353	–1.377	–4.30 to +1.55
	CELF-3^{UK} exp T2	0.584	0.446	+0.919	–1.46 to +3.30
	CELF-3^{UK} exp T3	0.092	0.762	+0.356	–1.96 to +2.67
	BPVS T2	0.164	0.687	+0.546	–2.13 to +3.22
	BPVS T3	0.160	0.690	+0.474	–1.87 to +2.82
Individual vs group therapy	CELF-3^{UK} rec T2	0.306	0.581	–0.803	–3.67 to +2.07
	CELF-3^{UK} rec T3	0.000	0.999	+0.001	–2.92 to +2.92
	CELF-3^{UK} exp T2	0.423	0.517	+0.789	–1.61 to +3.19
	CELF-3^{UK} exp T3	2.459	0.119	–1.837	–4.16 to +0.48
	BPVS T2	0.549	0.460	–0.999	–3.67 to +1.67
	BPVS T3	1.384	0.242	+1.396	–0.95 to +3.74
Protocol analysis		$F_{1,119}$			
Direct vs indirect therapy	CELF-3^{UK} rec T2	0.724	0.397	+1.287	–1.71 to +4.28
	CELF-3^{UK} rec T3	0.492	0.485	–1.078	–4.12 to +1.96
	CELF-3^{UK} exp T2	0.766	0.383	+1.101	–1.39 to +3.59
	CELF-3^{UK} exp T3	0.080	0.777	+0.350	–2.09 to +2.79
	BPVS T2	0.130	0.719	+0.511	–2.30 to +3.32
	BPVS T3	0.162	0.688	+0.503	–1.97 to +2.98
Individual vs group therapy	CELF-3^{UK} rec T2	1.010	0.318	–1.560	–4.64 to +1.52
	CELF-3^{UK} rec T3	0.007	0.933	–0.219	–3.17 to +2.91
	CELF-3^{UK} exp T2	0.371	0.543	+0.796	–1.79 to +3.38
	CELF-3^{UK} exp T3	3.000	0.086	–2.138	–4.58 to +0.31
	BPVS T2	0.827	0.365	–1.325	–4.21 to +1.56
	BPVS T3	1.211	0.273	+1.381	–1.10 to +3.86

[a] Results from the CELF-3^{UK} total language score, the composite of the receptive and expressive language scales, showed a similar pattern.

[b] ITT analyses incorporated the corresponding T1 measure as a covariate in the T2 analyses and the T2 measure as covariate in the T3 analyses. Protocol analyses also included T1–T2 test–retest interval as a covariate in the case of the T2 analyses, and the number of community speech and language therapy sessions in the T3 analyses.

[c] A positive value here denotes change in favour of direct or individual therapy, while a negative value indicates change in favour of indirect or group therapy.

low as to reduce the statistical power of the T1–T2 and T2–T3 analyses to the level where clinically significant effects[157] have been masked.

Analysis of treatment outcomes for children in therapy conditions relative to the control group

A series of analyses was carried out on the preintervention and blind-assessed postintervention outcomes from children randomised to therapy conditions relative to the control group. In the absence of any significant differences between the outcomes for direct versus indirect and individual versus group modes of therapy, the first analyses reported here compare the language measure outcomes for the combined therapy group (n = 130) versus those for the control group (n = 31), based on ITT. The numbers of participants[158] permitted analyses to be carried out using AMOS 6.0 software[159] which provides a means of analysing both the direct effects of intervention upon outcome measures at T2 and T3 and also the indirect effects at T3. Further, and again in contrast to conventional approaches to ANCOVA, specific covariance terms can be included in the AMOS model only where they are evidenced by significant correlations between variables, thus making the resulting model more sensitive. *Table 9* shows the intercorrelations between the three language measures at T1, non-verbal IQ and the combined therapy versus control variable.

TABLE 8 *Standardised effect sizes and 95% CIs derived from one-way ANCOVAs for direct versus indirect and individual versus group speech and language therapy for postintervention T2 and T3 scores for ITT analyses*

Therapy mode	Outcome measure	Adjusted SES[a]	95% CI for SES
Direct vs indirect therapy	CELF-3^{UK} rec T2	+0.15	–0.20 to +0.50
	CELF-3^{UK} rec T3	–0.004	–0.34 to +0.34
	CELF-3^{UK} exp T2	+0.06	–0.29 to +0.41
	CELF-3^{UK} exp T3	+0.01	–0.33 to +0.35
	BPVS T2[b]	–0.01	–0.35 to +0.33
	BPVS T3	+0.005	–0.35 to +0.35
Individual vs group therapy	CELF-3^{UK} rec T2	–0.08	–0.43 to +0.27
	CELF-3^{UK} rec T3[b]	–0.005	–0.34 to +0.34
	CELF-3^{UK} exp T2[b]	–0.02	–0.36 to +0.32
	CELF-3^{UK} exp T3	–0.02	–0.36 to +0.32
	BPVS T2	–0.10	–0.45 to +0.25
	BPVS T3	+0.01	–0.34 to +0.36

SES, standardised effect size.
[a] Cohen's *d* with adjustment for the effects of the covariate. A positive value here denotes change in favour of direct or individual therapy, while a negative value indicates change in favour of indirect or group therapy.
[b] The direction of effect from the one-way ANCOVA is different from that in the 2 × 2 analysis.

TABLE 9 *Intercorrelations between language measures and non-verbal IQ at T1*

		BPVS T1 score	CELF exp score T1	WASI IQ score	Combined therapy vs control
CELF rec score T1	Pearson correlation	0.377**	0.475**	0.290**	–0.129
	Sig. (2-tailed)	0.0001	0.0001	0.0001	0.102
BPVS T1 score	Pearson correlation		0.238**	–0.014	0.027
	Sig. (2-tailed)		0.002	0.858	0.736
CELF exp score T1	Pearson correlation			0.125	–0.156*
	Sig. (2-tailed)			0.113	0.048
WASI IQ score	Pearson correlation				–0.033
	Sig. (2-tailed)				0.673

* Significant at the 0.05 level (two-tailed); ** significant at the 0.01 level (two-tailed).

The ANCOVA model shown in *Figure 5* was specified by including covariance terms where there were significant correlations as reported in *Table 9* and was used to analyse the ITT data. Maximum likelihood estimation was utilised in regard to the effects of intervention upon the standardised age-corrected scores for the CELF receptive language scores at T2 and T3 while adjusting for the effects of non-verbal IQ (NVIQ) and the CELF expressive language and BPVS scores at T1. The regression weights for the paths linking combined therapy versus control to CELF receptive language at T2 and at T3 provide the tests of the hypothesis that adjusted postintervention scores are higher for those who received intervention.

The results revealed that the above model achieved satisfactory levels of fit,[160] with root mean square error of approximation (RMSEA) = 0.025, Comparative Fit Index (CFI) = 0.998 and Tucker–Lewis Index (TLI) = 0.991, accounting for 40% of the variance in CELF receptive language scores at T2 and 44% at T3. The covariances (denoted by double-headed arrows in *Figure 5* and interpreted as correlation coefficients) were all statistically significant (all p-values < 0.003), with the exception of that between combined therapy versus control and CELF expressive language at T1 (p = 0.136). The regression weights revealed no significant differences between the combined therapy and control groups in adjusted CELF receptive language scores at

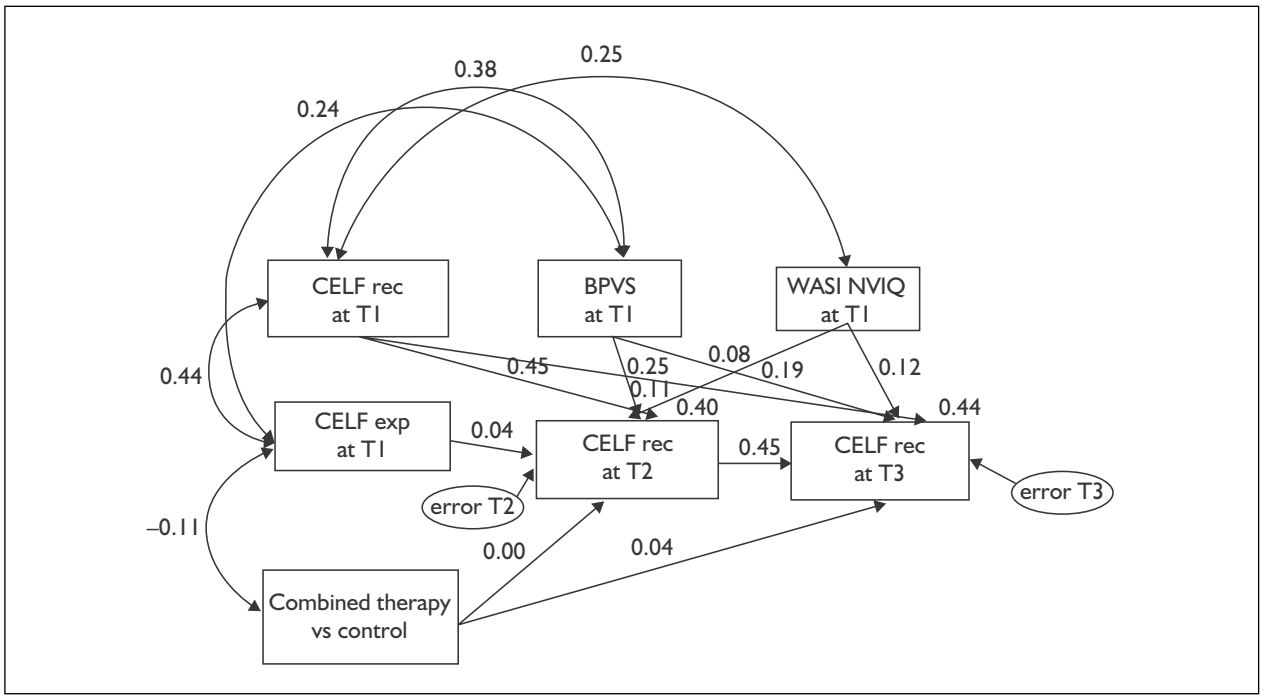

FIGURE 5 *ANCOVA of postintervention effects for CELF receptive language outcomes: ITT analysis (n = 161).* $\chi^2 = 6.614$ *(6 df), p = 0.358; RMSEA = 0.025; TLI = 0.991.*

either T2 (p = 0.950, unstandardised regression weight –0.10, 95% CI –3.09 to +2.84) or at T3 (p = 0.515, unstandardised regression weight 1.00, 95% CI –2.03 to +4.04). The 95% confidence intervals reveal considerable variability, with 2.84–4.04 standard score points in favour of intervention and 2.03–3.09 in favour of the control group.

The results also revealed that the BPVS II score at T1 and the CELF receptive language score at T1 were the only significant predictors of adjusted receptive language scores at T2 (both p-values <0.0001). Those with higher scores at T1 for receptive vocabulary and for receptive language more generally were more likely to attain higher adjusted scores at T2. In contrast, neither the WASI (p = 0.240) nor the CELF expressive language scores at T1 (p = 0.153) accounted for significant variance.

In the case of the adjusted receptive language scores at T3, while the BPVS II score at T1 (p = 0.004) and the CELF receptive language score at T2 (p = 0.0001) were significant predictors, the WASI score also approached conventional levels of significance as a predictor (p = 0.052), indicating that children with less severe deficits in receptive language and with higher non-verbal IQs are more likely to make progress in measures of language comprehension irrespective of whether they were involved in the project intervention.

Similar findings and a perfect fit of the model to the data (RMSEA = 0.000, CFI = 1.00 and TLI = 1.00) emerged from an analysis of the data from the 152 children who participated in the project intervention and controls for whom postintervention scores were available. This model, which also included the T1–T2 test–retest interval as a variable, accounted for 37% of the variance in the CELF receptive language scores at T2 and 41% at T3. The results are summarised in *Figure 6* and reveal no differences from the ITT analysis, with regression weights again revealing no significant differences between the combined therapy and control groups in adjusted CELF receptive language scores at either T2 (p = 0.865, unstandardised regression weight 0.272, 95% CI –2.86 to +3.40) or at T3 (p = 0.418, unstandardised regression weight 1.342, 95% CI –1.90 to +4.59). Although the T1–T2 retest interval covaried significantly with the combined therapy and control factor (p < 0.007), the regression weight revealed that it did not account for a significant level of variance in adjusted CELF receptive language scores at T2 (p = 0.605, 95% CI –0.89 to +0.52).

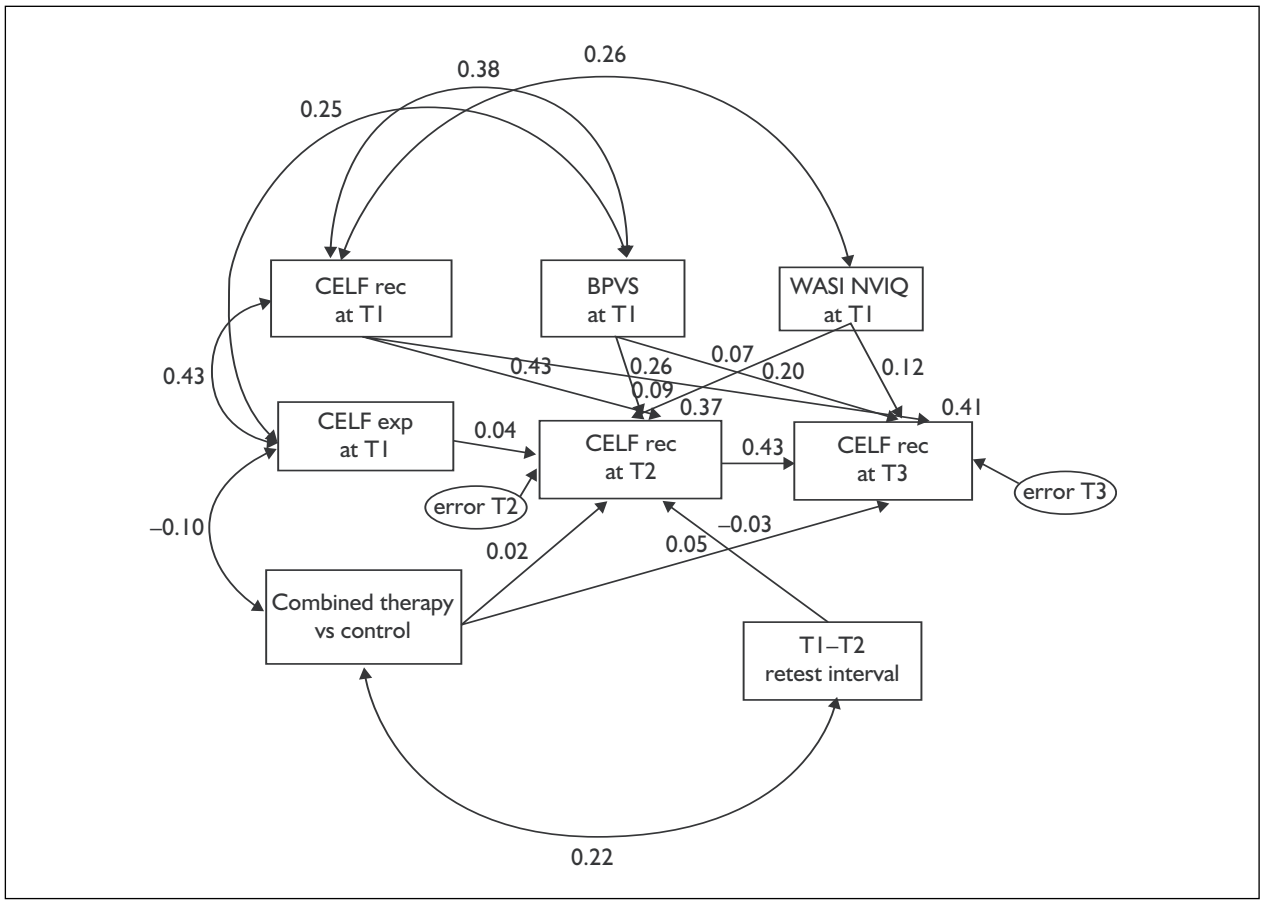

FIGURE 6 *ANCOVA of postintervention effects for CELF receptive language outcomes: protocol analysis* (n = *152*). χ^2 = *3.355 (11 df),* p = *0.985; RMSEA = 0.000; TLI = 1.00.*

The results from the analyses of the ITT and protocol analyses of BPVS II scores are summarised in *Figures 7* and *8*, respectively. The models achieved good levels of fit in both cases, with RMSEAs of 0.026 and 0.000, CFIs of 0.998 and 1.000, and TLIs of 0.993 and 1.000, and accounted for 42% of the variance in BPVS II scores at T2 and 59% at T3 in the case of the ITT analysis, and 39% and 57%, respectively, in the case of the protocol analysis.

The covariances (denoted by double-headed arrows in *Figure 7* and interpreted as correlation coefficients) were all statistically significant in both analyses (all p-values <0.01), with the exception of that between CELF expressive language scores at T1 and the combined therapy and control groups (both p-values <0.136). The regression weights in both the ITT and protocol analyses revealed no significant differences between the combined therapy and control groups in the adjusted BPVS II scores at either T2 (p = 0.606, unstandardised regression weight 0.771, 95% CI –2.16 to +3.70, in the case of ITT, and 0.847, 95% CI –2.37 to +4.07 in the case of the protocol analysis) or T3 (p = 0.630, unstandardised regression weight 0.647, 95% CI –1.99 to +3.28, in the case of ITT, and p = 0.710, unstandardised regression weight 0.538, 95% CI –2.30 to +3.37 in the case of the protocol analysis). The 95% confidence intervals again reveal considerable variability, with 3.28–4.07 standard score points in favour of intervention and 1.99–2.37 in favour of the control group.

The BPVS II score at T1 was the only significant predictor of BPVS II scores at T2 and T3 (both p-values <0.0001), although the CELF receptive language score at T1 approached significance as a predictor of BPVS II scores at T3 (p = 0.055 for the ITT analysis and p = 0.056 for the protocol analysis). In contrast, neither the WASI, the CELF expressive language scores nor the T1–T2 retest interval was a significant predictor of BPVS II scores at either T2 or T3 (all p-values > 0.256).

In the case of the adjusted receptive language scores at T3, while the BPVS II score at T1

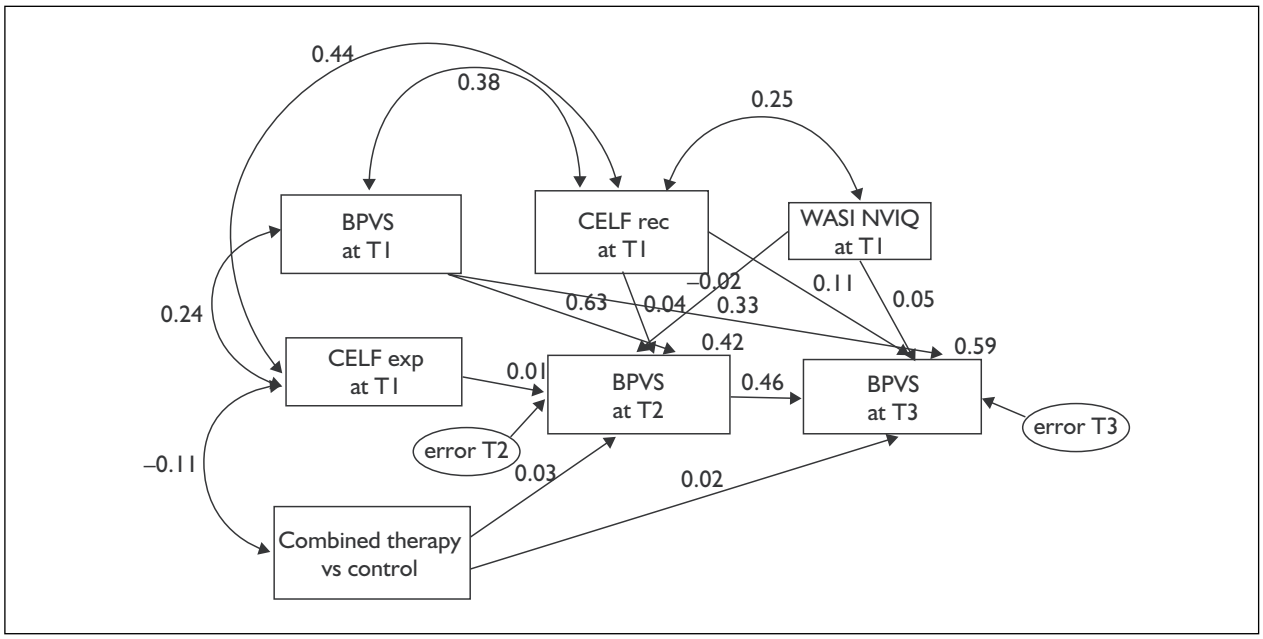

FIGURE 7 *ANCOVA of postintervention effects for BPVS outcomes: ITT analysis (*n = *161).* χ^2 *= 6.625 (6 df),* p = *0.357; RMSEA = 0.026; TLI = 0.993.*

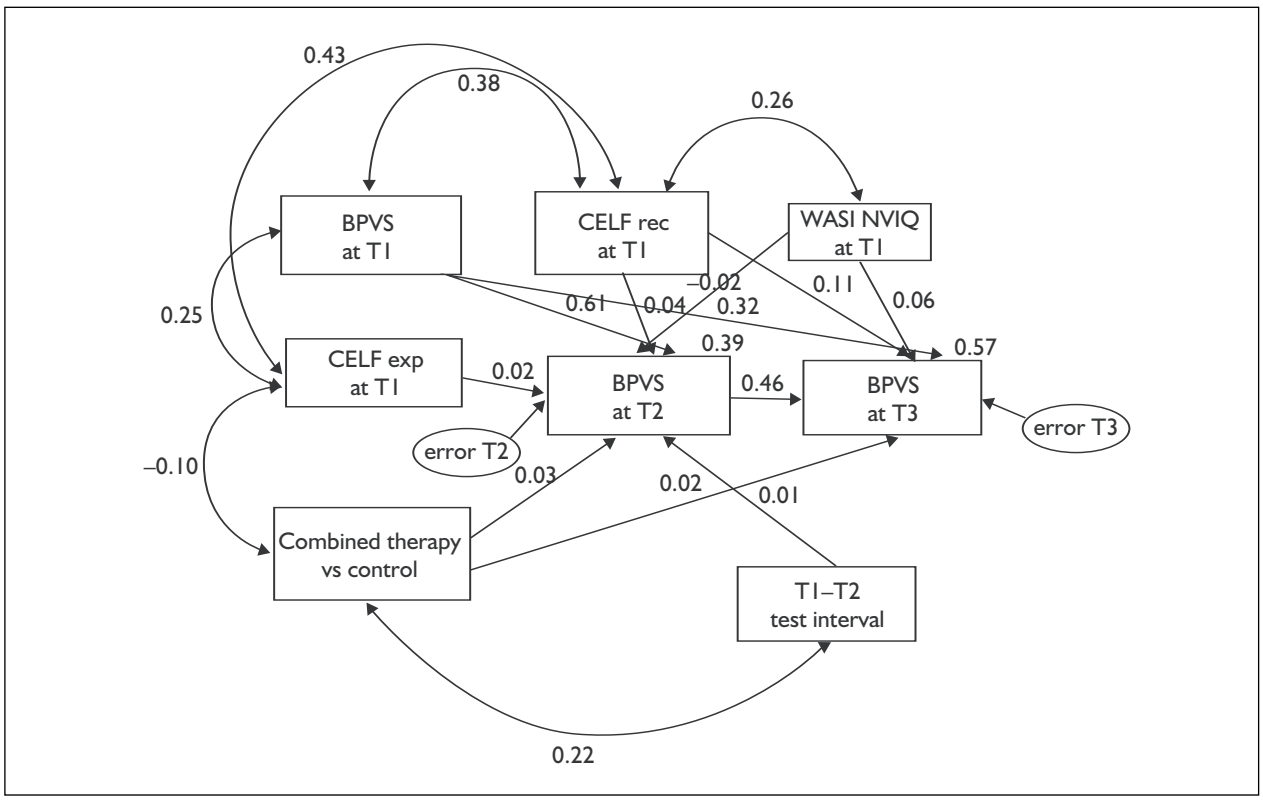

FIGURE 8 *ANCOVA of postintervention effects for BPVS outcomes: protocol analysis (*n = *152).* χ^2 *= 4.441 (11 df),* p = *0.955; RMSEA = 0.000; TLI = 1.00.*

($p = 0.004$) and the CELF receptive language score at T2 ($p = 0.0001$) were significant predictors, the WASI score also approached conventional levels of significance as a predictor ($p = 0.052$), indicating that children with less severe deficits in receptive language and with higher non-verbal IQs are more likely to make progress in measures of language comprehension, irrespective of whether they were involved in the project intervention.

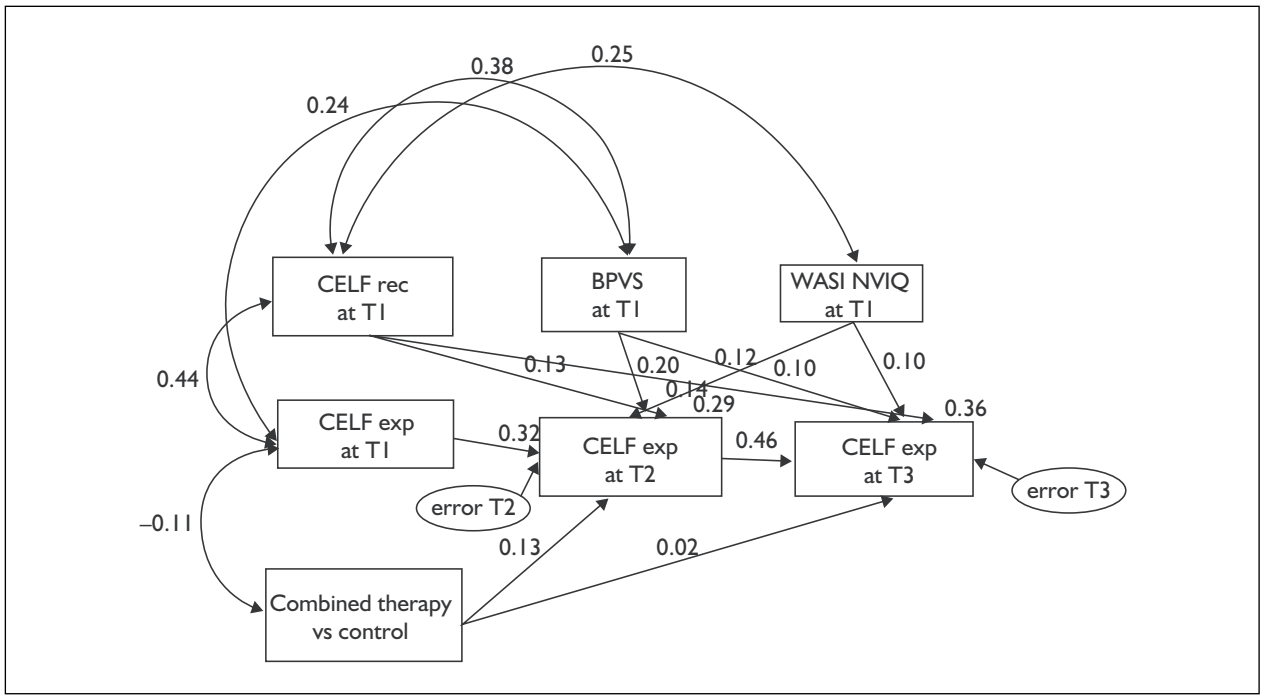

FIGURE 9 *ANCOVA of postintervention effects for CELF expressive language outcomes: ITT analysis (*n = *161).* χ^2 *= 9.115 (6 df),* p = *0.167; RMSEA = 0.057; TLI = 0.945.*

The results from the ITT and protocol analyses for the CELF expressive language postintervention outcomes are shown in *Figures 9* and *10*. The models achieved good levels of fit in both cases, with RMSEAs of 0.057 and 0.000, CFIs of 0.984 and 1.000, and TLIs of 0.945 and 1.000, respectively. The model explained 28.5% of the variance in the CELF expressive language score at T2, and 36.4% of the variance in the T3 scores. In the case of the ITT analysis, the regression weight between combined therapy versus control and adjusted CELF expressive language scores at T2 approached conventional levels of significance (p = 0.052), indicating a relative advantage in favour of intervention, with children receiving therapy from the project achieving adjusted T2 scores for expressive language on average some 2.40 standard score points (95% CI –0.02 to +4.82) higher than those in the control group. However, no significant direct effects of intervention (p = 0.731, 95% CI –2.05 to +2.92) or indirect effects (p = 0.062, 95% CI –0.114 to +2.399) were evident at T3. Test–retest interval between T1 and T2 assessments failed to account for a significant level of variance (p = 0.734).

There was a similar pattern of results from the protocol analysis, but the regression weight indexing the effects of intervention at T2 failed to reach significance (p = 0.102). There was a relative advantage in favour of intervention of 2.29 standard score points (95% CI –0.44 to +4.88), but this failed to reach significance because of increased variability in scores. The CELF expressive and receptive language scores and BPVS II scores at T1 were significant predictors of adjusted T2 expressive language scores (all p-values < 0.007) in both analyses. The CELF expressive language T2 scores were also significant predictors of adjusted T3 expressive language scores (p < 0.0001). Indirect effects of intervention at T3 were of a magnitude that could be accounted for by measurement error on the CELF (+1.14, 95% CI +0.14 to +2.90).

The inclusion of two intercorrelated tests of receptive language in the model adversely affected the sensitivity of the test of the effectiveness of combined therapy relative to the control group. The composite CELF receptive scale is a more general measure, while the BPVS II is a measure of only one aspect, receptive vocabulary, and has a larger score range than any of the other language measures, as it was not used to determine eligibility and there was no requirement that participants should have a low score.

Two further AMOS models were tested in regard to the outcomes for expressive language. In the first, the BPVS II variable was omitted, and in the second, the equally weighted composite receptive

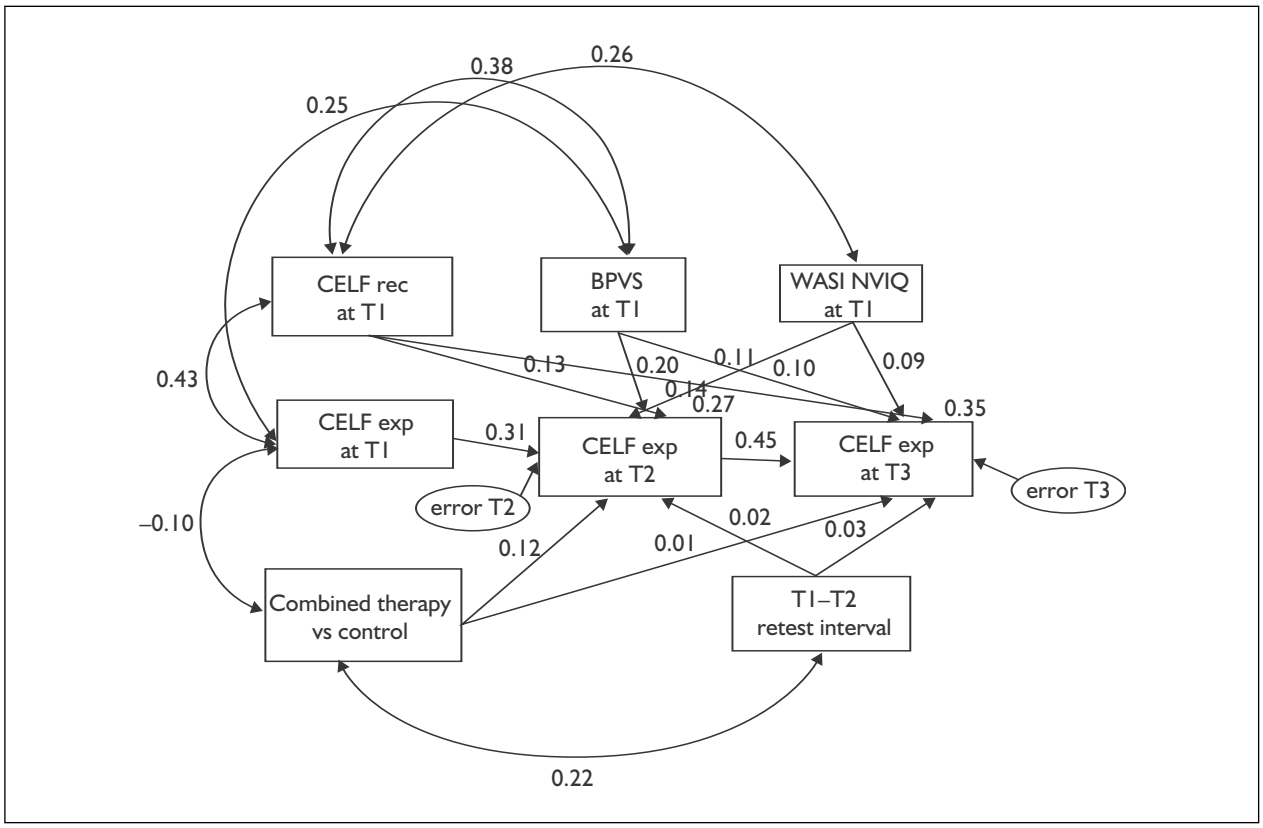

FIGURE 10 *ANCOVA of postintervention effects for CELF expressive language outcomes: protocol analysis (*n *= 152).* $\chi^2 = 5.646$ *(10 df),* p *= 0.844; RMSEA = 0.000; TLI = 1.00.*

language variable (the mean of CELF receptive language and BPVS II scores) used to distinguish specific expressive impairment from mixed receptive–expressive was included instead of the separate CELF receptive and BPVS II variables. The other variables were as before, with the further removal of the T1–T2 retest interval variable from models for the protocol analysis, given the lack of significance observed in the analyses above. The results from both models achieved satisfactory levels of fit, with an RMSEA of 0.067, CFI of 0.987 and TLI of 0.935 for the first model, and an RMSEA of 0.017, CFI of 0.999 and TLI of 0.995 for the second, in the case of ITT analyses. In both cases, the regression weight between combined therapy versus control and adjusted CELF expressive language scores at T2 achieved conventional levels of significance in favour of intervention ($p = 0.031$ and $p = 0.046$ for models 1 and 2, respectively). In the case of model 1, children receiving therapy from the project achieved a mean adjusted T2 score for expressive language of 2.72 points greater than the children in the control group (95% CI +0.24 to +5.20), and similarly an advantage of 2.48 points (95% CI +0.05 to +4.91) in the case of model 2. As before, there were no significant direct effects of intervention at T3 and indirect effects could be accounted for by measurement error.

There were similar results from the protocol analyses, with RMSEAs of 0.000, CFIs of 1.000 and TLIs of 1.000 in the case of both models 1 and 2. The regression weight indexing the effectiveness of intervention was significant in the case of model 1 ($p = 0.050$), but not in the case of model 2 ($p = 0.072$).

Planned comparisons were carried out to compare the components of therapy with the control group to determine their relative effectiveness over the T1–T2 period. As the reduced sample size did not permit analysis using AMOS,[158] one-way ANCOVAs were carried out, comparing the main effects of direct therapy versus control, indirect therapy versus control, individual therapy versus control and group therapy versus control at T2 for CELF expressive language scores, with T1 scores as a covariate. Following the results from the AMOS models above, the WASI and the composite receptive language variable were included in the analyses to determine the moderating effects of

TABLE 10 *Results from ANCOVAs of adjusted scores at T2 for CELF expressive language scores for therapy mode versus control*

Therapy mode	F_{df}	*p*	Adj. mean difference (intervention – control) and effect size	95% CI for difference
ITT				
Direct vs control	$4.89_{1,91}$	0.029*	+3.060 $Eta^2 = 0.051$ $d = +0.47$	+0.31 to +5.81
Indirect vs control	$2.14_{1,91}$	0.147	+1.960 $Eta^2 = 0.017$ $d = +0.26$	–0.70 to +4.62
Individual vs control	$4.09_{1,93}$	0.046*	+2.955 $Eta^2 = 0.042$ $d = +0.41$	+0.05 to +5.86
Group vs control	$2.83_{1,89}$	0.096	+2.120 $Eta^2 = 0.031$ $d = +0.37$	–0.38 to +4.62
Protocol analysis				
Direct vs control	$4.02_{1,84}$	0.048*	+3.036 $Eta^2 = 0.046$ $d = +0.43$	+0.03 to +6.05
Indirect vs control	$1.40_{1,84}$	0.241	+1.804 $Eta^2 = 0.016$ $d = +0.26$	–1.23 to +4.84
Individual vs control	$2.67_{1,89}$	0.106	+2.560 $Eta^2 = 0.029$ $d = +0.34$	–0.55 to +5.67
Group vs control	$2.828_{1,79}$	0.097	+2.451 $Eta^2 = 0.035$ $d = +0.39$	–0.45 to +5.35

non-verbal cognitive ability and specific expressive PLI (with higher receptive language scores) versus mixed receptive–expressive language impairment (with lower receptive language scores). The T1–T2 test–retest interval was also included in the protocol analyses.

There was a mixed pattern of results regarding covariates. Both the CELF expressive language scores at T1 and the composite receptive language variable scores at T1 were significant covariates in all analyses (all F-values > 6.01, all p-values < 0.02, and all F-values > 4.33, all p-values < 0.041, respectively). However, neither of the two other covariates explained significant levels of variance in any of the analyses (all F-values < 2.43, all p-values > 0.123 in the case of the WASI, and all F-values < 1, all p-values > 0.535, in the case of the T1–T2 test–retest interval). The results for the between-group comparisons are summarised in *Table 10*.

Eta^2 statistics are reported for each of the 1 df comparisons above as a measure of effect size,[161] and indicate the proportion of variance accounted for by the intervention relative to the control group after adjustment for the covariates (e.g. 5.1%, in the case of the direct therapy and the control group ITT analysis). Cohen's d effect sizes derived from the above are also shown to provide a comparison with the data in *Table 8* (p. 29).

The results reveal sizeable effect sizes and in particular, adjusted mean differences relative to the control group of some 3 standard score points in favour of both direct therapy and individual therapy in the ITT analyses, and a difference of the same magnitude in the direction of direct therapy in the case of the protocol analysis. All of the other adjusted mean differences in the other comparisons favoured project intervention, and indeed exceeded +1.80, which represents a score increase outside the upper bound of the 95% confidence interval for the control group scores based on the standard error of measurement of the CELF-3^{UK}.[155] However, none of the comparisons above achieved statistical significance

using a Bonferroni-adjusted alpha of 0.0125 to correct for the number of comparisons, which ensures an overall type I error rate of 0.05 for each comparison.

Subgroup analyses

2 × 2 ANCOVAs (treatment versus control × specific expressive language delay versus mixed receptive–expressive delay) with postintervention scores at T2 as the dependent variable and the related preintervention score, child's chronological age at T1, and T1–T2 test–retest interval as covariates were carried out on the protocol analysis data to determine whether the nature of the child's language delay and his or her age had any impact on the response to treatment. The interactions between type of language delay and treatment/control were not significant for the CELF-3^{UK} receptive language scores ($F_{1,144} = 1.66$, $p = 0.200$) or for the BPVS II scores ($F_{1,144} = 0.23$, $p = 0.635$), but there was a significant interaction in the case of the CELF-3^{UK} expressive scores ($F_{1,144} = 4.49$, $p = 0.036$), revealing that the scores of children with specific expressive delay showed greater change in response to treatment (an improvement of some 4.89 standard score points) than those with mixed receptive–expressive delay, whose scores showed no improvement relative to the control group.

Interactions between treatment/control and chronological age as a covariate failed to reach statistical significance (all F-values < 1.21, all p-values > 0.276), indicating that the children's age did not affect their response to treatment.

A further series of analyses was carried out to investigate whether measures of the children's non-verbal cognitive ability had an effect on the progress they made as a result of treatment. ANCOVAs were carried out on the protocol analysis data with treatment versus control as a factor, and postintervention scores at T2 as the dependent variable and the related preintervention score, child's WASI score at T1, and T1–T2 test–retest interval as covariates for each of the three language outcome measures. The interactions between treatment/control and WASI score as a covariate failed to reach significance for any of the language outcome measures (all F-values < 2.42, all p-values > 0.122), indicating that the children's WASI scores had no impact on the effects of treatment relative to the control group. Children with lower WASI scores were thus no less likely to make progress in response to treatment than those with higher WASI scores.

Predictors of progress

The final analysis in this section of the report examined predictors of progress in the three language outcome measures across the T1–T2 time-points, using the data from the 124 children who participated in project therapy. As previous analyses established equivalence in outcomes between the four modes of therapy, mode of intervention was not entered as a term. Standard logistic regressions were carried out with 'made progress' (an increase in CELF-3^{UK} score of ⩾1 standard score point from T1–T2)/'did not make progress' (no improvement in CELF-3^{UK} score from T1–T2) as the binary dependent variable, and participants' chronological age at the beginning of the study, gender, WASI non-verbal IQ score and case status in regard to specific expressive language impairment or mixed receptive/expressive language impairment based on an equally weighted composite of the CELF receptive language scale and the BPVS II receptive vocabulary scale at T1, with a cut-off standard score of 81 or less representing a problematic level of functioning. Sixty-one of the participants (49%) made progress on the CELF receptive language scale, 57 (46%) made progress on the CELF expressive language scale, and 65 (52%) made progress on the BPVS II. The results from the logistic regression analyses are summarised in *Table 11*.

Only the model for binary gains on the CELF receptive language scale was statistically significant ($\chi^2_{df4} = 20.45$, $p < 0.0001$), with the models for gains on the expressive language scale and the BPVS II failing to achieve statistical reliability ($\chi^2_{df4} = 1.522$, $p = 0.823$ and $\chi^2_{df4} = 1.545$, $p = 0.819$, respectively).

The model for the receptive language scale accounted for 20% of the variance, based on Nagelkerke's R^2. The four predictors thus jointly distinguished between those who made progress over the T1–T2 period and those who did not. Some 69.8% of those who made progress were correctly identified, together with 59% of those who did not so progress, for a total success rate of 64.5%. The Wald test revealed that only the children's gender and case status in regard to specific expressive impairment or mixed receptive–expressive impairment were significant predictors. Odds ratios [exp(B) in *Table 11*] revealed that girls were almost three times more likely to make progress in receptive language than boys. In addition, those with mixed receptive–expressive difficulties were

TABLE 11 *Summary of logistic regression of predictors of progress, T1–T2*

	B	SE	Wald	df	Sig.	Exp(*B*)	95% CI for exp(*B*)
Receptive language							
CA at T1	–0.018	0.012	2.316	1	0.128	0.983	0.96 to 1.00
Gender	1.090	0.436	6.253	1	0.012	2.974	1.27 to 6.99
ELD_V_MIX	1.885	0.619	9.273	1	0.002	6.584	1.96 to 22.14
WASI IQ	0.037	0.020	3.494	1	0.062	1.038	1.00 to 1.08
Constant	–3.578	2.333	2.351	1	0.125	0.028	
Expressive language							
CA at T1	–0.003	0.011	0.063	1	0.802	0.997	0.98 to 1.02
Gender	0.089	0.396	0.051	1	0.822	1.093	0.50 to 2.37
ELD_V_MIX	–0.203	0.504	0.163	1	0.686	0.816	0.30 to 2.19
WASI IQ	0.017	0.018	0.887	1	0.346	1.017	0.98 to 1.05
Constant	–0.974	2.114	0.212	1	0.645	0.378	
BPVS II							
CA at T1	0.009	0.011	0.727	1	0.394	1.009	0.99 to 1.03
Gender	–0.024	0.395	0.004	1	0.952	0.976	0.45 to 2.12
ELD_V_MIX	0.109	0.499	0.047	1	0.827	0.897	0.42 to 2.96
WASI IQ	–0.013	0.018	0.563	1	0.453	0.987	0.95 to 1.02
Constant	0.167	2.088	0.006	1	0.936	1.181	

ELD_V_MIX, specific expressive versus mixed receptive–expressive impairment.

some six times more likely to progress in their receptive language scores, possibly as a result of regression to the mean associated with their lower T1 scores for receptive language (mean 67.52, SD 4.22) compared with those with specific expressive language impairment (mean 80.59, SD 8.03).

Summary of key findings

The results from the analyses of the primary and secondary language outcome measures reported here reveal no significant differences between direct and indirect and between individual and group therapies.

Comparisons between the blind assessed scores from those receiving intervention and the controls revealed that those receiving therapy from the project made significantly greater progress in expressive language over the T1–T2 period, although there were no effects of intervention in regard to receptive language or to receptive vocabulary. There was evidence of statistically significant indirect effects of intervention at T3 for expressive language, but the magnitude of this effect was within the range of test–retest error for the CELF.

None of the Bonferroni-corrected follow-up tests in the case of expressive language achieved statistical significance, although the results reveal sizeable treatment effects of $d = +0.40$ in favour of direct therapy and individual therapy relative to the control group.

The results from the above analyses are consistent with the systematic reviews of the research literature[49,94] regarding both the null effects of intervention for receptive language, and the effectiveness of speech and language therapy for expressive language, and revealed also that there were no direct effects of intervention on T3 scores.

These findings do not support the view that therapy directly administered by an SLT or provided via individual therapy provides more sizeable treatment effects than indirect or group therapy, given the absence of any significant difference from the 2×2 analyses reported above. However, they do provide some measure of support for the efficacy of the speech and language therapy intervention delivered as part of the project in regard to outcomes for expressive language.

Finally, gender and nature of language difficulty (specific expressive or mixed receptive–expressive) were significant predictors of progress in receptive language. Satisfactory models could not be identified for expressive language or receptive vocabulary outcomes.

These findings will be discussed in Chapter 8.

Chapter 5

Views of parents, teachers and the project speech and language therapists and assistants: data from rating scales T1–T3

Views of parents and teachers

CELF observational rating scales

The CELF observational rating scales were sent out preintervention to the parents and teachers of the children randomised to intervention (n = 130). Subsequently, the scales were sent out at postintervention and at 12 months' follow-up to the parents and teachers of the children who received intervention (n = 124). The CELF scales form a 1–4 interval scale where '1' denotes 'never' a problem and '4' denotes 'always' a problem. To minimise the effects of type I statistical error, arithmetic means were used to construct composite scores for 'listening' (based on the nine statements in the scale relating to listening skills, memory and comprehension) and 'speaking' (based on the 19 statements in the scale relating to expressive language, vocabulary, conversation, question asking and narrative skills). *Table 12* shows means and standard deviations and response rates for parents and teachers for each of these composites for each therapy mode and the control group for T1–T3.

Eighty-nine of these parents completed preintervention scales (68%), 82 completed postintervention scales (63%) and 62 returned follow-up scales (48%). However, there was some variability in responses, most notably with 18 fewer parents completing the scales for listening than those for speaking at T2.

In the case of the teachers whose pupils were randomised to intervention, 95 completed preintervention scales (73%), 91 postintervention scales (70%) and 105 follow-up scales (81%) were returned. There were no significant differences in response rates between parents and teachers across the four modes of therapy at any of the three time-points (all $\chi_{df3}^2 < 1.80$, all p-values > 0.615). However, in view of the level of missing data, the analyses below were carried out on the responses received, rather than on the basis of ITT. Thus, children who left the study before T2 are not included in the analysis below.

To determine whether there was any relationship between the parents' and teachers' perceptions and the mode of therapy their child or pupil received, 2 × 2 ANCOVAs with the main effects of direct versus indirect and individual versus group modes as independent variables and T2 score as the dependent variable were carried out separately for each of the postintervention composite scores for listening and speaking for parents and for teachers. The corresponding T1 score was entered as a covariate to control for the effects of severity of impairment. A further series of ANCOVAs was carried out with the same independent variables with T3 scores as dependent variable, and with the corresponding T2 score as covariate to examine whether there were any sustained between-group differences.

The results are shown in *Table 13*. The direction of adjusted mean between-group differences has been itself adjusted to take into account the fact that a decrease in score across time-points represents improvement and is thus consistent with the data in other tables.

Preintervention scores were significant covariates of postintervention scores in all cases (all F-values > 7.17, all p-values < 0.009), but there were no significant adjusted main effects of direct versus indirect or individual versus group therapy at either T2 (all F-values < 1.26 and all p-values > 0.268) or T3 (all F-values < 3.03 and all p-values > 0.086) for either parents or teachers. The reported problems were not particularly marked prior to intervention, with average T1 ratings indicating that the listed difficulties on the scales occurred only 'sometimes', and the mean adjusted differences and associated confidence intervals indicate that the score changes across the T2 and T3 time-points were small, with little variability. However, it should also be noted that the children's teachers usually changed each year, and it is likely that a different teacher may have completed the scale at T3 from that at T2, affecting the comparability of the ratings.

TABLE 12 *Means (SDs) and response rates for composite listening and speaking scores from the CELF observational rating scales for parent and teachers for T1–T3 by therapy mode for children receiving intervention*

Therapy mode	Mean baseline scores (SD) at T1				Mean post-treatment scores (SD) at T2				Mean follow-up scores (SD) at T3			
	Parents		Teachers		Parents		Teachers		Parents		Teachers	
	Listening	Speaking	Listening	Speaking	Listening	Speaking	Listening	Speaking	Listening	Speaking	Listening	Speaking
Direct individual	*n* = 24 (71%) 2.19 (0.52)	*n* = 24 (71%) 2.50 (0.44)	*n* = 26 (76%) 2.24 (0.51)	*n* = 26 (76%) 2.64 (0.57)	*n* = 18 (53%) 2.03 (0.48)	*n* = 23 (68%) 2.30 (0.48)	*n* = 27 (79%) 2.06 (0.41)	*n* = 27 (79%) 2.32 (0.47)	*n* = 15 (44%) 2.08 (0.47)	*n* = 15 (44%) 2.33 (0.55)	*n* = 30 (88%) 2.11 (0.35)	*n* = 30 (88%) 2.37 (0.52)
Direct group	*n* = 23 (74%) 2.10 (0.50)	*n* = 23 (74%) 2.24 (0.61)	*n* = 23 (74%) 2.24 (0.46)	*n* = 23 (74%) 2.51 (0.63)	*n* = 15 (48%) 1.91 (0.31)	*n* = 20 (65%) 2.08 (0.55)	*n* = 18 (58%) 2.23 (0.48)	*n* = 18 (58%) 2.42 (0.60)	*n* = 16 (52%) 1.86 (0.44)	*n* = 16 (52%) 2.04 (0.56)	*n* = 25 (81%) 2.09 (0.46)	*n* = 25 (81%) 2.15 (0.58)
Indirect individual	*n* = 20 (61%) 2.16 (0.48)	*n* = 21 (61%) 2.57 (0.53)	*n* = 24 (73%) 2.30 (0.44)	*n* = 24 (73%) 2.67 (0.43)	*n* = 16 (48%) 2.06 (0.41)	*n* = 19 (58%) 2.45 (0.64)	*n* = 28 (85%) 2.12 (0.42)	*n* = 28 (85%) 2.37 (0.46)	*n* = 15 (45%) 2.08 (0.44)	*n* = 15 (45%) 2.17 (0.51)	*n* = 24 (73%) 2.16 (0.47)	*n* = 24 (73%) 2.33 (0.59)
Indirect group	*n* = 22 (69%) 2.07 (0.56)	*n* = 22 (69%) 2.34 (0.57)	*n* = 22 (69%) 2.19 (0.40)	*n* = 22 (69%) 2.47 (0.47)	*n* = 15 (47%) 2.10 (0.60)	*n* = 20 (62%) 2.13 (0.48)	*n* = 18 (56%) 2.05 (0.40)	*n* = 18 (56%) 2.24 (0.52)	*n* = 16 (50%) 1.95 (0.45)	*n* = 16 (50%) 2.05 (0.59)	*n* = 26 (81%) 1.97 (0.42)	*n* = 26 (81%) 2.19 (0.56)

TABLE 13 *Results from ANCOVAs of postintervention scores for CELF observational scale listening and speaking composite scores for parents and for teachers for all eligible children randomised to an intervention group*

Therapy mode	CELF observational scale	*F*	*p*	Adjusted mean difference[a]	95% CI for difference
Direct vs indirect therapy	Parent (listening) (n = 53) T2	$F_{1,49}$ = 1.256	0.268	+0.116	–0.09 to +0.32
	Parent (listening) (n = 42) T3	$F_{1,38}$ = 0.061	0.807	+0.033	–0.24 to +0.31
	Parent (speaking) (n = 71) T2	$F_{1,67}$ = 0.000	0.983	+0.002	–0.17 to +0.17
	Parent (speaking) (n = 46) T3	$F_{1,42}$ = 0.508	0.480	–0.088	–0.34 to +0.16
	Teacher (listening) (n = 69) T2	$F_{1,65}$ = 0.645	0.425	–0.061	–0.21 to +0.09
	Teacher (listening) (n = 76) T3	$F_{1,72}$ = 0.497	0.483	–0.065	–0.25 to +0.12
	Teacher (speaking) (n = 69) T2	$F_{1,65}$ = 0.014	0.906	–0.011	–0.19 to +0.17
	Teacher (speaking) (n = 76) T3	$F_{1,72}$ = 1.534	0.220	–0.140	–0.37 to +0.08
Individual vs group therapy	Parent (listening) (n = 53) T2	$F_{1,49}$ = 0.409	0.526	+0.066	–0.14 to +0.27
	Parent (listening) (n = 42) T3	$F_{1,38}$ = 1.537	0.223	–0.169	–0.44 to +0.11
	Parent (speaking) (n = 71) T2	$F_{1,67}$ = 0.332	0.567	–0.051	–0.23 to +0.13
	Parent (speaking) (n = 46) T3	$F_{1,42}$ = 0.330	0.569	–0.073	–0.33 to +0.18
	Teacher (listening) (n = 69) T2	$F_{1,65}$ = 0.228	0.635	+0.037	–0.12 to +0.19
	Teacher (listening) (n = 76) T3	$F_{1,72}$ = 1.712	0.195	–0.121	–0.30 to +0.06
	Teacher (speaking) (n = 69) T2	$F_{1,65}$ = 0.053	0.819	–0.021	–0.21 to +0.16
	Teacher (speaking) (n = 76) T3	$F_{1,72}$ = 3.021	0.086	–0.198	–0.42 to +0.03

[a] A positive value here denotes change in favour of direct or individual therapy, while a negative value indicates change in favour of Indirect or group therapy.

TABLE 14 *Summary of additional information from the CELF observational scale provided by parents and teachers for T1–T3*

		Area											
		Talking/listening			Reading/written language			Other curricular			Social/emotional/ behavioural		
Respondents	Comments	T1	T2	T3	T1	T2	T3	T1	T2	T3	T1	T2	T3
Parents	Positive	2	4	7	1	5	7	0	0	0	0	0	0
	Negative	22	13	7	21	12	12	1	1	0	11	2	12
Teachers	Positive	2	3	3	3	3	6	1	0	3	2	0	7
	Negative	20	18	25	18	10	22	2	2	5	13	9	14

Parents were also asked to list any other problems or concerns on the rating scale form. Sixty-three of the parents and 92 of the teachers (n = 92) provided additional information covering the three time-points (42 at T1, 23 at T2 and 33 at T3, for parents, and 45 at T1, 28 at T2 and 60 at T3, in the case of the teachers). These comments were coded as 'positive' (any mention of progress, such as '[child] has greatly improved in talking and confidence') or 'negative' (any ongoing problem or difficulty, such as 'trouble with reading') for the four areas of talking and listening, reading and written, other curricular areas (e.g. mathematics), and social/emotional development or behaviour (e.g. relating to problems with frustration or with other children). Comments could relate to more than one of the four areas (e.g. '[problems with] writing, reading, speaking') and were coded accordingly. However, as a result the data do not meet the requirements of independence for statistical analyses. One-hundred and forty comments from parents were coded (58 relating to T1, 37 to T2 and 45 to T3) and 191 from teachers (61 at T1, 45 at T2 and 85 at T3). Five of the parents' comments (three at T1, one at T2 and one at T3) and 16 of the teachers' comments (nine at T1, one at T2 and six at T3) could not be coded as their referent was unclear (e.g. 'NA' and 'No'). The results are summarised in *Table 14*.

The nature of these data precluded a fuller statistical analysis, but parents and teachers were around four times more likely overall to report a negative comment than a positive comment. Further, while the children/pupils of the respondents continued to present problems, the

TABLE 15 *Means (SDs) and response rates for composite listening and speaking scores from the CELF observational rating scales for parent and teachers for each therapy mode and the control group at T3*

	Mean follow-up scores (SD) at T3			
	Parents		Teachers	
Therapy mode	**Listening**	**Speaking**	**Listening**	**Speaking**
Control	*n* = 13 2.08 (0.65)	*n* = 3 2.26 (0.59)	*n* = 24 2.19 (0.48)	*n* = 24 2.45 (0.57)
Direct individual	*n* = 15 2.08 (0.47)	*n* = 15 2.33 (0.55)	*n* = 30 2.11 (0.35)	*n* = 30 2.37 (0.52)
Direct group	*n* = 16 1.86 (0.44)	*n* = 16 2.04 (0.56)	*n* = 25 2.09 (0.46)	*n* = 25 2.15 (0.58)
Indirect individual	*n* = 15 2.08 (0.44)	*n* = 15 2.17 (0.51)	*n* = 24 2.16 (0.47)	*n* = 24 2.33 (0.59)
Indirect group	*n* = 16 1.95 (0.45)	*n* = 16 2.05 (0.59)	*n* = 26 1.97 (0.42)	*n* = 26 2.19 (0.56)

ratios of positive to negative comments did show some change over time, from around 1:10 for talking/listening, reading/written language and social/emotional/behavioural at T1, to around 1:3 at T2 and T3. The problems in comparability of teachers' responses at T3 should again be noted, however, together with the response bias in favour of reporting problems to comply with the invitation on the rating scale form.

The CELF observational rating scales for both parents and teachers were administered at T3 not only to the parents and teachers of the children who received intervention, but also to those whose children/pupils were in the control group. Descriptive statistics and response rates are shown in *Table 15*.

In the absence of T1 scores for the control group, a series of one-way ANOVAs was used to compare the main effects of combined therapy relative to the control group at T3 for the composite scores. The results revealed no significant sustained benefits at T3 relative to the control group for the children receiving therapy in regard to the speaking and listening scores from the CELF observational scales (all F-values < 0.428, all p-values > 0.560). However, the low response rate and the number of comparisons made should be noted.

Additional analyses were carried out to determine whether parents were more likely to respond to the CELF observational rating scales if their children made greater gains on the language outcome measures at T2. The results from between-group t-tests, with whether parents responded at T2 or not as independent variable, revealed no significant differences between the two groups in the gains made by their children over T1–T2 for expressive or receptive language scores on the CELF-3 or for the receptive language scores from the BPVS II (all t-values < 1.26, 122 degrees of freedom (df), all p-values > 0.210, two-tailed tests) indicating that there was no systematic response bias as a function of the progress made by the children. A similar pattern of results was observed in the case of the responses from teachers, again indicating an absence of systematic bias (all t-values < 1.29, 122 df, all p-values > 0.20, two-tailed tests).

In summary, the results from the CELF observational rating scales reveal that there were no significant differences observed in the parents' or teachers' ratings of the children's listening or speaking in regard to whether the children received their therapy from an SLT or from an assistant, or individually rather than in a group, although the possibility that such significant differences might have been observed had a larger sample been available should be borne in mind. Further, there were no significant differences between the intervention and control groups at T3.

Parent Perception of Children's Progress Questionnaire (PPCPQ)

The parents of the 130 eligible children randomised to intervention were asked to provide their perceptions of progress made by their children over the course of the project by means of a questionnaire using five-point Likert scales to

determine progress 'over the last three months' at T1, T2 and T3 in the six areas of receptive language (six items), speech (three items), expressive language (seven items), use of language (five items), literacy (four items) and general behaviour (four items). The questionnaire was piloted on the parents of 77 children with SLI in a previous study and was further modified following a focus group discussion with parents not involved in the present study. The five scale points of the questionnaire ranged from 'no progress' to 'very good progress', and parents were also able to indicate if an area was one in which their child did not have a difficulty. Arithmetic means were used to construct composite scores for each of the six areas, and *Table 16* shows means and standard deviations and response rates for parents for each of these composites for each therapy mode for T1–T3.

The overall average response rate at T1 was some 60%, and around 45% at both T2 and T3. In view of this, analyses were carried out on the responses received rather than on ITT.

A series of one-way ANOVAs revealed no significant between-group differences in preintervention T1 scores for the six areas of the questionnaire (all F-values < 1.71, all p-values > 0.174), indicating equivalence between the therapy modes. Further analyses also confirmed preintervention equivalence in terms of the direct/indirect and individual/group variables (all F-values < 1.43, all p-values > 0.23) for five of the six areas, with one exception: a significant difference in favour of the progress made by the children in the group therapy conditions relative to those in the individual therapy conditions (average ratings of 3.09 versus 2.62) in the 3 months before the introduction of the project intervention) ($F_{1,74} = 4.65$, $p = 0.034$).

As before, 2×2 ANCOVAs with the main effects of direct versus indirect and individual versus group modes as independent variables and T2 scores as the dependent variable were carried out separately for each of the postintervention composite scores for receptive language, speech, expressive language, language use, literacy and behaviour. The corresponding T1 score was entered as a covariate. This incorporated data from 42 parents (32% of the total sample) for receptive language, 44 (34%) for speech, language use, literacy and behaviour, and 46 (35%) for expressive language. A further series of ANCOVAs was carried out with the same independent variables with T3 scores as dependent variable, and with the corresponding T2 score as covariate to examine whether there were any sustained between-group differences.

The results from the T1–T2 analyses revealed significant effects of covariates (all F-values > 12.58, all p-values < 0.001) and significant effects of direct/indirect on adjusted ratings for progress in literacy at T2 ($F_{1,42} = 4.12$, $p = 0.049$) and for behaviour at T2 ($F_{1,40} = 4.075$, $p = 0.05$). In the case of the literacy composite score, adjusted mean T2 parental ratings of the children's progress were 3.12 following direct therapy (indicating 'satisfactory' progress) compared with 2.63 for indirect therapy (indicating 'a little progress'), an adjusted mean difference of 0.49 (95% CI +0.003 to +0.979). In a similar vein, the adjusted mean rating for behaviour for the children who received direct therapy was 3.48 compared with 3.10 for those receiving indirect therapy, an adjusted mean difference of 0.38 (95% CI 0.000 to +0.758). No other comparisons approached significance (all F-values < 2.67, all p-values > 0.110) and, in particular, there was no significant effect of individual/group therapy on language use ($F_{1,40} = 2.67$, $p = 0.11$) over the period T1–T2. Although caution is required in the interpretation of these findings on account of response bias owing to the low return rate, the unblinded nature of the ratings and also the number of comparisons made, the parents who returned the questionnaire reported that they perceived some differential functional benefits from intervention favouring direct therapy in regard to the children's progress in literacy and behaviour at T2.

In the case of the T2–T3 analyses, the analyses again showed significant effects of the T2 covariates (all F-values > 5.32, all p-values < 0.02), but there were no significant differences between either of the between-groups variables on any of the language areas (all F-values < 1.001, all p-values > 0.325), indicating no sustained perceived differential benefits at T3.

Further analyses were carried out to determine whether parents were more likely to return the PPCPQ if their children made greater gains on the language outcome measures at T2. However, the results from between-group t-tests, with whether parents responded at T2 or not as independent variable, revealed no significant differences between the two groups in the gains made by their children over T1–T2 for expressive or receptive language scores on the CELF-3 or for the receptive language scores from the BPVS II (all t-values < 1.26, 122 df, all p-values > 0.211, two-tailed tests), indicating that there was no

TABLE 16 *Means (SDs) and response rates for PPCPQ for T1–T3 for children receiving intervention*

		Therapy mode			
Time point	**Language area**	**Direct individual**	**Direct group**	**Indirect individual**	**Indirect group**
T1	Receptive	*n* = 20 (59%) 2.58 (0.58)	*n* = 19 (62%) 2.80 (0.65)	*n* = 18 (55%) 2.82 (0.80)	*n* = 19 (59%) 2.65 (0.89)
	Speech	*n* = 21 (62%) 2.43 (0.93)	*n* = 20 (65%) 2.79 (1.00)	*n* = 17 (52%) 2.53 (0.75)	*n* = 19 (59%) 2.35 (1.17)
	Expressive	*n* = 21 (62%) 2.18 (0.81)	*n* = 21 (68%) 2.52 (0.98)	*n* = 18 (55%) 2.44 (0.73)	*n* = 20 (62%) 2.55 (1.08)
	Language use	*n* = 20 (59%) 2.56 (0.80)	*n* = 20 (65%) 2.85 (0.82)	*n* = 18 (55%) 2.57 (0.72)	*n* = 19 (59%) 2.73 (1.00)
	Literacy	*n* = 21 (62%) 2.39 (0.80)	*n* = 20 (65%) 2.67 (0.97)	*n* = 18 (55%) 2.56 (1.00)	*n* = 21 (66%) 2.60 (1.17)
	Behaviour	*n* = 21 (62%) 2.65 (0.86)	*n* = 21 (68%) 3.18 (1.13)	*n* = 17 (52%) 2.58 (0.97)	*n* = 19 (59%) 3.00 (0.86)
T2	Receptive	*n* = 18 (53%) 3.30 (0.63)	*n* = 14 (45%) 3.40 (0.78)	*n* = 14 (42%) 3.15 (0.92)	*n* = 13 (38%) 2.97 (1.03)
	Speech	*n* = 18 (53%) 3.24 (0.92)	*n* = 15 (48%) 3.50 (1.23)	*n* = 14 (42%) 3.19 (1.12)	*n* = 13 (38%) 2.64 (1.26)
	Expressive	*n* = 18 (53%) 2.99 (0.83)	*n* = 15 (48%) 3.47 (0.81)	*n* = 15 (45%) 2.98 (0.93)	*n* = 13 (38%) 2.58 (1.10)
	Language use	*n* = 18 (53%) 3.09 (0.70)	*n* = 14 (45%) 3.56 (0.94)	*n* = 15 (45%) 3.16 (1.06)	*n* = 13 (38%) 2.68 (0.93)
	Literacy	*n* = 18 (53%) 3.28 (0.80)	*n* = 15 (48%) 3.15 (1.05)	*n* = 15 (45%) 2.87 (1.14)	*n* = 13 (38%) 2.21 (1.19)
	Behaviour	*n* = 18 (53%) 3.31 (0.81)	*n* = 14 (45%) 3.67 (1.05)	*n* = 14 (42%) 3.05 (1.02)	*n* = 12 (37%) 2.76 (0.90)
T3	Receptive	*n* = 15 (44%) 3.13 (0.87)	*n* = 13 (42%) 3.37 (0.69)	*n* = 15 (45%) 3.44 (0.99)	*n* = 15 (47%) 3.08 (1.04)
	Speech	*n* = 15 (44%) 3.22 (0.82)	*n* = 12 (39%) 3.44 (0.83)	*n* = 15 (45%) 3.60 (1.06)	*n* = 14 (44%) 3.02 (1.32)
	Expressive	*n* = 15 (44%) 3.00 (0.80)	*n* = 13 (42%) 3.38 (0.80)	*n* = 15 (45%) 3.44 (1.07)	*n* = 15 (47%) 2.81 (1.22)
	Language use	*n* = 15 (44%) 3.06 (0.97)	*n* = 13 (42%) 3.49 (0.86)	*n* = 15 (45%) 3.19 (0.83)	*n* = 15 (47%) 3.16 (0.94)
	Literacy	*n* = 15 (44%) 2.98 (0.90)	*n* = 11 (35%) 3.11 (0.87)	*n* = 15 (45%) 3.47 (1.17)	*n* = 15 (47%) 2.92 (1.13)
	Behaviour	*n* = 15 (44%) 3.04 (1.09)	*n* = 12 (39%) 3.63 (0.76)	*n* = 15 (45%) 3.12 (1.05)	*n* = 15 (47%) 3.16 (1.13)

TABLE 17 *Means (SDs) and response rates for PPCPQ at T3*

	Therapy mode				
Language area	**Control**	**Direct individual**	**Direct group**	**Indirect individual**	**Indirect group**
Receptive	*n* = 13 3.03 (0.72)	*n* = 15 3.13 (0.87)	*n* = 13 3.37 (0.69)	*n* = 15 3.44 (0.99)	*n* = 15 3.08 (1.04)
Speech	*n* = 11 2.88 (0.91)	*n* = 15 3.22 (0.82)	*n* = 12 3.44 (0.83)	*n* = 15 3.60 (1.06)	*n* = 14 3.02 (1.32)
Expressive	*n* = 13 2.69 (0.79)	*n* = 15 3.00 (0.80)	*n* = 13 3.38 (0.80)	*n* = 15 3.44 (1.07)	*n* = 15 2.81 (1.22)
Language use	*n* = 13 3.01 (0.70)	*n* = 15 3.06 (0.97)	*n* = 13 3.49 (0.86)	*n* = 15 3.19 (0.83)	*n* = 15 3.16 (0.94)
Literacy	*n* = 13 2.69 (0.85)	*n* = 15 2.98 (0.90)	*n* = 11 3.11 (0.87)	*n* = 15 3.47 (1.17)	*n* = 15 2.92 (1.17)
Behaviour	*n* = 13 3.13 (0.97)	*n* = 15 3.04 (1.09)	*n* = 12 3.63 (0.76)	*n* = 15 3.12 (1.05)	*n* = 15 3.16 (1.13)

systematic response bias as a function of the progress made by the children.

Finally, the PPCPQ was administered at T3 not only to the parents and teachers of the children who received intervention, but also to those whose children/pupils were in the control group. Descriptive statistics and response rates are shown for the CELF rating scales and the PPCPQ in *Table 17*.

Again, in the absence of T1 scores for the control group, the main effects of combined therapy were compared with those from the control group on the composite scores on the PPCPQ at T3 by means of a series of one-way ANOVAs. There were no significant sustained benefits at T3 relative to the control group for the children receiving therapy in regard to the composite scores for receptive language, speech, expressive language, use of language, literacy and general behaviour (all F-values < 2.38, all p-values > 0.128). However, as above, the low response rate and the number of comparisons made should be noted.

SLT/As' and assistants' ratings of children's progress

The project SLT/As' and assistants' perceptions of the children's progress were gathered using Enderby's Therapy Outcome Measures[151] (TOMs), a standardised and widely used means of reflecting changes in patients' status following intervention based upon the WHO's Classification of Impairment, Disability and Handicap.[162] The TOMs utilise four 0–5 scales to describe the level of children's impairment, disability, handicap and well-being/distress resulting from speech and language difficulties. The speech and language SLT/As rated the children in discussion with their assistant, where appropriate in the case of indirect modes, using the TOMs before and after intervention. The means and standard deviations are shown in *Table 18* for T1 and T2. Note that there were some missing data arising from project staff changes midway through the project.

One-way between-group ANOVAs carried out for each of the five areas revealed that there were no significant differences in the preintervention scores for impairment, disability or handicap (all F-values < 1.25, all p-values > 0.297). However, there was a significant difference between the groups in the well-being/distress ratings ($F_{3,119}$ = 2.85, p = 0.04). Follow-up multiple t-tests with Bonferroni adjustment revealed that the indirect group preintervention ratings for well-being/distress were significantly higher than those for the direct individual mode (p < 0.05), indicating that the children were judged to be less upset or frustrated, but were not significantly

TABLE 18 *Means (SDs) for TOMs completed at T1 and T2*

	Mean baseline scores (SD) at T1				Mean post-treatment scores (SD) at T2			
Therapy mode	**Impairment**	**Disability**	**Handicap**	**Well-being/ distress**	**Impairment**	**Disability**	**Handicap**	**Well-being/ distress**
Direct individual	*n* = 34 1.79 (1.03) Range 0–4	*n* = 34 2.96 (0.59) Range 2–4	*n* = 34 2.90 (0.68) Range 1–4	*n* = 34 3.31 (0.85) Range 2–5	NA	*n* = 33 3.51 (0.57) Range 2–5	*n* = 33 3.48 (0.69) Range 1.5–5	*n* = 33 3.95 (0.77) Range 2.5–5
Direct group	*n* = 28 1.82 (0.74) Range 1–3	*n* = 28 2.98 (0.65) Range 2–4	*n* = 28 3.09 (0.76) Range 2–4	*n* = 28 3.66 (0.85) Range 2–5	NA	*n* = 28 3.52 (0.57) Range 2–5	*n* = 28 3.50 (0.67) Range 2–4.5	*n* = 28 4.07 (0.69) Range 2.5–5
Indirect individual	*n* = 29 1.81 (0.95) Range 0–4	*n* = 32 2.87 (0.91) Range 1–4	*n* = 32 2.89 (0.93) Range 1–4	*n* = 32 3.42 (1.08) Range 1–5	NA	*n* = 33 3.39 (0.85) Range 1–5	*n* = 33 3.38 (0.79) Range 1.5–5	*n* = 33 3.71 (0.91) Range 1–5
Indirect group	*n* = 23 1.74 (0.81) Range 1–3	*n* = 29 3.22 (0.76) Range 2–5	*n* = 29 3.12 (0.81) Range 2–4.5	*n* = 29 3.93 (0.81) Range 2–5	NA	*n* = 29 3.72 (0.62) Range 2.5–5	*n* = 29 3.67 (0.57) Range 2.5–4.5	*n* = 29 4.21 (0.76) Range 2–5

NA, not applicable.

different from the ratings for the indirect individual or direct group modes (both p-values > 0.05).

Impairment scores are benchmarked by standardised assessments, but as T2 standardised assessments were carried out by the blind assessors and their findings were not available to the project SLTs and assistants at the end of the intervention phase owing to the practicalities of scheduling the reassessments, project SLTs and assistants were not able to provide ratings on impairment at T2.

The main effects of direct versus indirect and individual versus group therapy on the TOM were compared by means of three 2×2 ANCOVAs, with T1 scores as covariates, the main effects of direct versus indirect therapy and individual versus group therapy as between-group factors, and T2 rating scores for disability, handicap and well-being/distress as dependent variables. The results revealed significant effects for the covariate in all cases (all F-values > 163.09, all p-values < 0.0001), but no significant between-group differences for adjusted scores for T2 disability or handicap (both F-values < 1.12, p-values > 0.346). However, there was a significant between-group difference for adjusted scores for T2 well-being/distress ($F_{1,118} = 6.31$, $p = 0.013$), with the project SLTs' adjusted but unblinded ratings indicating that children receiving direct therapy from an SLT made significantly more improvement in terms of well-being and reduced distress and frustration than those receiving indirect therapy.

Summary of findings

The results from the analyses of the views of parents, teachers and from the project SLT/As obtained by means of rating scale measures revealed no significant differences between direct and indirect and between individual and group therapies apart from some functional benefits in literacy and numeracy at T2 following direct therapy reported by parents, and benefits at T2 in regard to increased well-being and reduced stress and frustration reported at T2 by the project SLT/As, again following direct therapy. However, neither parents nor SLT/As were blind to the children's status.

However, there was no evidence that the children/pupils of parents or teachers who returned a rating scale made significantly better progress on the primary or secondary language outcome measures than those who did not respond.

These findings will be discussed in Chapter 8.

Chapter 6

Views of parents, teachers and the project research team: qualitative data from questionnaires and focus groups

Overview

This chapter presents the views of parents and teachers about the research intervention, and the views of research SLT/As on working with schools and parents gathered by means of questionnaires and focus groups.

The research intervention provided a series of formal contacts with schools and families, and in addition a considerable amount of informal contact took place. Formal contact for families and schools for each child receiving research intervention comprised:

- the SLT delivering or supervising therapy arranging a meeting or making telephone contact at the start of intervention with parents and schools
- a written note to parents and schools of the therapy targets set at the start of intervention
- a mid-intervention written report to parents and schools on progress
- a final written report to parents and schools on progress.

Informal contact consisted of additional telephone calls or meetings, written notes to and from parents and schools, and written suggestions or materials for parents and teachers to continue language work at home or school.

Investigating parents' and teachers' views

Questionnaires and focus groups were used to collect information from parents and schools at the end of the each child's intervention period, seeking views on aspects of the research project. Questionnaires were also completed by the research SLTs and SLTAs at the end of the project about their work with families and schools.

Devising questionnaires for parents, teachers and researchers

Questionnaires were devised by the research team, following discussion of areas of interest and of specific questions. Parents' questionnaires were piloted by a focus group of four parents of children with severe receptive–expressive language impairments who had taken part in a previous study, but who did not reside in Glasgow or Edinburgh, and so were not eligible for the present study. The same questions (as revised) were asked of the child's class teacher, having been checked for acceptability by a primary school teacher with knowledge of language impairment, but who did not teach children involved in the project.

Three questionnaires were constructed and distributed:

- for families, completed at the end of a child's intervention phase, reporting on contact with the research project
- for schools, completed at the end of a child's intervention phase, reporting on contact with the research project
- for research project SLTs and SLTAs, completed at the end of phase II, reporting on contact with schools and families.

Questionnaire analysis

Responses to dichotomous and interval scale questions are reported as number and percentage (in parentheses, rounded to nearest whole) of responses. Where questions required or invited free comment, data inspection and discussion were used to form classificatory categories and comments given a preliminary classification. Inter-rater reliability of coding was established by a researcher independently reclassifying all comments, with agreement of 83% or above for all questions. Remaining examples of disagreement were then discussed and classified.

Up to three comments are reported to illustrate the range of opinion recorded, with editorial clarifications in square brackets. To maintain anonymity, SLT/A is used to refer to any member of the research team delivering intervention, and 'the' or 'my' child is used throughout.

TABLE 19 *Children receiving project intervention: therapy mode and school stage*

Intervention mode and location	*n* (%)	Primary school class and intervention phase	*n* (%)
Direct individual	34 (27)	Primary one	9 (7)
Direct group	28 (23)	Primary two	37 (30)
Direct total	62 (50)	Primary three	25 (20)
Indirect individual	33 (27)	Primary four	24 (19)
Indirect group	29 (23)	Primary five	15 (12)
Indirect total	62 (50)	Primary six	12 (10)
Individual total	67 (54)	Primary seven	2 (2)
Group total	57 (46)		
Total	124 (100)		
Glasgow	77 (62)	Phase I intervention	63 (51)
Edinburgh	47 (38)	Phase II intervention	61 (49)

TABLE 20 *Mode, location and phase of intervention and primary school class of parent respondents' children*

Intervention mode and location	*n* (%)	Primary school class and intervention phase	*n* (%)
Direct individual	19 (32)	Primary one	4 (6)
Direct group	16 (26)	Primary two	17 (27)
Indirect individual	15 (24)	Primary three	11(18)
Indirect group	12 (19)	Primary four	14 (23)
Direct total	35 (56)	Primary five	10 (16)
Indirect total	27 (43)	Primary six	5 (8)
Individual total	34 (55)	Primary seven	1 (2)
Group total	28 (45)		
Total	62 (100)		
Glasgow	36 (58)	Phase I intervention	39 (62)
Edinburgh	26 (42)	Phase II intervention	23 (37)

The children

In total, 124 children received project intervention, with therapy mode and school stage as shown in *Table 19*.

Parents' opinions: contact with the research team

Questionnaires were sent to parents immediately following their child's intervention phase, asking about the information they received from the project, their contact with the SLT/A carrying out intervention and their opinions of the research. Responses from both phases have been combined.

Parents' responses

Questionnaires were returned for 62 children, 50% of the 124 children receiving project intervention, as shown in *Table 20*. Between-groups *t*-tests revealed no significant differences between the progress made by the children of the parents who responded over T1–T2 and the parents who did not respond for either expressive or receptive language scores on the CELF-3 or for the receptive language scores from the BPVS II (all *t*-values <1.34, 122 df, all *p*-values >0.184, two-tailed tests).

Q P1: Were you given enough information about the project before therapy started with your child?
A large majority of the parents who responded felt that they had been given sufficient information about the project before therapy commenced.

Response: *n* (%)	Illustrative comments
Yes: 57 (92)	• Everything was explained clearly before [the] project started. • Staff made [a] good effort to keep us informed. • [The SLT/A] was helpful and always available when needed.
No: 4 (6)	• There was a rush to get started and [I] was not aware of the implications of [my child] being out of school for 15 afternoons. This was quickly resolved.
Neither marked: 1 (2)	• [At] the initial meeting to discuss [the] project [the SLT/A was] not invited ('down-side of school'), [and] the psychologist [was] unwell ('unprofessional').

Q P2: Did you ever contact the person working with your child, e.g. by phone or by notes?
Around three-quarters of the parents contacted the relevant project researcher.

Response: *n* (%)	Illustrative comments
Yes: 46 (74)	• [We] spoke over the phone about [their] time with [my child] and how [my child] was doing. • [I] phoned [the SLT/A] to know about [my child's] progress often and the SLT/A phoned regularly to update [me] on this. • [I] would have appreciated meeting with [the SLT/A] prior to [the] start of [the] project. [I] feel this is not SLT/A's fault but the school's.
No: 15 (24)	• I didn't have to. They phoned regularly enough to keep me up to date. • [The SLT/A] called and let me know all that was going on. • [I] always feel it is best if [the] SLT/A gets in touch with [the] parent if there is a problem. That way the child has the full attention of both parties.
Neither marked: 1 (2)	• [The SLT/A] contacted me by phone.

Q P3: Did you meet the person working with your child?
A majority of parents reported that they did not meet the project researcher working with their child. While some indicated that they would have liked face-to-face contact, others felt that other forms of contact, such as telephone, were sufficient. Some 11% would have welcomed more contact.

Response: *n* (%)	Illustrative comments
Never: 36 (58)	• [It] would have been advantageous for [the SLT/A] to have met [the child] in [their] own home. [I] would have liked to have met [the SLT/A] at the start of [the] project. • As far as can recall, [a] meeting was arranged but [I] could not attend. • [I] had telephone conversation and correspondence with SLT/A which kept me up to date.
Not often enough: 7 (11)	• [I would have] preferred if [the SLT/A had] kept contact with parents and not parents contacting [the SLT]. • With work, it was difficult to meet up with SLT/A. • Although [we] met towards the end of [the] study, [the] meeting took the form of [a] post-study debrief with [the] class teacher, head teacher and [my child]. [I] would have liked [the] opportunity to meet [the SLT/A] alone.
Often enough: 14 (23)	• I met [the SLT/A] a few times. She took time to explain everything she was doing with [my child]. [My child] enjoyed her sessions with [the SLT/A]. • Contact regarded attendance and taxi, plus [a] meeting at end of [the] research for feedback. • [I] usually was able to see [the SLT/A] at school before [the] session.
Neither marked: 5 (8)	• The person worked with my son in his school and if I needed to meet her more often I could have. • Mostly by phone. • No.

Q P4: Were you kept up to date about what your child was doing in therapy?
The large majority of respondents indicated that they were kept up to date with what their child was doing in research therapy.

Response: *n* (%)	Illustrative comments
Yes: 58 (93)	• [I was] regularly kept informed. • [I] would like to have known what [my child] was doing more often. • [By] having reports sent informing [me] of [the] outcome.
No: 4 (6)	• [It] was quite difficult because [we] kept missing each other by phone. • [I] received worksheets at the end of the project. • Not in any great detail on a day to day basis.

Q P5: Did you ever get any ideas that were helpful for you at home?
Around two-thirds of parents who responded indicated that they had received ideas which were helpful for them at home.

Response: *n* (%)	Illustrative comments
Yes: 42 (68)	• Sentence structuring was simplified with use of coloured cards. • [The SLT/A] provided ideas and games which she took the trouble to photocopy and send. • Games and role play [were] very helpful.
No/not sure: 18 (29)	• [I] didn't know what type of work was covered with [my child].
Neither marked: 2 (3)	• [I] wasn't advised of anything special to do at home.

Q P6: Were you able to give any ideas to the researchers about useful areas for your child to work on?
Around half of the parents felt that they had been able to provide useful ideas for the researchers to work on with their child, but the other half were unsure.

Response: *n* (%)	Illustrative comments
Yes: 29 (47)	• [I] told [the] SLT which areas [I] thought [the child] needed most help. • [I] let the researcher know by phone what we were concerned about. • Via an initial questionnaire.
No/not sure: 30 (48)	• [I was] told [I] could phone researchers with any question anytime. [The] lack of personal contact didn't build a mutual connection. • [The] researcher used language assessment by [a] previous SLT for information. • They sussed [my child] out quite well.
Neither marked: 3 (5)	• [I] can't remember discussing this with [the SLT/A].

Q P7: Do you think your child enjoyed therapy?
Almost all of the parents indicated that their child enjoyed the project therapy.

Response: *n* (%)	Illustrative comments
Yes: 59 (95)	• He loved it. • At first [I was] worried about moving in and out of class, but this was minimal. [My child] loved seeing [the SLT/A] and boys in [the] group. • [My child] enjoyed it, seemed better one-to-one and responds better to someone unrelated.
No/not sure: 3 (5)	• [My child] wasn't willing to talk about therapy openly.

Q P8: Can you list two or three things about the research which you would like to change?
In total, 42 points were categorised from 33 respondents into six categories, presented in rank order.

1. *Wanting a different time, location, duration and/or travel arrangement for the intervention, or therapy to continue after the project was over (n = 13)*
   - Because [the] location [was] away from school [I] felt [the child] might miss some school work.
   - [We] could do with more SLT so after [the] project [it] will not take "about another year" before seeing someone else.
   - Go on for [a] longer period.
   - The timings were too late finishing after normal school hours. [My child] was very tired after each session.
   - Reduce therapy slowly rather than abruptly.
2. *Wanting more meetings and/or contact with SLT/A (n = 10)*
   - An initial meeting including [the SLT/A] to discuss things.
   - I would like to have met [the SLT/A].
   - Meeting [the SLT/A] to discuss work and progress and inputting our ideas.
   - Maybe be able to meet the researcher.
   - [I] would have liked a home visit prior to [the] project starting.
3. *No changes, none or happy with everything (n = 7)*
   - Nothing I would change. Everything [was] satisfactory.

- None. Every bit of help for [my child] was a bonus and we realise how lucky he was to be chosen for this.
- None.
- No.
- [I] noticed a big improvement in his speech. I am quite happy.

4. *Wanting more information on sessions, and/or work for home (n = 5)*
   - More parent information enabling us to reinforce work at home.
   - A rough guideline of what type of work was to be covered during [the] project.
   - Being given work to back up [my child] at home.
   - [I] would have liked feedback on [my child's] particular problems and hints on what to do to help.
   - More information of what parents can do at home to reinforce the help [the child] receives.
5. *Other (n = 4)*
   - Open to lots of other children.
   - [My child] was happy doing all the things.
   - More awareness about children with a stammer.
   - More of a variety going into the actual speech/sounds of words where [my child] has more of a problem.
6. *Unsure of what went on (N = 3)*
   - [I] can't comment. [I was] not present during sessions.
   - Not quite sure what went on.
   - Not sure.

The majority of comments relating to aspects of the project which might have been improved related to the organisation and delivery of intervention, or to increased contact with the research team.

Some of the parents indicated that no changes were required in regard to delivery of the project therapy, but others felt that additional information or activities to carry out at home would have been helpful.

Q P9: Can you list two or three things about the research which you thought were good?
In total, 121 points from 59 respondents were categorised into ten categories, presented in rank order.

1. *The child obtained learning, confidence and/or communication benefits (n = 24)*
   - [My child] seemed to improve greatly.
   - Helped [my child]. Gave him confidence etc. Big difference.
   - It made a real difference to [my child's] speech.
   - [My child] understands and listens more often than [they] used to and that has helped me help [my child].
   - [My child] did well in therapy. [I] noticed change in [my child's] behaviour.
2. *Project staff had positive qualities, were welcoming and/or provided good information to parents (n = 21)*
   - [The] SLT seemed very on top of things, very understanding and helpful, keeping us informed at various stages.
   - Feedback was good.
   - People were very friendly.
   - Contact between the SLT/A and ourselves.
   - [The SLT/A was] helpful and understood [my child's] needs and abilities.
3. *Organisation, intensity, continuity, amount and/or location of intervention (n = 17)*
   - [My child] getting lots of speech therapy.
   - Taking place in school helped keep things normal.
   - Frequency of visits.
   - Very intense work.
   - Three times a week helped [my child] to get to know [the SLT/A].
4. *The child enjoyed therapy, looked forward to it, found it fun and/or had a good relationship with the SLT/A (n = 16)*
   - [I am] really pleased with [the] work and [my child] looked forward to the days [the SLT/A] came to the [the] school.
   - [My child] enjoyed the sessions and the company.
   - [My child] was very happy to attend sessions.
   - The way in which [my child] was able to trust and become friendly with [the SLT/A]. This is not easy to do with him.
   - My child] looked forward to [the SLT/A's] visits to school.
5. *Therapy activities or techniques mentioned (n = 14)*
   - Good ideas about making [my child] think of a word by breaking it down so that it meant something to her.

- Pages about putting things in the right order.
- Helping [my child] with how to put things in [the] right order and help with sounds and meanings of words.
- Games which improved his train of thought and his speech.
- Repetition seemed to work well with [my child].

6. *Mention of group or individual mode of intervention (n = 11)*
   - Small group, [my child] got more attention.
   - Individual work was good for [my child's] needs.
   - [My child] seems to work better in a small group or one-to-one.
   - One-to-one relationship.
   - Group sessions.
7. *Intervention at right level or right style for the child (n = 6)*
   - [The child] was never made to feel he could not do things.
   - Therapy in the area [my child] needed help.
   - Variety in work. [My child] gets bored easily.
   - [My child was] encouraged to work on [their] own.
   - No pressure on [my child] to do things. Everything is done at the child's own level.
8. *Other (n = 6)*
   - Staff that drove taxis [were] very pleasant.
   - Friends.
   - All good.
   - That my child was accepted into the project.
   - Raised awareness of [my child's] subtle difficulties with the school.
9. *No, or unsure what went on (n = 4)*
   - [I] cannot comment on research as [I] do not have full understanding.
   - Not sure.
   - Not quite sure what went on.
   - No.
10. *Child 'part of something', other children in class positive (n = 2)*
    - [My child] thought he was special. Other kids wanted to go with [the SLT/A] too.
    - Sometimes in class [my child] felt alone, [the SLT/A] made her feel part of something.

The parents felt that their children achieved benefits from the project therapy and that the project staff were welcoming.

Teachers' opinions: contact with the research team

Questionnaires were sent to classroom teachers immediately following a child's intervention phase, asking the same questions as asked of parents about the information they received from the project, their contact with the SLT/A carrying out intervention, and their opinions of the research. Responses from both phases have been combined.

Teachers responses

Questionnaires were returned by teachers in regard to 93 children, 75% of the 124 children receiving research intervention, as shown in *Table 21*.

TABLE 21 *Mode, location and phase of intervention and primary school class of teacher respondents' children*

Intervention mode and location	*n* (%)	Primary school class and intervention phase	*n* (%)
Direct individual	28 (30)	Primary one	6 (6)
Direct group	19 (20)	Primary two	33 (35)
Direct total	47 (50)	Primary three	20 (21)
Indirect individual	27 (29)	Primary four	14 (15)
Indirect group	19 (20)	Primary five	11 (12)
Indirect total	46 (49)	Primary six	8 (9)
Individual total	55 (59)	Primary seven	1 (1)
Group total	38 (41)		
Total	93 (100)		
Glasgow	62 (67))	Phase I intervention	49 (52)
Edinburgh	31 (33)	Phase II intervention	44 (47)

Q T1: Were you given enough information about the project before therapy started with the child?
Over 80% of the teachers who responded felt that they received sufficient information about the project before intervention commenced.

Response: *n* (%)	Illustrative comments
Yes: 75 (81)	• [I] had [a] meeting near the beginning which informed [me] on areas to be covered. • [There was a] helpful letter outlining everything – [my] own copy helped. • The project details were both informative and interesting.
No: 13 (14)	• [I] was unsure of what the content of the programme was and exactly what was going on in the sessions. • Received it during. • Information did not come to class teacher though it may well have been delivered to school.
Neither marked: 5 (5)	• Arrangements regarding times, dates, transport were all clear. • NA. [The child] joined [my] class during [the course of] therapy sessions. • Not much.

Q T2: Did you ever contact the person working with the child, e.g. by phone or by notes?
Almost half of the teachers contacted project researchers. Of those who did not, some felt that it would have been beneficial to have met the project researcher before the commencement of intervention.

Response: *n* (%)	Illustrative comments
Yes: 41 (44)	• We met regularly to check progress. • Just to inform [the] researcher of [the] child's absence. • [I] spoke to [the SLT/A] in school.
No: 48 (52)	• It may have been beneficial for us to meet prior to [the] project. Did [the child] meet [the SLT/A] prior to [the] start of [the] project? • [I] was contacted twice by visits from [the] researcher. • Contact numbers were made available.
Neither marked: 4 (4)	• We met regularly to check progress. • Letter.

Q T3: Did you meet the person working with the child?
Over 80% of the teachers felt that they met the project researcher sufficiently often, highlighting an advantage of school-based intervention.

Response: *n* (%)	Illustrative comments
Never: 4 (4)	• A meeting was arranged but I was out on a course on that day.
Not often enough: 12 (13)	• [I] would have liked more time outwith class to discuss [the child's] progress. • [I] met [the SLT/A] at the beginning of [the] session. [It] would be beneficial to meet again at the end. • It would have been helpful to have had an opportunity to liaise more – possibly [one-] third and two-thirds [of the] way through therapy.
Often enough: 75 (81)	• [I] met [the SLT/A] at [the] start of each session and had plenty [of] time to discuss any concerns. • [I was] able to exchange information and discuss progress/work being done over lunchtime. • It is always difficult to discuss the child during class times. However, we chatted occasionally at coffee time.
Not marked: 2 (2)	• [The] researcher would be waiting for [the child] in [the] cloakroom to allow us a brief informal discussion.

Q T4: Were you kept up to date with what the child was doing in therapy?
Almost 90% of the teachers felt that they were kept up to date with what was happening in the intervention.

Response: *n* (%)	**Illustrative comments**
Yes: 83 (89)	• [I was] kept well informed. • [I had] brief updates verbally each week. • Clear reports [were] provided.
No: 8 (9)	• There was no correspondence until after the course had finished. • [I] would have preferred a more formal discussion with [the SLT/A]. Perhaps this should be built in to the time spent in school. • I didn't know on a day to day level but I was finally aware of the aims/goals. So I was happy with that.
Neither marked: 2 (2)	• Sometimes, not so much at the beginning. [It was] better towards the end.

Q T5: Did you ever get any ideas which were helpful for you in school?
Around two-thirds of teachers reported receiving ideas that were helpful to them in school.

Response: *n* (%)	**Illustrative comments**
Yes: 62 (67)	• [SLT/A] feedback was of excellent help. She also left copies of material she was using and recommended materials too. This is so relevant as language communication is an increasing problem in mainstream education. • Suggestions were given to be used with [the child] and may be useful to other children in the future. • At [a] meeting [I] was shown literature which could be used in class which targeted [the child's] specific difficulties.
No/not sure: 25 (27)	• No actual teaching strategies were mentioned or recommended. • [I am] not sure what was carried out. • Any help/ideas would have been much appreciated.
Neither marked: 6 (6)	• From [the] written report. • A lot of very helpful ideas. • NA. [I] wasn't particularly aware of what work was being done with [the child].

Q T6: Were you able to give any ideas to the researchers about useful areas for the child to work on?
Sixty per cent of the teachers reported giving the researchers ideas for the child to work on.

Response: *n* (%)	**Illustrative comments**
Yes: 55 (60)	• Sequencing in written work. • [I] discussed areas in which [the child] had been having difficulty within class and also problems [I] could foresee in the next few months in terms of the curriculum. • [I] discussed that [the child's] concentration span was very limited and that listening skills could be improved.
No: 26 (28)	• [The] researcher seemed very aware of areas to be developed. • We were never asked. • [There was] no consultation time.
Neither marked: 12 (13)	• [It was] not necessary. • [I was] not asked. • Maybe not enough ideas.

Q T7: Do you think the child enjoyed therapy?
Over 80% of the teachers felt that the child enjoyed the therapy.

Response: *n* (%)	Illustrative comments
Yes: 78 (84)	• [The child] looked forward to her session and seemed to grow in confidence as the year wore on. • [The child was] always keen to go and smiling on return. • [The child] thoroughly enjoyed therapy and was able to tell the class and myself all about what he did.
No/not sure: 12 (13)	• [The child] seems more relaxed in general terms since therapy ended. [The child] is very anxious and it was quite traumatic for him to be taken out of class. • [The child] didn't really volunteer any information regarding experiences one way or the other. • [The child] didn't enjoy being taken out of the class but certainly liked the games and some of the attention.
Neither marked: 3 (3)	• [The child was] sometimes reluctant but did settle. • [It is] difficult to tell. • [The child was] very enthusiastic at the beginning then got frustrated as [they] had to miss out on class activities – usually music and art in the afternoon.

Q T8: Can you list two or three things about the research which you would like to change?
In total, 64 points were categorised from 47 respondents into eight categories, presented in rank order.

1. *Wanting different time, location, duration, mode and/or travel arrangements for intervention (n = 18)*
   - If possible, in [the child's] own school environment.
   - Lengthened if possible.
   - One hour every day instead of three hours per week.
   - Programme lasted too long.
   - Spend longer periods with [the child] on [a] longer term basis.
2. *No changes, nothing or happy with everything (n = 13)*
   - NA. Everything was ideal for our school situation.
   - No, nothing I would change.
   - No, [I] was very happy with [the] research.
   - No. [I] felt [the child] was given a super boost from the time spent with [the SLT/A].
   - [I] thought [the] period of intervention was good.
3. *Wanting more information on programme, session content and/or child progress (n = 10)*
   - [To be] kept up to date as to what is happening and ensure time is made available for this.
   - More information [to be] given to schools.
   - More detailed knowledge of [the] type of help being given.
   - Communication – information could have been more available to class teachers.
   - Report back to teacher after every session.
4. *Wanting follow-up work and/or ideas for classrooms (n = 8)*
   - Some follow-up activities that would help [the child] in class.
   - Perhaps some follow-up work to complete in [the] classroom?
   - Follow-up till next session.
   - [A] simple programme of work [should be] made available for class teachers to follow through.
   - More actual teaching strategies to be used in a classroom setting.
5. *Wanting to observe SLT/A or SLT/A to observe child in class (n = 7)*
   - Could teachers get a visit to see what is happening?
   - [I would like] to observe [SLT/A] practice.
   - [I would like to] sit in on [a] lesson.
   - [It would be] useful for class teacher to observe sessions or work alongside [the SLT/A] in one session.
   - [The] researcher [could] observe [the child] in [their] own class setting as one-to-one doesn't give [a] true picture of [the child].
6. *Wanting more meetings and/or contact with the SLT/A (n = 4)*
   - More interaction between [the SLT/A] and teacher.
   - More contact with [the SLT/A].
   - More consultation time with [the SLT/A].

- [It] would have been beneficial for [the SLT/A] to meet with class teachers ([to] fill out Observational Rating Scales) prior to setting up work. All targets which were covered had been met previously.

7. *Other (n = 3)*
   - Maybe more structure.
   - [The] research seemed to concentrate on grammar rather than physical aspects of speech.
   - [I] would have preferred to have received these questionnaires before the end of term, but the actual research programme seemed fine.
8. *Unsure of what went on (n = 1)*
   - [I don't] really know enough about it.

As with parents, the majority of comments by the teachers related to aspects of the project which might have been improved concerned the organisation and delivery of intervention, or to increased contact with the research team. However, some of the teachers indicated that no changes were required in regard to delivery of the project therapy, while others felt that additional information or activities would have been helpful.

Q T9: Can you list two or three things about the research which you thought were good?
In total, 146 points were categorised from 69 respondents into nine categories, presented in rank order.

1. *Project staff had positive qualities, were welcoming and/or provided good information to schools (n = 29)*
   - [The SLT/A was] kind, approachable, professional and built excellent rapport.
   - The pleasant manner and commitment shown by the SLT.
   - Discussion with [the] researcher caused me to focus better on facilitating [the child's] communication [and] on developing strategies.
   - Information given to [the] teacher – [it] helped not only with [the child] but [with] things to look out for in future.
   - The detailed reports which showed exactly what was covered.
2. *Organisation, intensity, continuity, amount and/or location of intervention (n = 29)*
   - [The SLT/A] coming to school [was] less disruptive.
   - Frequent regular visits were advantageous.
   - Large block of time, with continuity.
   - The sessions were regular, which was important to [the child].
   - Three sessions weekly gave continuity and intense S[L]T.
3. *The child obtained learning, confidence and/or communication benefits (n = 27)*
   - Self-esteem of [the child] increased. [The child] was much happier, [and] began to participate in class discussions.
   - [The child's] self-confidence and esteem were boosted so much that she passed her national test level in both reading and writing.
   - [The child is] generally much more confident and keen to talk to both teachers and children.
   - [It] helped [the child] with conversation and this gave her more confidence with reading and writing.
   - [I] can see a definite difference in [the child]. [The child] has made such progress.
4. *Mention of group or individual mode of intervention (n = 21)*
   - Intensive one-to-one situation was very beneficial to [the child].
   - Concentrated work in [a] small group.
   - Small working groups – individual attention.
   - Great individual attention which benefits a child when having speech difficulties.
   - Small numbers in [the] group made it very personal.
5. *The child enjoyed therapy, looked forward to it, found it fun and/or had a good relationship with the SLT/A (n = 16)*
   - [The child] bonded with [the SLT/A].
   - [The SLT/A] had lovely rapport with [the child].
   - [The child] enjoyed the games/work and talks in [the] group.
   - [The child] really enjoyed going.
   - [The] sessions were much enjoyed and even looked forward to by [the child]. [The child] is usually shy when he thinks he is under observation.
6. *Therapy activities or techniques mentioned (n = 7)*
   - Activities – 'Who, When, Where' game.
   - Useful resources – cue cards.
   - The suggestion for phonic games.
   - Good handout material.
   - Given games to help [the child].

7. *Other (n = 10)*
   - Communication between [the SLT/A] and home.
   - [It] highlighted problems in a different setting.
   - More input is needed. Class performance has not improved.
   - Easiness of the project. [I] was involved but not involved; [it] worked independently of me.
   - [It] would be beneficial for a lot of children if it were to continue.
8. *Intervention at right level or right style for the child (n = 6)*
   - Programme of work.
   - Clear aims were made for the child.
   - Overall the project was excellent for [the child's] needs.
   - Work integrated well with what was going on in the classroom.
   - Model of good practice throughout.
9. *No, or unsure what went on (n = 1)*
   - [I] don't really know enough about it.

Teachers also felt that the project staff were welcoming, that organisation and delivery of the project were helpful and that the child achieved benefits. Modes of intervention, both individual and group, were commended.

Views of parents and teachers who participated in focus groups

Focus groups were conducted to complement the data collected by questionnaire and rating scales by selecting parents and teachers/special needs auxiliaries to discuss and comment on their personal experience of the progress made by their children/pupils receiving therapy and of their contact with the project.

Method

Participants

A random sample of 50% of the parents whose children received intervention stratified by mode of service delivery, phase and city, was invited to attend focus group discussions. The form letter sent to parents can be found in Appendix 4. In total, 17 parents of 14 children (nine from Glasgow and five from Edinburgh) receiving therapy from the project (22% of the children in the intervention group sampled) attended a session. One teacher and one special needs auxiliary also attended a focus group for teachers.

Patients

Turning first to the parents, *Table 22* summarises the therapy modes received by the children of the parents who participated in the focus groups.

While numerically more of the children attended direct modes and group modes, there was no significant difference between the therapy modes represented by the parents (Fisher's exact probability = 0.521, two-tailed test), although the small sample size should be noted.

Procedure

The letters to participants contained three questions which structured the discussions:

1. How did you feel about the therapy your child received?
2. How did you feel about your contact with the project SLT or SLTA?
3. How did you feel about the progress made by your child over the course of the project?

The principal investigator served as moderator for each group, providing a clear explanation of the purpose of the group; using open questions to facilitate interaction between participants; and prompting, to elicit participants' experiences, to encourage everyone to contribute, and where required to reorientate discussions back to the topic areas.[163] The principal investigator also summarised the main points made during the discussions on a flipchart. The sessions were tape-recorded, and an independent researcher also attended to scribe the discussions and to provide context notes.

TABLE 22 *Therapy modes of the children of the participants in the parents' focus groups*

Mode of therapy	Direct (SLT)	Indirect (SLTA)	Total
Individually administered	2	2	4
Group-administered	8	2	10
Total	10	4	14

The composition of the focus groups was as shown below:

- five parents of five of the children (four from Glasgow and one from Edinburgh who asked to attend the session in Glasgow) receiving direct/group (n = 3), direct/individual (n = 1) and indirect/individual (n = 1) therapy
- one mother (from Edinburgh) of a child receiving direct/group therapy, who was interviewed on her own as other invited parents failed to attend, and whose comments were coded with those of the other parents to maximise the representativeness of the data
- eight parents of five children (all from Glasgow) receiving direct/individual (n = 1), direct/group (n = 2), indirect/individual (n = 1) and individual/group (n = 1) therapy
- three parents of three children (all from Edinburgh) receiving direct/group (n = 2) and indirect/group therapy (n = 1).

Analysis

Transcribed data from the sessions were organised into discrete themes, with a theme defined as "a segment of text that is comprehensible by itself and contains one idea, episode or piece of information".[164] Categories were then constructed by means of open coding.[165] Reliability of coding using these categories was checked by independent coding of 11% of the themes and 84% agreement achieved.[166] A framework approach was then used to analyse the themes which emerged,[167] focusing on the parents' perception of the therapy their child received, their views on the contact with the project and their perception of their child's progress over the course of the project. Appendix 5 shows the categories used to code the data.

There were 494 coded themes in all, 131 themes from group 1, 34 from the parent in Edinburgh, 274 in group 3 and 82 in group 4. Of the total, 43% related to general comments about education and the school system (n = 74), community speech and language services (n = 25) and general comments about the problems of PLI (n = 22), or consisted of non-evaluative comments, requests for information, comments about non-participating siblings of the project children, or comments with unclear referents (n = 68).

The emergent themes (n = 363) relating to the parents' experiences and views of the project are summarised in *Table 23*.

Parents' views of therapy

Parents were, in general, pleased with the therapy their child received:

> I have four children two of which have speech and language problems. The youngest is at a Speech and Language Unit so I've been through the system and experienced the slowness of the system. This project was like a godsend. [SLT/A] was brilliant and it was just the right thing for [child].
>
> [The project] is like a breath of fresh air. It's all set up for you.

Parents also highlighted the benefits of school-based, intensive therapy, with the benefits of direct, indirect, individual and group modes noted, as shown in the following illustrative quotes:

> I think it's quite good it is carried out in a school environment as well, because that's where the children are. I know that [my child] went over to [a group] in a different primary school, but it was still a school environment he was in, you know.
>
> It was also kept with the school hours.
>
> I was really pleased with it. It was very intense compared to what they normally get. Normally, [my child] would go for six weeks and then have a break for about 3 or 4 months. But this being three times a week for, I think, 19 weeks, I felt was really worthwhile and you could really notice a difference very quickly. And it also let him get to know [SLT/A] quickly as well because one of the difficulties he's got is with change and meeting new people and things so it is difficult for him. It can take [him] a few weeks to get to know the person before they start being confident with him. So I was really pleased with it.
>
> The therapy was intensive and this was good: there was continuity.
>
> I think working in small groups was a good thing for him as well. [SLT/A] managed to make it fun for learning. She did it though games and different things which made it fun for them. I think that builds their confidence when they are in a smaller group.
>
> [My child] was the opposite, she was 1:1, she wasn't in a group with it. But the teachers had been doing things with her, like learning support in the school. She had been taken out. She didn't like that because she felt she was different from the rest of the class, she was getting taken out. But in this study she was absolutely brilliant with it, I think because it was all made fun.
>
> I feel that it went really well. There's nothing that I feel that could change with it at all. It was an SLTA that [my child] saw and I was quite happy with that. I was certainly happy with the work that the SLTA was doing with [my child].

There was also widespread agreement that the children both enjoyed the therapy and that they had a good relationship with their project SLT/A:

TABLE 23 *Summary of emergent themes from the focus groups*

Parents' views of therapy	Contact with the project	Children's progress
Positive aspects		
Therapy was school-based	Contact was helpful with advice and feedback provide	Children's confidence improved
Sessions were frequent and the therapy was intense	SLT/As were readily contactable	Progress in speech and language, reading, written language and other curricular areas were noted
Timing of group therapy sessions at the end of the afternoon minimised disruption to classwork		Social benefits including better peer interaction and being able to deal with bullying
There were benefits of delivery of the therapy from all four modes (direct/indirect and individual/group)		Many of the children were less frustrated following intervention, with fewer tantrums and an increase in their motivation
There were benefits in the children being in another school for group therapy		
Children enjoyed the therapy and felt it was helpful		
Children had a positive relationship with their SLT/A		
The project provided schools with support		
Taxis and escorts were provided		
Project also received support from the schools		
Negative aspects		
Some parents did not know enough about the aims of the project at the start	Transition at the end of the child's therapy might have been better planned	There were concerns about the effects of children missing sessions as a result of illness or injury
A number of parents had difficulties with the project homework (and one parent felt there should have been more homework)	Reports from the project were too similar to school reports	Some teachers told parents that the children were not progressing
Some children did not understand why they were involved in the project	There was not enough contact (separated father)	There were concerns about the ending of the intervention phase and that children may regress once they are no longer receiving therapy from the project
Some children took time to settle in a group		Concerns that the intervention phase should have been longer
Sessions should have been longer		Some parents were uncertain about the project efficacy
There were problems in communication between the school and the project SLT/A		

> He obviously liked [SLT/A] who was doing the treatment and could relate to her and he got on with her, so he felt comfortable with that.
>
> [My child] really liked [SLT/A] which was a huge help.
>
> He really likes [SLT/A].

The provision of taxis and escorts to take the children to groups in other schools was welcomed:

> They were coming and bringing him back [by taxi] which took the pressure off me and it was late in the afternoon which didn't disrupt him too much.
>
> But they got to know the escort as well. That was very good as well, which I think helped [my child] as well get on, and made them want to go.

The opportunity for the children to benefit from the experience of having their group therapy in another school was similarly welcomed:

> I think it also helped the children – I don't know if it was the same in all cases – but the children going to a different place to do it, rather than – I know sometimes it's good when somebody comes to the school and helps to do things with them, but it would have just felt like a normal, boring school day for them, I think! I know that with [my child], he loved to go because he was getting – it was like a trip for them, getting away from – it was like a different group of friends who were meeting. Just a different environment for them, really.

Parents also noted that the project provided their children's schools with support:

> [School] have learned a lot about the problems and they can … give the support – some of the support that [my child] got to other children.

> When I went up to see [my child's] teacher as well, [teacher] says you don't know how much this has helped us as well because we did not realise the extent to which the [SLT/A] can help people like [my child]. So that means that if anybody else is starting the school they can see it, whereas before they didn't [pick up on it].

> We even felt that the school was actually pleased that [my child] was part of this group because they were getting to the stage where they didn't know where to go, whereas they feel that this [SLT/A] has come in and she has worked with [my child] and they have found a better understanding of her problems. And it's helping them as well to teach her.

> I think because it is specialised. Their learning pack goes in and the teachers are going through it, materials that they don't have they have got them available. It can help within the class as well as help your child.

> [SLT/A] was very good in that she went in and saw [my child's] teachers. They were nervous about what she was going to say to them. She went in and she continued to follow it up. At the end of it, she gave the school a project pack.

One parent felt that teachers would benefit from additional training and support to continue the work in the classroom:

> The teachers [in the school] weren't sure – they don't know what the matter is, they don't know where to go. They've tried all the things they could help with, but they are not too sure how to begin.

However, some of the parents felt that they did not have enough information about the aims of the project at the beginning:

> Firstly, I didn't really understand things about Outreach or whatever. I just knew that [my child] had regular appointments with speech SLT/As and when his name was put down [for the project], I thought that they were just really wanting to put children together to get feedback from them for whoever's own benefits. I didn't actually realise that they were actually working with the children until later on, when I was a bit dubious about whether the kids were getting anything out of it. But then obviously, I found out a lot more. I didn't think it was going to be helping them. Because we never heard about the aims before, I just didn't understand.

Some reported difficulties in getting their children to do project homework:

> Any time [my child] has had work, maybe with the special needs teacher in the school, she is really in there. She wants to do it, she wants to learn. But again in the house, we can't get her to do any of that. It's very hard because packs and all that, although they're brilliant and you go through them with her, and she's like, 'Right, OK'. But it's actually trying to get her to sit down and do it.

> I wasn't always very successful at doing the homework as I work fulltime and have two other children. It was a bit of a nightmare to fit it all in.

Although in contrast, one parent felt that there should have been more homework from the project:

> It would have helped if we knew what they were doing, you know, even bits of homework.

There was concern that some of the children did not understand why they had been involved with the project:

> Actually going to something he didn't understand why he was having to go [to].

And some children took time to settle into their groups:

> It took [my child] quite a while to settle into it. He was so shy.

One parent felt that the sessions should have been longer, particularly for those attending groups on account of the travel time:

> I would have liked the sessions to be slightly longer, because obviously by the time a child has got picked up, dropped off, sometimes with the traffic, they are maybe only there for half-an-hour sometimes. Yes, even slightly longer, yes, not so much so that they get too tired, or whatever.

Some problems in communication between schools and the project members were also reported:

> The school organised a meeting but hadn't told [SLT/A]. [There are problems with] liaison.

Contact with the project

There was widespread consensus that the project SLT/As provided helpful advice and feedback and were easy to contact, with parents of children attending groups more likely to have telephone contact than face-to-face:

> Nothing was a bother, it didn't matter how trivial something was.

> [SLT/A] was always there when you needed her.

> I had quite good contact. It was either by phone, or a quick word first thing in the morning before the session started, and also by 'schoolbag post' as well. Every time there was a package home there was a letter with it and the phone numbers all on it so I could phone her if I wasn't sure what was in the package or what I was supposed to do with it or whatever.

> I thought they were great. They phoned me and let me know different things, sent me letters, sent me packs with things to do for [my child]. They were really good with [my child].

> I phoned [SLT/A] and she came out to visit me after it, gave me some more detail and left me some things to do with [my child], which I thought was great. You wouldn't normally get that. It wasn't a bother. There was more time to attend to the smaller details, which I think makes much more of a difference to the child.

However, a number of parents commented that the transition at the end of the child's therapy might have been better planned, as the children attending groups in particular did not appreciate that they would not have further contact with their fellow group members:

> [My child] was upset [when the sessions ended]. I think it is quite hard to have that much contact and then cut it off. That's my only downside to it: it didn't tail off, it just cut off and then we're back to the system.

> I don't think [my child] actually really knew that it was actually finished. He thought that he would go back after the summer holidays and he would continue. He knew that he was having a party, you know, and that kind of helped. But it didn't really make him understand that it was finished after the summer holidays. So I had to kind of explain to him that it wasn't going to happen again and he didn't really like that. He wanted to go back.

> Another meeting of [my child's] group before the end of term for the boys to see each other again I think would be a really good idea.

Some of the parents felt that at the end of the children's intervention phase the project should have provided reports or information directed specifically towards parents rather than merely send out copies of the reports that were sent to the children's schools:

> No, they were like school reports, like behaviour and reading, speech and how he's progressed in the group and just an overall report from the teacher.

> With Outreach we tend to get a tape of the session which I found quite handy.

> [My child] did not get a lot of work home or packages home but you got a report every so often [as to] how he was progressing, much more detailed than a normal one. At the end of it, the report I felt didn't give me enough information, it gave what they were letting the school know.

Finally, one parent (a separated father) noted that his ex-wife had the contact with the project and that:

> I didn't get any feedback about my child at all.

Children's progress

All of the parents reported benefits from therapy, with 102 themes mentioned in total. Improvements in self-confidence, in social interaction and behaviour, literacy and other curricular areas were mentioned in addition to progress in speech and language:

> I've noticed him now when he realises that he is using the wrong sort of tense when he's speaking he's actually trying to stop himself and he's actually trying to correct himself.

> I think it has made my son more confident in himself … He feels more lively. He feels that he can contribute more in group sessions and at home. He feels that he can be a part of the group, talking to his sister or whatever. This time he has an opinion more. I notice that [my child] always waited at first to ask questions. He just wanted to give a 1- or 2-word answers, sort of thing. He's actually coming out with more, he's asking us more questions. He's wanting to talk about other things, whereas before, we were just doing the talking for him really. I think it's helped [my child] to be more confident out of school as well as in school, as well.

> [My child] has never been a quiet, quiet child, but a teacher said she would never be a leader in the class. Last year, just when the term ended up, they were away on a trip doing something, and [my child] was sitting in the mini-bus. And [the teacher] says, [my child] was like, 'Right everybody, we're all going to sing'. And [the teacher] says that it's as if [my child] came into her own. She just had the confidence to come out and do things. And [the teacher] says it's obviously – it's just confidence-building. [The teacher] said, 'I had tears in my eyes that [my child] was right up there and she was like, 'Everybody, do this.' And before, [my child] was always in the background.

> As soon as this project started, [it's] unbelievable the difference in [my child]. Unbelievable. She used to get angry with herself because no one could understand her. But see within the space of 5–6 weeks, she had more confidence.

> I definitely felt [my child] made really good progress and it was noticeable to everybody. Think some days when you are with your child all the time you maybe don't notice it as other people do. But [at the end of]

> the 15 weeks, at Burns Day, he won a prize from the Burns Association for reciting Burns poetry. It was a runner-up prize. I was really impressed. He really was very proud, [and] I was even more proud. It just shows how much his confidence has grown.
>
> He has done well with his reading. He's got his results and it's to the standard he should be at.
>
> Reading, not a great improvement with what I would have liked, but he is actually wanting to read now.

Benefits in terms of improved peer interaction and in dealing more effectively with the problems of racial bullying were also noted:

> [The project] makes them better at mixing with other kids as well.
>
> [It] made him make new friends at school and it stopped the bullying as well. He made more friends and the racism stopped because he was able to stand up for himself and tell the teacher. Before, he wasn't able to tell the teacher.
>
> [My child] seems to have settled down OK and is mixing well.
>
> Because [the project] made [my child] make new friends at school.

Parents also reported that their children were happier, less frustrated and presented with fewer tantrums as a result of the project:

> A lot happier
>
> [My child] still does have some problems with instructions and things but he's not got that initial going into a temper.
>
> He doesn't get frustrated as much if he can't get the word.
>
> [My child's] been quieter: he was always 'in my face' all the time.

However, there was concern about the effects of children missing project sessions:

> I felt that when [my child] had the chicken pox he missed three weeks and went back a bit. He missed nine sessions. The class teacher said that he was unsettled for a few days and then eventually got back into the swing.
>
> [My child] broke his leg and was off school for two-and-a-half weeks. I was really concerned but [SLT/A] said that he was doing so well with a 1:1 that she wasn't too worried that he had missed some of it.

Further, in some cases, teachers advised parents that their children were not progressing:

> The teacher says she doesn't see any difference.

There were concerns about the conclusion of the children's project therapy and about the effects on the children's progress:

> It's frustrating. You notice the difference when they are getting therapy and then it stops. If it was continuous it would [be better].
>
> Now you've done this, it's stopped. We've all admitted there are benefits to it. From my point of view, there is no more, and that's a worry.
>
> I'm selfish, though, I'm looking for something to carry it on. If it doesn't happen now, that's the chance gone.
>
> But you don't know – I mean, this study has been brilliant, but you don't know if it's going to be a short-term, like, them feeling as if they can do it. It's maybe four or five months after the study finishes – how the kid actually feels. Whether they go back to where they were.
>
> It isn't really enough, it's like a taster, dipping your toe into the water.

And finally, two parents expressed uncertainty about the efficacy of the project:

> I would say we're lucky that [my child] was chosen for it because I've noticed an awful difference in him … It could have been coincidental. I really don't know.
>
> There was progress but how it came about I'm not sure.

In summary:

- Parents felt that the project had been extremely beneficial for the children involved and identified the following ways in which this was evident:
  - an increase in the children's self-confidence and their enthusiasm for learning
  - an improvement in the children's behaviour as a result of a reduction in frustration
  - an improvement in the children's speech and language skills
  - an improvement in literacy and in other areas of the curriculum.
- There was widespread agreement that implementing the therapy three times per week was of value to the children. This degree of intensity was considered to be helpful for achieving progress.
- The relative benefits of individual and group modes of therapy were noted, and the parents

were positive about both SLTs and SLTAs. Many felt that it was important to cater for each child's individual needs by providing the most appropriate mode of therapy.
- The role of the SLT/A was considered to be extremely important. Parents in the main reported a good relationship with their child's SLT/A. They also felt that their children had developed a good rapport with the SLT/A, which they felt had enhanced their progress during the therapy sessions.
- However, many parents expressed concern about the fact that the therapy was cut off rather than being phased out gradually. This was particularly difficult for those children who had established new friendships with the others in their groups.
- There were concerns about the longer term outlook for the children and their progress in the absence of ongoing support.
- Some parents also noted that they would like to see training offered to teachers so that the work of the SLT/As could be continued within the classroom setting.

Teachers' focus group

A random sample of 50% of the schools whose pupils received intervention in phase I of the project, stratified by mode of service delivery and city, was invited to attend focus group discussions (see Appendix 6). However, only one class teacher and a special needs auxiliary, both of whose respective pupils were randomised to direct individual therapy, attended. They advised that the poor response was due to practical problems in releasing school staff, and no further invitations to schools were issued.

There were some 60 themes in the focus group transcript, but in view of lack of representativeness, a grounded theory analysis was not considered appropriate. Instead, the independent researcher who served as scribe during the session provided the summary of the session below, structured around the responses to the questions asked.

Summary of comments from teacher and special needs assistant

Views of the therapy

Both the teacher (CT) and the special needs assistant (SNA) felt that the therapy had been very useful for the children involved. The SNA thought that the content of the therapy sessions was relevant for the age and the ability of the child concerned. She stated that the therapy took the form of game-playing, which was very good as it helped to keep the child focused on the task in hand. This form of therapy was fun for the child and the SNA felt that this contributed to its success. She also commented that the therapy sessions ran over an appropriate length of time. The SNA was present at all the therapy sessions and noted that the SLT/A formed a good relationship with the child during the sessions. She did comment that more attention on the 'sound' aspect of the child's speech would have been useful, but overall noticed a big improvement in the child's speech and language ability.

The CT would have liked to sit in on some of the sessions. He was not present at any of the sessions involving his pupil. He also commented that no feedback was given to him regarding the content of the therapy sessions. However, he did notice a large improvement in his pupil's speech and language ability as a result of these sessions, especially in her sentence formation. He also noticed that the child's confidence has grown since she started the sessions. He also felt that the SLT/A developed a good relationship with the child. Overall, both the SNA and the CT felt that the therapy sessions had been enjoyable for the children.

Contact with the project SLT/A/assistant

The SNA felt very positive about the level of contact she had with the SLT/A. The SLT/A would explain the material to be covered in the sessions, prior to and after the sessions had taken place, and the SNA found this extremely helpful. She was also sent written advice and information regarding the therapy, which she found very useful.

The CT reported that he had very little contact with the SLT/A. He had one 15–20-minute session to inform him what was happening, but this took place well after the start of the therapy sessions. He was also given an A4 sheet with some information on it before the onset of the therapy, but felt that this was inadequate. He did acknowledge that the lack of information given to him could have been the result of a breakdown in communication at his end (i.e. within the school). He would have liked more contact with the SLT/A, as this would have allowed him something concrete to work with.

Children's progress

The SNA was quite impressed with her pupil's progress and could see a marked improvement. She noticed that the child's sentences were getting more complex and felt that the SLT/A was successful in drawing out information from the child. This particular child also had behavioural problems and this may have affected the therapy

TABLE 24 *Children by mode of therapy, primary school class, location and phase of intervention for SLT/A responses*

Intervention mode and location	*n* (%)	Primary school class and intervention phase	*n* (%)
Direct individual	34 (29)	Primary one	9 (8)
Direct group	28 (24)	Primary two	36 (30)
Direct total	62 (53)	Primary three	22 (19)
Indirect individual	31 (26)	Primary four	24 (20)
Indirect group	26 (22)	Primary five	14 (12)
Indirect total	57 (48)	Primary six	12 (10)
Individual total	65 (55)	Primary seven	2 (2)
Group total	54 (46)		
Total	119 (100)		
Glasgow	47 (39)	Phase I intervention	58 (49)
Edinburgh	72 (60)	Phase II intervention	61 (51)

slightly. However, the SNA was happy with the progress made during the sessions. She was slightly disappointed that the child's 'sound' ability was not focused on, as she felt that this was a problematic area. The SLT/A also seemed frustrated that this could not be given more attention.

The CT noted a significant improvement in the child's speech and language ability. The biggest improvement he noticed was that the child now knows when she has made a mistake and will try to correct herself. However, the CT commented that his lack of direct involvement in the sessions made it difficult to judge the extent of the child's progress.

In summary:

- Both the CT and the SNA felt that the project had been beneficial and the therapy appropriate for their pupils, although the SNA noted that the absence of therapy for speech sounds in the programme was problematic.
- Both reported that their pupils made progress in speech and language and that there was also a concomitant improvement in self-confidence.
- Both SLT/As were judged to have a good relationship with the children.
- The CT reported that he had little contact with the SLT/A who visited his pupil and no feedback regarding the content of the sessions, although it appeared that information provided to the school had not been passed on to him. In contrast, the SNA sat in on all sessions and received helpful advice and information regarding the therapy.

Researchers' opinions on contact with children's schools and families

This section presents the views of SLTs and SLTAs concerning working with schools and parents. Questions were constructed following discussion of areas of interest and of specific questions.

Investigating researchers' views

Questionnaires

SLTs and SLTAs completed a questionnaire at the end of intervention phase II for each child for whom they had delivered intervention, detailing contact with the child's school and family. One SLTA had left the project by then and information for her five children was unavailable.

SLT/A researchers' responses

Questionnaires were returned for 119 children, 96% of the 124 children receiving research intervention (*Table 24*).

Frequency and forms of contact with families

Q SLT/A F1a: I had contact with this child's family:

Response *n* (%)	Amount of contact
24 (20)	Every fortnight or more
42 (35)	Every three to four weeks
31 (26)	About three times in the phase
13 (11)	Once or twice in the phase
8 (7)	Never
1 (1)	No response

Q SLT/A F1b: Please say why in your opinion this pattern occurred
In total, 102 comments were classified into six categories, presented in rank order.

Over 90% of families had contact three times or more during the intervention phase. Around half of the SLT/As felt that this was sufficient; another third listed family factors as influencing contact.

Reasons for contact patterns *n* (%)	**Illustrative comments**
Contact was sufficient, including updating on targets or progress: 52 (51)	• It was felt that was all that was necessary. • [I] made sure [the] parent knew to phone if she wished to discuss anything. • To keep parent updated on therapy.
Lack of opportunity (e.g. no phone at home, or family not very keen): 22 (22)	• Parents were difficult to contact and changed [their] phone number without informing the project. Messages had to be relayed through [a] grandparent. • We did not have [a] phone number for this child and neither did [the] school. I wrote to the parents lots of times and received no reply. I also gave [a] homework diary but it didn't come back. • [The] family phone frequently went unanswered – [parents] could not phone from office as calls were barred. Mum was reluctant to talk to me.
Parent or family very interested or concerned: 11 (11)	• Parents/family were keen to know of ongoing progress. • [The] family were keen. • I had a lot of phone contact with Dad before therapy started, and in fact before the initial assessment. Both parents were very anxious and keen to be kept fully informed.
Working environment was convenient for contact: 7 (7)	• Mum helped with school activities so informal contact occurred naturally. • [The] child's parents escorted him to therapy sessions, allowing us to meet regularly. • Mum was in school regularly so we frequently bumped into each other. We also spoke on the phone and used a home-therapy diary.
Other: 7 (7)	• Child found it difficult to pass on and return homework diary. • I checked to see if they had any questions a couple of times and to enquire after [the] child when he was off – they were not seeking more contact than this. • Parents welcomed feedback but did not seem sure about how to reply, therefore only necessary contact was carried out.
Child absence/illness: 3 (3)	• [Contact] was uneven throughout [the] phase – [the] child had [a] long absence due to hospitalisation, so [there was] no contact then. • The child didn't attend well. • To discuss the child's lack of attendance and intervention update.

Q SLT/A F2: If contact occurred, what form did it take?
Seven forms of contact were listed: phone call, pack/worksheets for the child, written note from SLT/A, prearranged meeting, informal meeting, regular diary and written note to SLT/A. Several forms could be used with one child. Additional comments were received for 35 children, some relating to several forms of contact.

Around three-quarters of families had three or more forms of contact. Telephone was listed for over 90% of families; around one-third received packs or worksheets, and a similar percentage received written notes.

Response *n* (%)	**No. of forms of contact used**
34 (29)	One form
26 (22)	Two forms
26 (22)	Three forms
19 (16)	Four forms
6 (50)	Five forms
8 (7)	No response

Form of contact: *n* (%)	**Additional comments**
Phone call: 108 (91)	• During one phone call, the father asked my advice about the suitability of games for his child. • [The] parents worked full-time therefore [I was] unable to arrange [a] meeting. • Phone calls [were] made to give mum [an] opportunity to discuss any queries regarding information in [the] homework diary.
Pack/worksheets for child: 41 (34)	• Mum was keen to talk about difficulties she had observed and to go over work with the child. • Packs/notes were sent but no feedback [was obtained] and [I was] unable to get hold of mum to discuss work [for the child].
Written note from SLT/A: 36 (30)	• Regular contact was made through written notes. • A meeting [was] offered but Mum [was] happy with written feedback.
Pre-arranged meeting: 26 (22)	• I met the mother at a pupil support group meeting for the child. • Mum attended a meeting at the school with [the] head teacher, class teacher, the child and myself. • A multi-disciplinary meeting [was held] with mum, class teacher, his [?] teacher, head teacher and educational psychologist and myself. The mother didn't direct any queries at me.
Informal meeting: 22 (18)	• The father appeared at school at my final session to thank me. • Mum was keen to talk about difficulties she had observed and to go over work with the child.
Regular diary: 25 (21)	• This child was given a home-therapy diary which was filled in by me when it was returned. I also phoned every two–three weeks to make sure Mum understood what we were working on and to see if she had any questions. • Mum often wrote comments in the homework diary. • [A] homework diary [was] sent weekly. However parents rarely wrote comments on the book, so I phoned to ensure they understood what was happening and to discuss any queries they may have.
Written note to SLT/A: 12 (10)	• Contact was made by dad to let me know that he was noticing a difference.
No response: 8 (7)	• (No comments listed)

Q SLT/A F3: Which family members were ever involved?
Several family members could be involved for one child. Additional comments were received for 11 children, some relating to several family members.

Only one family member was involved for over 60% of children, and few had more than two. For the large majority of children the mother was involved, with fathers for 30%.

Response: *n* (%)	**No. of different family members involved**
74 (63)	One
35 (29)	Two
1 (1)	Three
1 (1)	None
8 (7)	No response

Family member mentioned: n (%)	**Additional comments**
Mother: 102 (86)	• Mum was very aware of child's difficulty and very appreciative of extra input. [She] spends a lot of time doing extra work with [the] child at the advice of his Learning Support Teacher. Father lives abroad. • [Mother was] very supportive of child, but anxious about difficulties. • [The] father [was] not with [the] family.
Father: 36 (30)	• [I had] more contact with father. • Both parents were equally involved in discussing progress over the phone. • Mother mostly and father at [a] school meeting.
Grandparent: 4 (3)	• The grandparent often phoned to say the child wouldn't be at school for a while but was reluctant to discuss progress.
Other: 3 (3)	• Foster mum and dad. Foster mum was very supportive and keen to have as much SLT input as possible for [the] child. • The child's aunt was a learning support teacher at the school and we had an informal meeting. • Aunt and uncle (legal guardians).
Sibling: 2 (2)	• (No comments listed)
None: 1 (1)	• Letters and homework diaries were addressed to parents. I never actually managed to speak to either.
No response: 8 (7)	• (No comments listed)

Q SLT/A F4a: Did the family ever initiate contact with you?

Response *n* (%)
No: 81 (68) Yes: 38 (32)

Q SLT/A F4b: If so, about what issues?
Comments were made for 38 children.

Over 80% of families were reported not to initiate contact with researchers. Comments suggested that those who did so exchanged information about a child, or about routine matters such as child attendance.

Issues on which families contacted researcher: *n* (%)	Illustrative comments
Exchanging information on progress or about a child (e.g. health, behaviour, information): 16 (43)	• [About] general progress – work [that] can be completed at home. • Regarding absences and also when [the] child had [a] good school report. • [To say they were] happy about therapy starting and happy about extra therapy sessions, and [about] what will happen when therapy finishes.
Routine (e.g. appointments, child absence): 15 (40)	• To discuss longer [child] absences. • To return phone calls to [the] project if messages were left. • To inform [the project] about child absence.
Concerns about the project or the child: 6 (16)	• To discuss concerns regarding behaviour and how this was managed outwith SLT. • Keen to get a clearer 'diagnosis' for [the] child and to have areas to work on. • Prior to assessment, [the] dad phoned frequently to discuss his concerns about his child. During therapy, they rarely if ever initiated contact but perhaps it wasn't necessary.
Other: 1 (3)	• They said they did not know what to ask, but were very pleased and always very thankful to receive feedback.

Q SLT/A F5: Did you ever feel the family was reluctant to have contact?
Respondents felt that families of over 80% of children were not reluctant to have contact.

Response: *n* (%)	Illustrative comments
No: 97 (81)	• They were always very pleased to receive feedback. • [They were] very eager to have contact. • Mum was very interested and keen to do anything she could to help at home with therapy.
Yes: 17 (14)	• [I] left [a] message which was never answered; [I] asked [the] class teacher to ask [the] parent to phone when she saw them, [but they] never did. [The parent] did not return [the parent] questionnaire. • I felt that the family felt slightly intimidated [and they] did not reply to letters or phone calls. • I think they were happy it was happening at school and that they didn't need to do anything.
No response: 5 (4)	• (No comments listed)

Q SLT/A F6: How welcomed did you feel by the family?
Respondents felt welcomed or very welcomed by the families of around two-thirds of the children, with less than 10% of families making them feel not very or not at all welcomed.

Response: *n* (%)	**Illustrative comments**
Very welcomed indeed: 41 (34)	• Always pleased to have contact. • Despite her initial misgivings, Mum was very relieved that they took part in the project. • Good response to therapy process.
Welcomed: 42 (35)	• Always eager to chat, often had thought through specific questions to ask. • But mum had an awful lot of prior anxieties regarding SLT service as her child had been on the waiting list for over 18 months without any input. Mum appeared to believe that SLT was going to be the 'cure' for her child's problem. • Dad was very positive about the work his child was receiving and that the rest of the family were also noticing a difference.
Fairly welcomed: 20 (17)	• Mum was friendly on the phone, [and] said her child enjoyed the group – she didn't have any concerns she wanted to discuss. • Mum was concerned about [the] child's difficulties but appeared reluctant to discuss with me. • There were lots of family problems that possibly took precedence over concerns about SLT provision. When I talked to mum on [the] phone and met her at [the] end of intervention, she was very pleased and grateful about [the] project and her son's progress.
Not very welcomed: 5 (4)	• They may have liked the input – I just don't know! And no questionnaires were ever received. • Mum commented that her child had seen several different SLTs and that he didn't like the 'change'. She didn't let me know that they would be away for 3 weeks or discuss other assessments he was having by other professionals.
Not at all welcomed: 6 (5)	• [We] had no contact.
No response: 5 (4)	• (No comments listed)

Q SLT/A F7: Do you think the family acted on the advice the project gave?
For the majority of families respondents were unsure if advice given by the project was acted upon; although for around one third they considered advice had been acted upon.

Response: *n* (%)	**Illustrative comments**
Yes: 42 (35)	• [Parents] could see [the] difference – [and] asked for additional work. • This was indicated by comments in the homework diary. • Parents always sent notes into the school to inform how [the] child progressed with games at home.
No: 7 (6)	• [Parents] did not want additional advice or work. • Homework materials were given to the school – [the] child took these in to school. • [They] did not have any advice.
Not sure: 69 (58)	• Homework was provided – Mum [was] honest about [the] times it was not done. • [The] mum agreed that she would try [to] implement strategies and work on suggested activities. [The] child gave no indication of what was worked on at home however. • Mum very happy with therapy but her only feedback re: progress, when talking over phone, tended to be that her son was happy. I think she found it hard to express the types of difficulties her son was having and so phone calls were [a] very one-way process.
No response: 1 (1)	• (No comment listed)

Q SLT/A F8: Do you have any further comments?
Further comments about families were written for 20 children. These are listed as broadly positive (n = 12), broadly negative (n = 5) and mixed/other (n = 3) comments. No further categorisation of these comments has been made.

Broadly positive comments
- [An] aunt has a lot of contact with [the] school and they say she is very supportive. [The] school will also discuss with the aunt details of child's therapy/progress.
- [The] child had been on [an] NHS waiting list, so [a] formal meeting [was] arranged to give parents assessment feedback regarding [the] language profile. [This was] straightforward.
- [The] child had [a] range of difficulties, but [the] family [was] supportive of all feedback and ideas for behaviour management.
- Dad reports that he is now understanding his child better and that his tantrums have really lessened.
- [The] foster parents were aware of [the child's] poor attendance for SLT in [the] past and [were] keen to ensure child [was] now benefiting as much as possible from project input.
- [There had been] little direct SLT until [the] project started. [The] family wanted to 'fix' [the] child's difficulty.
- Mum appeared to appreciate SLT input.
- Mum [was] keen to have advice for broader areas than just [the] language targets covered in [the] group.
- Mum said she was happy with the level of contact and was pleased to be involved in the project. She needed a lot of support and guidance.
- Mum was very concerned for [the] child's progress and also behaviour and welcomed SLT ideas and advice. [She] appeared positive about project outcomes.
- Parents reported progress with [their] child – nice to have feedback!
- The school seemed to think this family were very happy with the input.

Broadly negative comments
- [The] child was discharged from [the] local SLT department due to persistent failure to attend. The history [is] thought to be of very delayed speech/language.
- Contact was not made with this family. Most contact was through [the] class teacher.
- Parents [were] very keen to have a 'label' for [their] child but [the] SLT [was] unwilling/unable to do this as [the] child has literacy issues. Also [there was] very poor follow-up of homework – [the] school had [the] same difficulty with reading and homework. [It was] frustrating as [the] child needed the support.
- This child was nearly nine at the start of therapy and had had quite a lot of previous assessments. Mum never wanted to discuss how I found the child – she just 'warned me' not to let him get away with saying he was bored.
- [I] would have preferred to have contact with parents to help plan targets – [it] would have been useful to gain their ideas on [the] child's area of difficulty.

Mixed/other comments
- The child had behavioural problems that the family and staff were struggling to find positive ways of coping with.
- [The] family did not appear to accept my reports of behaviour difficulties (included hitting peer and taxi escort). [These were] justified as 'He's just a boy'. [They] seemed happy with language progress however.
- Information from school suggests [the] parents have some degree of learning difficulties themselves. [They] are supportive of [the] child but not aware of the extent of her difficulties.

Frequency and form of contact with schools

Q SLT/A S1a: I had contact with this child's school

Response: n (%)	Amount of contact
45 (38)	Every fortnight or more
24 (20)	Every three to four weeks
31 (26)	About three times in the phase
18 (15)	Once or twice in the phase
1 (1)	Never

Q SLT/A S1b: Please say why in your opinion this pattern occurred
114 comments were classified into seven categories, presented in rank order.

Over 80% of schools had contact three times or more during the intervention phase. Contact was affected by therapy mode: children in groups had less chance of informal contact if their group met in another school. For just over 20% of schools respondents reported that contact was sufficient: the others listed school factors and convenient working environments as influencing contact.

Reason for contact patterns: *n* (%)	**Illustrative comments**
Not working in child's school (i.e. group children): 28 (23)	• [I was] not working in [this child's] school so missed out on informal contacts. • As [the child] was part of a group, and the group was not held in her school, it wasn't so easy to maintain contact. • As this child went to another school, it was difficult to see the teacher regularly, so formal meetings had to be arranged.
Contact was sufficient: 26 (22)	• This was all that was necessary to discuss progress etc. with [the] class teacher. [The] learning support teacher occasionally dropped in to observe sessions. • [The] class teacher was reluctant to meet more frequently [and] felt that the contact we had was sufficient to keep her informed. • All that was necessary to discuss areas of concern/progress. [There was] more contact in the last few weeks of intervention as I worked in class with [the] child.
Working environment was convenient for contact: 24 (19)	• [The] headteacher worked in the room next door so we had several casual encounters. I also conducted some sessions in the child's classroom so had contact with her class teacher beyond a formal meeting. • Working in the school made incidental contacts easy. [For this] complex child collaboration [was] very important. • I walked past the class teacher's room every session and as the school day had finished, she was often available to talk to. She was very concerned about the child's behavioural difficulties, and exhausted by him and was, at times, glad to have someone to talk to.
Lack of opportunity (including time, space, scheduling or school not very keen): 22 (18)	• The teacher did not always have time to discuss [the] child and was not always very willing. • This school was not very receptive to feedback and so feedback tended to be swift when I took the child back to class. • When in school, other group children [were] present – additional arrangements had to be made. • Contact was with [the] learning support teacher who was extremely busy. • Possible times for meetings were discussed (after school, lunch, interval) and [the] teacher decided that we should meet at intervals. [It] was difficult to have a proper discussion in this 10-minute period.
Teacher or school very interested or concerned: 8 (7)	• The class teacher was always interested to talk about the child. • I collected [the] child from class. [There was] a very open/welcoming class teacher and language teacher – they were very interested and easy to talk to. • [The] class teacher [was] very interested in [the] project and keen to give advice on how to help the child. She was willing to use time after school for meetings so we met once a week to discuss therapy and work being carried out in class. • The teacher was keen to discuss the work the child was doing in relation to the classroom learning and the child's difficulties. • The class teacher was interested in discussing the child's progress and for me to integrate topic vocabulary into therapy sessions.
Teacher or child absent: 6 (5)	• [The] teacher was absent for some time. Also [it was] difficult to arrange meetings with her as [she was] busy. • [The child's] teacher [was] off on maternity leave so didn't see her much. [I] saw [the] learning support teacher more. • Initially [the] child's teacher was absent and there were various [supply teachers] so [it was] harder to make contact. • [The] child had three teachers during [the] intervention phase, who did not know [the] child very well. [The] difficulty [was] to have useful discussion about [the] child's needs and progress. • [I was] mainly talking to [the] school regarding [the] fact that [the] child [was] not attending school.
No response: 5 (4)	• (No comments listed)

Q SLT/A S2: If contact occurred, what form(s) did it take?
Seven forms of contact were listed: phone call, pack/worksheets for the child, written note from SLT/A, prearranged meeting, informal meeting, regular diary and written note to SLT/A. Several forms could be used with one child. Additional comments were made for 22 children, some relating to several forms of contact.

The schools of around three-quarters of the children had three or more forms of contact. Prearranged meetings were held with the large majority, and informal meetings with nearly two thirds. Almost half received packs or worksheets. Telephone contact with school was used for less than one-quarter of children.

Responses: *n* (%)	**No. of forms of contact used**
25 (21)	One form
46 (39)	Two forms
24 (20)	Three forms
21 (18)	Four forms
2 (2)	Five forms
1 (1)	None listed

Form of contact: *n* (%)	**Additional comments**
Prearranged meeting: 102 (86)	• Meetings were informal but we had a set meeting time every week for feedback. • Meetings were informal but prearranged. We had a set time. The class teacher also read the home-therapy diary for the parents. • [We] occasionally had prearranged meetings. • I tried to arrange a regular time to meet with [the] teacher prior to therapy starting [but] she was reluctant to do this. Some pre-arranged meetings [were] held but were difficult to schedule as [the] teacher had to arrange cover for her class and couldn't manage after school. • [I was] invited to [the] child's review.
Informal meeting: 75 (63)	• [The] child had [a] 1:1 assistant – she came to most sessions and wanted extra work to do. • On occasions, informal chats occurred to detail progress in specific tasks. • Five minutes before and after therapy sessions. • [We] often discussed general progress in passing. • Most contact was informal and I would fill them in with what we had been working on. However, formal meetings during playtime and after school were also scheduled for more comprehensive feedback sessions.
Pack/worksheets for child: 54 (45)	• Cue cards were provided.
Written note from SLT/A: 34 (29)	• Sometimes [I was] asked by class teacher for a written note on specific class work. • [There was] no time with [the] teacher for chat. • [It was] most frequently in the form of written notes.
Phone call: 27 (23)	• (No comments listed)
Written note to SLT/A: 2 (2)	• (No comments listed)
Regular diary: 0 (0)	• (No comments listed)
No response: 1 (1)	• (No comments listed)

Q SLT/A S3: Which school staff were ever involved?
Several staff members could be involved for one child. Additional comments were received for 22 children, some relating to several members of staff.

More than one school staff member was involved for over 70% of children. For almost all children the class teacher was involved, and for nearly half the head teacher.

Response: n (%)	Number of different school staff involved
34 (29)	One
45 (38)	Two
26 (22)	Three
13 (11)	Four
1 (1)	Five

School staff mentioned: *n* (%)	Additional comments
Class teacher: 114 (96)	• [The] class teacher was very keen to carry on with any work which could have been used in class with [the] child or peers. • [I had] two formal meetings with the class teacher but frequent informal meetings with the headteacher as she was often walking about near the room I worked in and made a point of stopping to talk. • Both [the] head and class teacher gave feedback to me (reciprocal sharing of information was good in this school).
Headteacher: 57 (48)	• I had a meeting at onset of therapy with [the] depute and head teacher to discuss [the] project and also [to] run through intended targets for the child. • [The] head teacher observed therapy on a few occasions [and] was very interested in the project. • A general discussion was had with the head teacher prior to therapy beginning.
Learning/language support teacher: 25 (21)	• [The] learning support teacher [was also the] language teacher who was involved. • Contact with [the] learning support teacher occurred informally as we both had time in another school and overlapped at lunchtime. • [Because the] class teacher [was] never willing to meet.
Deputy/assistant headteacher: 38 (32)	• In [the] middle of therapy, [I] discussed concerns with [the] assistant head teacher, who was also the learning support teacher. [I] requested meeting with class teacher via the head teacher. • At the end of therapy, I met with the depute to discuss ongoing arrangements. • Mum had expressed concerns that despite psychological assessment being suggested in Primary One this had never been carried out. I arranged [a] meeting with [the] depute to discuss.
Educational psychologist: 8 (7)	• I attended a review meeting and initiated contact with the educational psychologist. [Also] the depute – I'd been in touch with her to arrange the setting up of the group and she was always very interested in [the] child's progress. • This child was a very complex case and had many additional issues so a whole team approach was important.
Classroom assistant: 12 (10)	• Special educational needs assistant – school staff were very helpful and friendly
Other: 3 (3)	• Speech and language SLT/A. • Secretary. • Planned activities time teacher.

Q SLT/A S4a: Did the school ever initiate contact with you?

Response: *n* (%)
No: 90 (76)
Yes: 28 (24)
No response: 1 (1)

Q4 SLT/A S4b: If so, about what issues?
Comments were returned for 29 children.

Around three-quarters of schools were reported not to have initiated contact with researchers. Comments suggested that those who did so exchanged information about a child or about child reviews.

Issues on which schools contacted researchers: *n* (%)	Illustrative comments
Sharing information about a child (e.g. progress, health, behaviour, communication): 12 (41)	• [The] headteacher often approached [me] regarding progress (and also regarding SLT in general). • [The] child not wearing glasses in school was brought to [the] attention of [the] project. • To discuss [the] child's entry in [the] school 'Golden Book' where they are recognised for various achievements.
Re review/parent/IEP meetings: 9 (31)	• In connection with a meeting for the parents and staff involved with the child. • To request I attend a multidisciplinary pupil support group meeting postintervention. • [I was] asked for additional information from the first assessment. [I was] asked for input for individual education plan targets.
Routine (e.g. re child attendance): 4 (14)	• Phone calls on his attendance. • Only regarding [the] child's absences. • [There were] frequent phone calls on his attendance.
Concerns about the project: 3 (10)	• [The] head teacher contacted the project office to express her concerns that the child would miss too much school under [the] initial arrangement (travelling to another school) [to attend a group]. Compromise was reached [with group] therapy delivered in [the] child's school after Easter. • To invite [me] to meetings about initial concerns regarding [the] child's distress regarding the group.
Other: 1 (3)	• However, the depute sent me some work that the child had done once the project had ended – to motivate the child.

Q SLT/A S5: Did you ever feel the school was reluctant to have contact?
Respondents felt that the schools of over 80% of children were not reluctant to have contact.

Response: *n* (%)	Illustrative comments
No: 103 (87)	• They were extremely receptive and welcoming [of] the involvement. • However, on a number of occasions, [the] class teacher cancelled scheduled meetings. • [The] class teacher cancelled three prearranged meetings at [the] beginning of intervention but discussed her concerns with the learning support teacher, whom I did have a meeting with.
Yes: 15 (13)	• [The] class teacher was reluctant and at times I feel she considered the child leaving [the] classroom three times a week as meaning that she had one child less to worry about. • [I was] always chasing [the] teacher to give information, to arrange meetings etc. • [It was] just that [the child's] teacher seemed [too] rushed to have time to talk and once she forgot an arranged meeting and I was waiting half an hour for her.
No response: 1 (1)	• (No comments listed)

Q SLT/A S6: How welcomed did you feel by the school?
Respondents felt welcomed or very welcomed by the schools of around two-thirds of the children, with less than 5% not very welcomed.

Response: *n* (%)	**Illustrative comments**
Very welcomed indeed: 44 (37)	• I was shown the staff-room, instructed to make coffee if I wanted to; the headteacher was often around and had informal talks. • All staff [were] very welcoming and knew me by name. • They were extremely welcoming and to the other children who came to the group from other schools.
Welcomed: 38 (32)	• The class teacher and learning support teacher were very welcoming. They gave me flowers when I left. • [They] appeared pleased to be given information. • [My] reception varied amongst school staff.
Fairly welcomed: 32 (27)	• [The] headteacher [was] occasionally critical of therapy. [I] had to work in the main corridor (very busy/noisy). • [I was] welcomed by [the] child's classroom staff but not by secretarial staff. • [The] headteacher found it difficult to arrange an appropriate area for therapy to take place.
Not very welcomed: 4 (3)	• [They] never remembered I was coming. • [I was] not welcomed by [the] class teachers but welcomed by [the] secretary. • I was not allowed to use staffroom for my lunch.
No response: 1 (1)	• (No comments listed)

Q SLT/A S7: Do you think the school acted on the advice the project gave?
For the majority of schools respondents were unsure whether advice given by the project was acted upon, although for around one-third they considered that advice had been acted upon.

Response: *n* (%)	**Illustrative comments**
Yes: 42 (35)	• [The] class teacher informed me that she was implementing the strategies discussed. • [The] class teacher and language teacher were very keen to receive project advice. Cue cards and strategies were reported to have been used in the classroom. • [The] class teacher appeared very keen to have/use advice for class generally as well as [for the] research [child].
No: 3 (3)	• Ideas and cue cards that I gave to teacher at Xmas were not used. When I met with [the] teacher at end of [the] block, she had little recollection of areas that I had previously discussed with her and many ideas had to be re-discussed. • Many targets were repeated as I didn't feel general ideas were being carried over.
Not sure: 73 (61)	• [The] child stated that worksheets given to teacher had not been worked on in class. More time for discussion, however, I'm sure would have avoided this problem. • [The] child gave no feedback on any work carried out in class. However, [the] teacher noted in her response to the questionnaire that she had received helpful ideas to work on in class. • I met the HT by chance post-intervention and he commented that he had just been reading the report and found it had good ideas to use.
No response: 1 (1)	• (No comments listed)

Q SLT/A S8: Do you have any further comments?
Further comments about relationships with schools were written for 20 children. These are listed as broadly positive (n = 5) and broadly negative (n = 15) comments. No further categorisation of these comments has been made.

Broadly positive comments
- All staff [were] very friendly (generally – not just those with direct involvement) [in the project].
- [A] great school to visit and work in. No problems with access to work stations.
- It was good to get so much input and feedback from school – good collaborative practice.
- [A] very friendly and positive school – sought and welcomed feedback.
- Feedback from me to school and ideas for classroom appeared to be appreciated. [The] school would have liked closer contact (e.g. me working in the school).

Broadly negative comments
- [The] class teacher [was] not keen for [the] child to be taking part as she did not feel [the] child would benefit from this. The class teacher feels children's problems are behavioural/possible learning disability.
- Rather than work on specific targets, both the learning support teacher and [the] class teacher felt [the] child would benefit from just having someone spending time with him and being interested.
- From [the] outset, [the] school felt therapy was unnecessary for this child – probably influenced [their] reaction to SLT.
- [The] class teacher [was] more concerned with literacy difficulties – [and] felt [the] child did not need SLT.
- [There was] quite poor understanding of [the] child's difficulties
- [The] child missed a lot of appointments due to school excursions (which I was not informed of).
- [It] seemed class teachers were unaware of therapy times (relief teachers) or unaware of importance of extra SLT input.
- [I] would have preferred more contact with [the] class teacher to discuss targets/progress etc.
- [The] headteacher did not always pass information/worksheets to [the] class teacher.
- [The] timing of this child's appointment meant I had to leave immediately afterwards. It would have been useful to have had contact with class teacher over lunch hour – I felt a lot of my feedback was rushed.
- [The] class teacher [was] keen for input, but didn't appear to use resources provided for [the] classroom or to adapt certain perceptions of [the] child which [the] SLT felt [were] inaccurate (e.g. 'he can't read at all' – [the] SLT found child sounding out effectively and blending sounds into words).
- This child may have benefited from closer contact – literacy issues were known about by [the] SLT, but could have been targeted better if more contact with [the] SLT (my fault, not theirs!).
- [The] school had poor awareness of [the] SLT's role and of [the] child's specific difficulties – this did improve. Not a friendly staffroom!
- This child only attended 13 sessions due to poor/non-attendance at school.
- More contact would have been preferable, as this child was quite complex – [a] more closely collaborative approach would have been beneficial.

Discussion

Questionnaires

Although a full range of opinions was expressed, on the whole responses to questionnaires suggest that good relationships were maintained among parents, schools and researchers. Researchers considered that they had initiated most of the contact with schools and families (SLT/A F4, S4) using a variety of forms of contact (SLT/A F2, S2). The school location for the delivery of therapy affected patterns of contact, with telephone calls prevailing for parents and meetings for schools (SLT/A F2, S2). Contact was unsurprisingly affected by the ease with which it could take place, (SLT/A F1, S1) and informal contact with teachers of children receiving group therapy outside their own school was obviously limited. Teachers (T3) were, however on the whole happy with the amount of contact, and felt that they were kept up to date with what was happening in intervention (T4). Some (T8) would have liked to observe the SLT/A and/or for SLT/As to observe the child in class. Parents (P3, P8) had more mixed views on the sufficiency of contact, and some would have preferred more contact with the research SLT/A. Nonetheless, parents felt overwhelmingly that they were kept informed of what was happening (P4).

SLT/As felt at least fairly welcomed in school and by families (SLT/A F6, T6), with some notable exceptions, although they were less certain that their advice was acted upon (SLT/A F7, S7). Most parents (P5) and teachers (T5), however, felt that they had received helpful ideas for use at home or school, although more information would be welcome (P8, T8).

Parents (P7) and teachers (T7) were sure that children enjoyed therapy, and appreciated the positive qualities of the project staff (P9, T9). Both parents and teachers listed child benefit as one of the good points of the project, when given a free choice of comment (P9, T9).

It would therefore appear that despite the largely extract model of intervention a great deal of useful information was exchanged with schools and families. The project was on the whole accepted and approved of by both schools and families, and researchers maintained good relationships with individuals relevant to the life of the child.

These results will be discussed, together with the findings from other questionnaire data, in Chapter 8.

Chapter 7

Analysis of short-run programme costs and effects

Introduction

The trial design allowed consideration of the short-run primary language and resource consequences following different modes of therapy. All children enrolled in the research intervention modes were included in the assessment of language and resource effects. The analysis used the perspective of the individual child for the primary outcome measure and the teaching setting for resource use. In what follows, intervention mode 1 refers to the control group, mode 2 to direct individual therapy, mode 3 to direct group therapy, mode 4 to indirect individual therapy and mode 5 to indirect group therapy.

Study population

The data analysed in this chapter relate to the 124 children who were randomised to one of the four research intervention arms of the trial.

Children were scheduled to receive therapy for around 30 minutes, three times a week over a 15-week period. This applies to all four modes of therapy in the intervention conditions. If children attained 100% attendance they would have received 45 therapy sessions. Scheduled sessions are defined here as those attended by the children plus any sessions planned which the children failed to attend. They do not include school holidays or sessions cancelled by the SLT/A.

Tables 25 and *26* describe the frequency distribution of scheduled and attended sessions for the children at the individual level. Compliance with the schedule was less than 100%, as might be expected, even within this group of 124 children who joined the trial. The minimum number of sessions attended was 13. Only five children attained the maximum of 45 therapy sessions.

The average number of sessions scheduled and attended, by each mode of therapy, shown in *Table 27*, is comparable across all modes. No one mode encountered significantly more non-attendance. The mean number of sessions missed

TABLE 25 *Number of scheduled sessions for the children at the individual level*

Number of sessions scheduled			
Sessions	**Frequency**	**%**	**Cumulative %**
35	4	3.23	3.23
36	3	2.42	5.65
37	3	2.42	8.06
38	4	3.23	11.29
39	3	2.42	13.71
40	7	5.65	19.35
41	13	10.48	29.84
42	1	0.81	30.65
43	22	17.74	48.39
44	16	12.90	61.29
45	34	27.42	88.71
46	8	6.45	95.16
47	3	2.42	97.58
48	1	0.81	98.39
49	1	0.81	99.19
51	1	0.81	100.00
Total	124	100.00	100.00

TABLE 26 *Number of sessions attended at the individual level*

Number of sessions attended			
Sessions	**Frequency**	**%**	**Cumulative %**
13	1	0.81	0.81
23	1	0.81	1.61
24	1	0.81	2.42
26	2	1.61	4.03
28	2	1.61	5.65
29	4	3.23	8.87
31	2	1.61	10.48
32	4	3.23	13.71
33	2	1.61	15.32
34	5	4.03	19.35
35	4	3.23	22.58
36	7	5.65	28.23
37	9	7.26	35.48
38	7	5.65	41.13
39	13	10.48	51.61
40	14	11.29	62.90
41	14	11.29	74.19
42	10	8.06	82.26
43	8	6.45	88.71
44	9	7.26	95.97
45	5	4.03	100.00
Total	124	100.00	100.00

TABLE 27 *Average number of sessions scheduled and attended, by each mode of therapy*

Allocated mode (*n*)		Scheduled	Attended
2. Direct individual (34)	Mean 95% CI	43.26 (42.31 to 44.22)	37.29 (35.02 to 39.57)
3. Direct group (28)	Mean 95% CI	42.64 (41.57 to 43.71)	38.39 (36.91 to 39.88)
4. Indirect individual (33)	Mean 95% CI	43.94 (42.83 to 45.05)	38.82 (36.99 to 40.65)
5. Indirect group (29)	Mean 95% CI	41.55 (40.43 to 42.68)	38.03 (36.37 to 39.69)

(scheduled – attended) was 5.97, 4.25, 5.12 and 3.52 for modes 2, 3, 4 and 5, respectively. Analysis by ANOVA suggests that the differences in non-attendance across the therapy modes are not statistically significant ($\alpha = 0.05$).

Resource use and costs

The cost of delivering the therapy has two major components. The first is the salary cost associated with each mode of delivery and the second the travel cost associated with the delivery method.

Salary costs

The salary costs have three elements. The first is the time spent actually delivering the therapy by either the therapist (direct) or the assistant (indirect). The second is the preparation time for the therapist and/or assistant as relevant associated with each child, and the third is the travel time for the therapists and assistants to the locations where intervention was delivered.

The salary costs were based on NHS salaries (2004/05) at the midpoint of the scale for a band 2 SLT. This salary range is from £20,474 to £30,302. The gross cost to the NHS employer, including national insurance contributions and superannuation, is £30,270 at the midpoint of the scale. For the assistants it was based on the midpoint of an SLTA. The current (2004/05) salary for this grade is £11,195 to £12,815.[168] The gross cost to the employer at the midpoint of the scale is £14,280. The hourly rate calculated assumes a 37-hour working week.

The salary costs for the delivery of therapy are based on the actual attendance of the children in groups, and scheduled attendance for those receiving individual therapy. Although variation in attendance was mainly due to child absence from school, different assumptions are made about groups and individual therapy modes. It is assumed here that the time scheduled for direct therapy could not always be productively reallocated if a child was absent at short notice, and that non-attendance by a child in individual therapy represents a real time cost to the therapist or assistant. It is further assumed that group sessions would run productively even if a child or children were absent. However, experience during the trial period was that SLT/As were able to attend to other tasks such as preparation or report writing when they were told that an individual mode child could not attend, and group mode children who missed sessions still had to receive intervention later. The salary costs for the delivery of therapy should be considered in this light.

The costs of non-contact time are associated with preparation for the therapy sessions. These are based on the number of sessions scheduled for each child, rather than the number actually attended. Using the information from the study regarding the length of time that was allocated to the therapists for preparation, across both phases of the trial, the average non-contact time per scheduled session was calculated as just under 9 minutes (8.73). The preparation time allocated to SLTAs was approximately 14 minutes for each scheduled session.

Therapists and assistants travelled to the various locations around both cities to deliver the therapy. An estimation of the cost of travel time for therapists and assistants was based on travel to the five therapy locations used in Edinburgh and 11 locations in Glasgow from a central base in each city as appropriate.

Travel costs

The travel arrangements put in place for the trial impacted on the travel, and subsequently total costs. Transport to group therapy locations for children was by escorted taxi. Standard regulated hackney cabs ('black taxis') were used in both cities. SLT/As travelled by car, except in cases of emergency, illness or breakdown, using a fixed mileage rate. The extent and pattern of transportation necessitated by the randomisation are unlikely to be replicated in any future therapeutic provision.

The travel costs for the children are therefore based on the cost of a return journey by taxi from the primary school they attended to the nearest therapy location, for each session attended. The cost of transport of the therapists, for each session given, is based on a return journey from a central base in each city to the nearest school where a group was held in Edinburgh and in Glasgow. There were five locations for the delivery of therapy in Edinburgh and 11 in Glasgow. The costs are based on the price of the taxi tariff published by the City of Edinburgh Council,[169] although the actual travel costs incurred included the additional cost of the escorts who accompanied the children on each journey. Lothian Education Authority advise that they would normally charge for this type of service on a contractual basis and therefore could not supply a unit cost.

Costs incurred by control mode children

A comparable method was used for estimating the costs of providing services in the community for children allocated to the control group using the incomplete factorial trial design. Information on the number of contacts the control children had with a therapist (or assistant) and whether they received individual, group (or in a few cases mixed) therapy was recorded for the 28 children in this mode. A total cost was assigned to the number and type of contact using the time estimates and salary scales described above, with an average travel cost (per contact) based on the observed patterns in Edinburgh and Glasgow. The distribution of contacts for these children over the T1–T2 period suggested a very heterogeneous pattern, with many children receiving little or no therapy. The average number of contacts was 8, but the median number of contacts was actually less than 1 (median 0.5, interquartile range 0–13).

Joint distribution of costs and therapy outcomes

This analysis focuses on the short-run resource consequences between T1 and T2. When comparisons are made between the difference in costs and therapy outcomes across the four therapy modes the change in total CELF-3^{UK} score for each child between periods T1 and T2 was used as the outcome measure, as there was no difference between receptive and expressive scores across modes.

Statistical analysis of therapy and travel costs

Mean incremental costs

The full sample method was used to summarise the cumulative distribution of total (therapy and travel) costs arising from the time of randomisation to follow-up at T2 using arithmetic mean costs observed for all children. Confidence intervals for estimated untransformed arithmetic mean costs were estimated analytically and empirically using bootstrapping techniques to check for the adequacy of the assumptions made regarding the normality of the cost distributions. Standard *t*-tests and *t*-test-based confidence intervals were very similar to those based on the bootstrap.

Mean versus quantile treatment effects

Heterogeneity in the impact of therapy modes on costs was considered by estimating quantile treatment effects (QTEs) across the distribution of total therapy and travel costs. This enabled a comparison of mean treatment effects with the treatment effects calculated at specific quantiles of the distributions to see whether the effects were uniform or concentrated among specific modes. The quantile regression model provides an efficient way to examine the impact of treatment (and other covariates) on the location, scale and shape of the entire distribution of cost or other outcome variable of interest. Quantiles and their confidence intervals are estimated with no assumptions about the underlying distribution. QTEs are based on a simultaneous quantile regression model for quintiles (20, 40, 60, 80) and the median (50).

Analyses reported in this chapter were conducted using Stata Statistical Software, release 9 (StataCorp, 2003) and SPSS version 13.

TABLE 28 *Average salary, travel and total programme cost by therapy mode*

		Direct		Indirect	
	1. Control (*n* = 28)	**2. Individual (*n* = 34)**	**3. Group (*n* = 28)**	**4. Individual (*n* = 33)**	**5. Group (*n* = 29)**
Salary cost (£)[a]					
Average	102	690	262	457	268
(95% CI)	(30 to 174)	(643 to 736)	(236 to 289)	(433 to 482)	(250 to 286)
Travel cost (£)[a]					
Average	79	455	257	442	225
(95% CI)	(25 to 134)	(408 to 501)	(216 to 298)	(395 to 490)	(189 to 262)
Total cost					
Average	181	1144	519	900	493
(95% CI)	(56 to 307)	(1057 to 1232)	(461 to 578)	(837 to 963)	(445 to 542)

[a] Based on NHS 2004/05 midpoint salary costs for grade 2 SLT.[168]
[b] Based on taxi tariff set by the Licensing Committee, City of Edinburgh Council (2004).[169]

Results

Mean costs and cost differences

Average (arithmetic mean) salary, travel and total costs are presented in *Table 28*. The average costs refer to the cost per child, excluding those lost to T2 follow-up.

Average salary costs are higher for therapists; thus, the highest average cost per child in terms of salary cost was incurred by children being treated on an individual basis by a therapist (£690). The lowest average salary cost per child was incurred by those treated in a group by a therapist (£262). The average travel costs were higher for those children seen on an individual basis (£455 and £442 for modes 2 and 4, respectively). Group treatment resulted in decrease in travel cost (£257 and £225 for modes 3 and 5, respectively). The average total cost per child for the 15-week therapy duration was highest for children receiving individual therapy from a trained therapist (£1144, individual direct therapy). The lowest cost per child for the duration of the programme therapy was for the children who were treated in a group by an SLTA (£493, indirect group therapy). The overall average cost per child, across all the therapy modes, was £786. ANOVA shows that there is a statistically significant difference in the average total cost across the four research treatment modes ($\alpha = 0.05$). Children who were allocated to the control mode, moreover, incurred average costs of only £181, reflecting the much lower level of contact that these children had with community-based services.

The difference in mean total costs between modes 2 and 3 was £625 (95% CI £517 to £733). This estimate of the difference between individual and group therapy delivered by a therapist is uniform across the distribution. The location of the cost distribution shifts by around £600, as suggested by the difference in medians (£659) and the QTEs, which range from £588 to £666 across the quintiles. When individual and group therapy delivered by an assistant is compared, the difference in mean total costs is £407 (95% CI £326 to £486), with a shift of between £360 and £421 estimated across quintiles.

These uniform shifts in the distribution of costs when individual and group modes are assessed are also apparent when modes led by therapists are compared with assistants. The difference in mean total costs is £152 (95% CI £38 to £267) when modes 2 and 3 are considered against modes 4 and 5. Likewise, there is a difference in mean total costs of £517 (95% CI £444 to £590) in favour of group approaches compared with individual therapy (groups 2 and 4 combined versus groups 3 and 5).

Table 29 illustrates the cost differences that emerge when direct, indirect, individual and group therapy modes are compared with the therapy received by children in the control mode. Not surprisingly, the largest cost difference emerged when individual therapy was compared. The cost differences range from £325 (group versus control) to £843 (individual versus control), with the overall difference averaged across all programme therapy modes being just over £600 on average.

TABLE 29 *Mean total cost and cost differences (95% CI)*

	Therapy cost per child (£)[a]		
	Therapy mode	**Control (*n* = 28)**	**Cost difference (£)[b]**
Direct (*n* = 62)	862 (766 to 958)	181 (56 to 307)	681 (517 to 845)
Indirect (*n* = 62)	710 (644 to 775)	181 (56 to 307)	529 (402 to 655)
Individual (*n* = 67)	1024 (963 to 1085)	181 (56 to 307)	843 (721 to 965)
Group (*n* = 57)	506 (469 to 543)	181 (56 to 307)	325 (225 to 425)
All modes (*n* = 124)	786 (727 to 845)	181 (56 to 307)	605 (469 to 741)

[a] From T1 to T2.
[b] Positive cost difference indicates that therapy mode is more costly than control.

TABLE 30 *Mean change in total CELF-3^{UK} score between the research periods T1 and T2*

	Direct		Indirect	
CELF-3^{UK} change	**2. Individual (*n* = 34)**	**3. Group (*n* = 28)**	**4. Individual (*n* = 33)**	**5. Group (*n* = 29)**
Mean (95% CI)	3.32 (1.31 to 5.34)	4.50 (1.65 to 7.35)	2.45 (–0.61 to 5.52)	1.59 (–0.89 to 4.07)

Outcome data by group

Table 30 shows the mean change in total CELF-3^{UK} score for research intervention modes between research periods T1 and T2, with the confidence intervals indicated in parentheses. These are based on the individual-level data and represent the mean change per child in each group. This outcome measure was normally distributed in each of the therapy modes. None of the changes was statistically significant.

Figure 11 plots the individual total cost of therapy for each child against his or her primary outcome measure (difference in total CELF score between periods T1 and T2). It shows the variation in outcome at an individual level. Within the total group of 124 children there are both those for whom there was little or no positive change in the primary outcome, independent of cost, and those for whom the assessed total CELF score did improve.

Incremental cost analysis

Table 31 shows the incremental analysis comparing the change in costs with the change in the outcome measure. Change in costs assumes an incremental change from no therapy to one of the modes provided. For research intervention modes the average total cost per child was lowest in the group receiving group therapy from an assistant, but the lowest cost per one-point increase in total CELF-3^{UK} score was achieved for the children receiving therapy in a group from a therapist.

Marginal analysis

If the mean costs and change in outcomes for each therapy mode and the control mode are considered in turn, it can be seen that mode 3, therapy delivered in a group by a therapist, dominates modes 1, 2 and 4. That is, mode 3 provides more outcome for less resource than either mode 2 or 4. *Table 32*, with the costs listed in ascending order, makes this clearer.

The marginal cost required to provide therapy in a group with a therapist was £25.89 compared with therapy in a group with an assistant for an additional mean change in total CELF-3^{UK} score of 2.91 points. This implies a cost per additional one-point change in total CELF-3^{UK} score of just under £9. If therapy were to be delivered in groups, decision-makers would have to decide

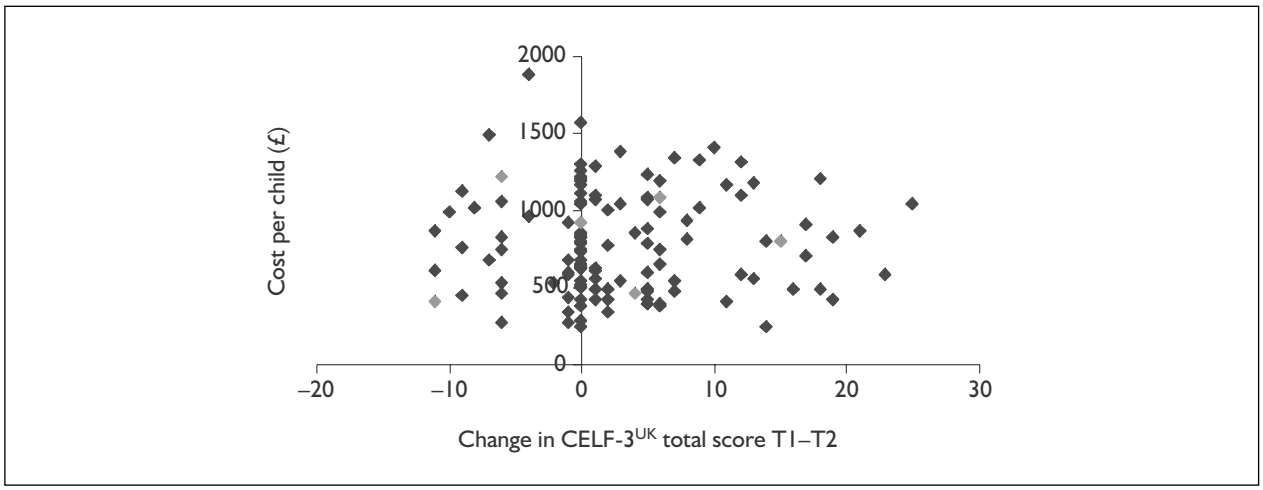

FIGURE 11 *Scatterplot of CELF-3^{UK} total score and cost*

TABLE 31 *Incremental analysis comparing the change in costs with the change in CELF-3^{UK} total score*

	Direct		Indirect	
	1. Individual	**2. Group**	**3. Individual**	**4. Group**
Additional cost (AC) (£) (95% CI)	1144 (1057 to 1232)	519 (461 to 578)	900 (837 to 963)	493 (445 to 542)
Change in total CELF score (95% CI)	3.32 (1.31 to 5.34)	4.50 (1.65 to 7.35)	2.45 (–0.61 to 5.52)	1.59 (–0.89 to 4.07)
AC (£)/CELF	345	115	367	310

TABLE 32 *Mean costs and change in outcomes for research therapy modes and the control group*

Mode	Mean cost per child (£)	Mean change in CELF-3^{UK} total language score	Cost per unit increase in CELF-3^{UK} total language scores (£)
1. Control group	181	0.75	241
2. Assistant, group	493	1.59	310
3. Therapist, group	519	4.50	115
4. Assistant, individual	900	2.45	367
5. Therapist, individual	1144	3.32	345

whether the incremental increase in change in total CELF-3^{UK} score was worth the incremental cost of moving from assistants to therapists.

Two-way comparisons of cost

The following analyses are concerned with possible two-way choices. *Table 33* shows a comparison of costs between the direct (therapist-led) and indirect (assistant-led) groups. The costs of the indirect therapy are significantly lower than direct therapy based on independent *t*-test of sample means ($p < 0.000$, $\alpha = 0.10$). The marginal cost of moving from assistant-led therapy to therapist led-therapy is £153 for a mean change of 1.81 points. That implies an additional £84 per one-point increase in total CELF-3^{UK} score.

Table 34 shows a comparison of costs between individual and group therapy. The costs of group therapy are significantly lower than individual therapy based on an independent *t*-test of sample means ($p < 0.000$, $\alpha = 0.05$). If there was a choice to be made between group and individual therapy (regardless of who was delivering it), then group

TABLE 33 *Comparison of costs between the direct (therapist-led) and indirect (assistant-led) groups*

	Therapist-led direct therapy (*n* = 62)	**Assistant-led indirect therapy (*n* = 62)**
Average cost (AC) (£) (95% CI)	862 (766 to 958)	710 (644 to 775)
Change in total CELF score (95% CI)	3.85 (2.17 to 5.54)	2.05 (0.06 to 4.04)
AC (£)/CELF	224	347

TABLE 34 *Comparison of costs between the individual and group-led therapy*

	Individual (*n* = 67)	**Group (*n* = 57)**
Average cost (AC) (£) (95% CI)	1024 (964 to 1084)	506 (470 to 543)
Change in total CELF score (95% CI)	2.90 (1.08 to 4.71)	3.02 (1.11 to 4.92)
AC (£)/CELF	353	168

TABLE 35 *Mean cost of therapy for direct individual therapy versus the other three modes aggregated*

	Therapist, individual (*n* = 34)	**Research modes combined (*n* = 90)**
Average cost (AC) (£) (95% CI)	1144 (1059 to 1229)	650 (599 to 702)
Change in total CELF score (95% CI)	3.32 (1.31 to 5.34)	2.81 (1.17 to 4.45)
AC (£)/CELF	345	231

therapy would dominate individual, as it produces a larger change in total CELF-3^{UK} score for a lower cost.

Table 35 compares the costs of the most expensive mode of therapy, that of individual therapy with a therapist, with the mean cost of therapy for the other three modes aggregated. Again, the average costs of the aggregated group are significantly lower than direct individual therapy based on an independent *t*-test of sample means ($p < 0.000$, $\alpha = 0.05$). In choosing between therapy with an individual therapist and any other therapy mode, one would need to be prepared to pay an additional £969 per additional point change in total CELF-3^{UK} score.

Discussion

In any consideration of the provision of therapy it is likely that the use of groups is considered following assessment. Therapists are likely to use a number of criteria when forming groups. The first would be the geographical location of the child's home and school. The aim would be to minimise travel. Other criteria could be age and language skills/difficulties. Groups could then be defined by having children with similar ages and/or similar therapy requirements. Another criterion might be the therapist's assessment of whether a child could and/or would interact within a group to his or her advantage. The randomisation process meant that the groups were not formed in this way.

It is likely that therapeutic groups would have a minimum of two children and a maximum of six. In the trial, group size varied from two to five. If the therapy were to be scheduled in a similar way, with three 30-minute sessions per week, and run throughout the academic year for approximately 30 weeks, the cost per child of providing group therapy would be as shown in *Table 36*.

TABLE 36 *Programme cost of providing group therapy in practice*

	No. of children in group	Programme cost over 30 weeks		
		Total salary costs (£)	Total travel costs (£)	Cost per child over 30 weeks (£)
Therapist led	1	1603	1086	2689
	2	1809	1485	1647
	3	2015	1884	1300
	4	2221	2283	1126
	5	2427	2682	1022
Assistant led	1	1024	1086	2110
	2	1388	1485	1437
	3	1753	1884	1212
	4	2117	2283	1100
	5	2482	2682	1033

Possible costs are provided for this 30-week scenario. The assumptions used are based on the trial experience. In this analysis it is assumed that therapists need to review and prepare for each scheduled session for each child, irrespective of who delivers the therapy. In addition, there is preparation time allocated to the assistants for the children to whom they deliver the therapy. The estimate of non-contact time is that calculated from the trial, 9 minutes per session per child for the therapists and 14 minutes for an assistant.

Average travel time and average travel costs are based on the data from the study and applied to groups of one to five for assistant- and/or therapist-led groups. They also assume that the child would attend all scheduled sessions and would not incur additional scheduled sessions. This may be unrealistic given the compliance observed in the trial where, across all groups, there was an average of five sessions scheduled, but not attended.

Another possibility, in a therapeutic intervention, highlighted by therapists,[124] is the possibility that children might have therapy delivered in a mixture of modes, over the period of an intervention. Therapists felt that they might require a period of therapy to establish the required therapy content before handing over to an assistant. It might also be necessary for the therapist to reassess the child and the therapy throughout the intervention period.

A number of hypothetical scenarios with costs attached is illustrated in *Figure 12*. The mix of

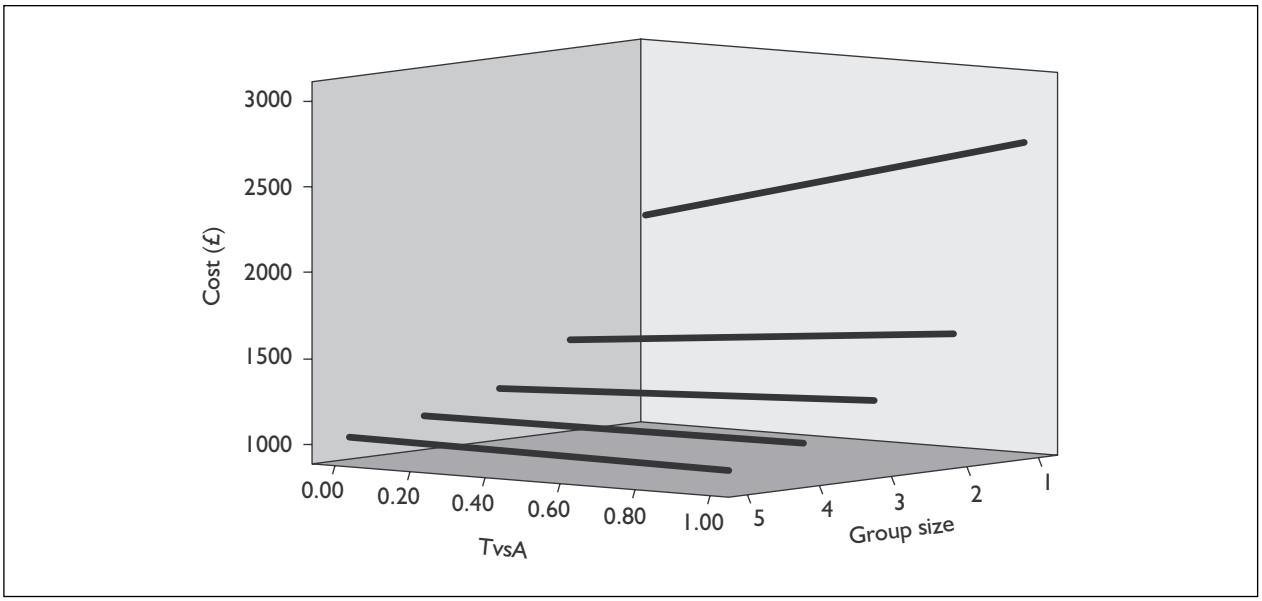

FIGURE 12 *Costs of mixed modes of therapy allowing for group size. TvsA, therapist versus assistant.*

therapist and assistant is accounted for on the axis entitled TvsA, which represents the percentage of total therapy delivered by the therapist rather than an assistant (e.g. 0.40 on the axis represents 40% of therapy delivered by the therapist).

The diagram reinforces that the most expensive way to deliver therapy is for 100% of it to be delivered on an individual basis by a trained therapist. It illustrates the cost differences between individual and group therapy.

The total gross revenue spend in primary schools in the year 2003/04 was £3537 per pupil.[170] No comparable NHS data have been collated. The cost of the most expensive way of providing therapy, individual work with a therapist, over the school year represents around 75% of the total annual spend if travel costs are incurred. If it was possible to eliminate or reduce travel costs, perhaps by basing the therapy at the child's school, the cost of this mode of therapy would still be around 45% of annual spend per child.

If it were possible to form groups within a school, travel costs for children would be eliminated. Project data suggest that there were a few schools where several children received therapy and might have formed a group if this proved age appropriate and clinically feasible. If parents or carers were willing to transport children to groups then costs would be transferred to them and removed from providers. Individual parents or carers would then have to choose whether they were willing to pay the travel and time costs involved. The minimum spend would be incurred if travel costs could be eliminated or reduced and the majority of therapy provided in a group setting by an assistant. Even in this scenario, the cost per child could be equivalent to around 10% of annual spend. The cost would have to be weighed against both the potential gains to the children and the opportunity cost of spending on this type of intervention.

The total costs for each child were calculated by combining the quantities of services received, measured in appropriate physical units (e.g. number of sessions, length of session, travel distances and time) with corresponding costs (professional salaries, travel costs, overhead costs). The most appropriate way to recalibrate the cost estimates would be to apply specific salary and travel costs, which reflect local market conditions and service configurations in different localities.

Long-run effects of therapy on economic outcomes

Language skills are an important component of human capital. Investing in children when they are young may lead to an increase in expected returns. There are studies that focus on the returns to language skills in terms of labour market outcomes such as earnings and unemployment.[113,114] The original study design allowed for an assessment of the out-of-trial outcomes. The authors had planned to use data from the National Childhood Development Study (NCDS) to estimate longer term outcomes conditional on the within-trial outcomes achieved at T3, or 12 months following the cessation of the therapy modes provided. As the gains made in the course of the short-term time-horizon between T1 and T2 were not sustained, even for 12 months, it is unclear whether any longer term treatment effects would be identified if the cohort was followed into adolescence and early adulthood. Accordingly, the longer run effects of this particular package of therapy have not been estimated. A more general analysis of the subsequent education and labour market consequences that may arise in adulthood for children whose language skills are and remain low throughout their school years is underway (Forbes and colleagues, forthcoming).

Chapter 8

Discussion of results and conclusions

Summary of main findings

This RCT was designed to address three research questions. First, a comparison of the relative effectiveness of direct individual therapy (SLT working with children), indirect individual therapy (SLTA working with children), direct group therapy (SLT working with a small group of children) and indirect group therapy (SLTA working with a small group of children) for primary school-age children with persistent primary receptive and/or expressive language impairment relative to a control group receiving current models and levels of community-based SLT. Secondly, to examine long-term benefits for such children from their therapy at 12 months' follow-up. Thirdly, to compare the cost-effectiveness of the four modes of therapy used in the study.

With regard to the first research question, the results from both the ITT analysis of the outcomes from the 161 children randomised who met the eligibility criteria and the protocol analysis of the outcomes from the 152 children for whom postbaseline data were available revealed that there were no significant differences at T2 between direct and indirect modes of therapy, or between individual and group modes on any of the primary language outcome measures, after adjustment for the effects of severity of language impairment (all p-values > 0.364).

There were no significant differences between individual and group conditions at T1 on the CELF-3, the WASI or the BPVS II, chronological age (all F-values < 2.75, all p-values > 0.100) or gender ($\chi^2_{df1} = 0.78$, $p > 0.37$), indicating equivalence before the onset of intervention, and no significant differences between the direct and indirect conditions in preintervention scores on the CELF-3, the WASI or the BPVS II (all F-values < 0.61, all p-values > 0.436). However, there were significantly fewer girls in the direct condition than in the indirect ($\chi^2_{df1} = 5.06$, $p = 0.024$), and differences in chronological age approached significance ($F = 3.43$, $p = 0.066$), with participants receiving direct therapy having a mean age of 92 months, compared with the 97 months of those receiving indirect therapy.

As a further check, ANCOVAs were carried out to compare the differences at T2 between direct and indirect therapy for the primary and secondary language measures for the ITT participants, with gender and the corresponding T1 scores as covariates. The results revealed highly significant effects for the T1 language scores (all F-values < 30.86, all p-values < 0.0001), but no significant effects of gender on the T2 language measures (all F-values < 2.38, all p-values > 0.125) and no significant differences between direct and indirect modes of therapy (all F-values < 1.32, all p-values > 0.254). Therefore, after statistical adjustment for postrandomisation between-condition gender differences, the results still support the conclusion that while some of the participants made marked improvements in their language scores between T1 and T2, these were not associated with significant differences between direct and indirect and between individual and group modes of therapy in regard to primary language outcome measures.

The results from the secondary outcome measures used in the study, the CELF observational rating scales (completed by parents and by teachers), the TOM (completed by the SLT/As), and the PPCPQ, revealed no significant differences in adjusted T2 scores between direct and indirect, and between individual and group modes of therapy, with only two exceptions. Both of these identified benefits from direct therapy. In the case of the TOM, the project SLT/As judged the children receiving direct therapy to have made more improvement in regard to their well-being and to exhibit less distress and frustration than those receiving indirect therapy ($F_{1,118} = 6.31$, $p = 0.013$). Secondly, parents' adjusted composite ratings on the PPCPQ at T2 indicated that they also judged the children receiving direct therapy to have made greater progress in literacy ($F_{1,42} = 4.12$, $p = 0.049$) and observed improvements in behaviour ($F_{1,40} = 4.075$, $p = 0.05$) compared with those receiving indirect therapy. However, these were not blind measures of outcome and in consequence may be subject to unknown response bias.

There were no significant differences between the number of sessions provided by SLTs compared

with SLTAs and between those provided in the individual and group conditions (all F-values < 1), with children receiving an average of 38 sessions over the intervention period. There were also high levels of compliance with the therapy manual, with fewer than 5% of the therapy sessions for which content analysis was possible involving activities that did not appear in the manual. Comprehension monitoring was used with 97% of the children, and all of the children worked on vocabulary development, chiefly common English words, with over 90% also working on aspects of grammar, in general grammar markers. Narrative was used with only 46% of the children as a result of prioritisation of work on grammar and vocabulary considered necessary for the development of story-telling skills.

However, there were some significant differences ($p < 0.05$) in the therapy provided by the SLTs and SLTAs in terms of the numbers of areas included in the sessions. SLTs as experienced practitioners were more likely to vary the number of subcategories of therapy delivered within a session. In particular, they carried out twice as many sessions involving general language learning strategies as did SLTAs, revealing a greater focus upon teaching general principles of language learning. There was no significant difference between SLTs and SLTAs in their use of other activities not included in the therapy manual. However, these activities were more likely to be used by the SLTs and SLTAs in individual modes of therapy than in the group modes ($p < 0.05$), reflecting opportunities for flexibility and for responding to individual needs.

There was wide variation in the number of contacts with SLT services received by the children in the control condition between T1 and T2. As there were no significant differences between the five groups in primary language outcomes measures at T1, the observed variation in service does not appear to relate to severity of impairment. Such variability in level of contact poses challenges for community SLT services in considering transparent and equitable models of service delivery.[171]

Parents' views regarding their child's progress and their experience of the project expressed by means of questionnaires and focus groups were generally positive, as were those of the children's teachers. Response rates for the questionnaires of around 50% for parents and 75% for teachers should be noted, however, together with a 22% participation rate for the parent focus groups. Parents and teachers in the main felt that they had been given sufficient information about the project before it began, and had positive relationships with the project SLT/As, although many parents indicated that they would have welcomed face-to-face contact with the project researchers in cases where this was not forthcoming. Most felt that the project SLT/As kept them up to date with their child's or pupil's progress and that they received helpful advice from the project on areas for work with the child. Most parents and teachers also indicated that they felt that their child enjoyed the therapy provided. However, parents were less sure than teachers about whether they provided the SLT/As with ideas for work with the children. There was wide consensus that the intensive and school-based nature of the therapy and the transport arrangements were particularly helpful, and benefits of therapy delivered in all four modes were noted. Progress in the children's self-confidence, enthusiasm for learning, behaviour and literacy were highlighted, as well as improvements in language skills. However, parents also expressed concern about the longer term outlook for their children in the absence of ongoing intensive support. For their part, the project SLT/As felt that they had positive relationships with parents, schools and teachers alike, although direct contact with the teachers of children travelling to groups in a school other than their local establishment was a particular problem. Overall, it appeared that all four intervention modes were acceptable to parents, schools and project SLTs, and that each could be operated successfully within mainstream schools.

The results also provided evidence for the overall effectiveness of the speech and language therapy delivered by the project over a 15-week period in regard to outcomes for expressive language relative to children receiving community-based SLT services ($p < 0.05$). Children with specific expressive language delay were more likely to show improvement in adjusted T2 scores than those with mixed receptive–expressive difficulties, although there was considerable individual variation. However, there were no significant differences in outcomes for receptive language between those receiving therapy from the project and the control group ($p > 0.05$). Non-verbal cognitive ability as measured by the WASI was not a significant mediator of progress for either expressive language or receptive language outcomes, and systematic between-group differences in T1–T2 test–retest intervals did not have any significant effects on adjusted T2 scores. Follow-up ANCOVAs revealed that while T2 scores

favoured project intervention in the case of all of the four therapy modes, only the adjusted mean scores for direct therapy were significantly higher than those of the control group at T2 in both the ITT and protocol analyses ($p < 0.05$). Children receiving direct therapy on average made gains of over 3 standard score points more than those in the control group, equivalent to a standardised effect size (d) of over 0.43.

Results from logistic regression analyses revealed a satisfactory model only in the case of receptive language outcomes at T2, where children's gender and their case status in regard to specific expressive impairment or mixed receptive–expressive impairment were the only significant predictors, with girls three times more likely to make progress in receptive language than boys, and those with mixed receptive–expressive difficulties six times more likely to make progress in their receptive language scores. However, caution is required in the interpretation of the latter finding, as those with mixed receptive–expressive problems had significantly lower T1 scores for receptive language than those with specific expressive problems (mean 67.89, SD 4.54, versus mean 80.86, SD 8.11, $F_{1,161} = 164.91$, $p < 0.0001$), raising the possibility of confounding effects due to regression to the mean.

Turning to the second research question, there were no significant differences between direct and indirect, individual and group, or combined therapy and control conditions for adjusted outcomes at T3 for any of the outcome measures (all F-values < 3.00, all p-values > 0.086). Thus, there was no evidence of long-term benefits of the project therapy at 12 months' follow-up. It should be noted, however, that the children, regardless of the condition to which they were randomised on the project, received on average some six sessions of therapy from community-based SLT/As over the T2–T3 period.

With regard to the third research question, the within-trial economic evaluation identified indirect therapy, particularly indirect group therapy, as the least costly of the modes investigated in the study, with direct individual therapy as the most costly option, around four times as costly as the optimal indirect group equivalent where travel costs are minimised by forming groups within a school, wherever possible. However, these cost differences should not be overinterpreted as providing robust evidence of the cost-effectiveness of different ways of providing therapy. The trial was not designed to demonstrate equivalence of the primary treatment effects. Hence, although the outcomes among the four research intervention modes did not achieve conventional levels of statistical significance, the lack of differences does not mean that the programmes can be analysed within a cost-minimisation framework where efficacy is proven (or assumed) to be equivalent. Likewise, the absence of significant differences in the trial primary endpoints does not exclude the existence of treatment effects that could emerge in a larger investigation that could support a more definitive and reliable estimate of cost-effectiveness.

The cost per unit increase in CELF-3^{UK} total language standard scores shown in *Table 32* (p. 82) suggests that the outcomes achieved by the children in the control group were cost-effective compared to all but the direct group therapy mode. However, this should be offset against the relatively lower levels of change observed.

Estimates were based on the pattern of resource use inherent in the trial design with allowance for how the different modes of therapy could be delivered in practical settings. These results should not be surprising given the differences in the ratio of trained professional staff to children and the differences in the cost of labour between different staff grades. Generalising the central estimates of the relative cost of different therapy modes to other educational/health systems is possible, but the precise differences reported in resource use need to be qualified by the level of programme intensity and other characteristic features of education and therapy services that may differ from those observed in this trial. Many of the elements of the programme could be varied in practice. The authors would not expect rigid replication of all modes studied and would caution against superimposing these findings in situations where local practices and resource constraints vary in material ways.

The direct non-medical costs (e.g. travel) will vary substantially depending on locational preferences for the programme setting (i.e. own, local or peripheral school). Transporting young children is costly. Whether by bus, taxi or private car, the resource consequences of transporting children to attend therapy sessions are not trivial, particularly considering the time that is lost by the children and the need to ensure their welfare and safety when travelling. The cost of escorting children receiving group mode therapy would need to be carefully considered alongside other direct costs likely to be incurred in practice.

Findings in the context of the literature

The findings that there were no significant differences in receptive or expressive language outcomes between direct and indirect therapy and between individual and group therapy are consistent with the pattern of results from controlled studies in the literature reviewed and those additional studies that met the eligibility criteria of recent systematic reviews.[49,94,172] *Table 37* illustrates this with reference to the findings from five of the controlled group design studies involving participants from the 6–11 years age group reviewed on page 5, and highlights the dearth of such studies of the children of school age. Further, the effect sizes shown in the table are not corrected for the effects of severity of language impairment and are not based on blinded assessments.

The results from the present study add to our understanding in the following ways. First, the participants were older, school-age pupils with persistent problems, in contrast to published studies involving younger, preschool participants, who may be more likely to catch up owing to maturation and the effects of early intervention. Secondly, and importantly, indirect modes of therapy here were delivered by SLTAs rather than parents as in previous studies, and this provides the basis for a more realistic analysis of the true costs in providing services to a school-age population. Thirdly, the present study provides direct comparisons between direct and indirect and individual and group modes on the basis of randomised allocation of participants with well-defined presenting problems, and blind assessed outcomes based on standardised assessment instruments, as the smaller effect sizes reported in *Table 10* (p. 35) reveal. Fourthly, the study further confirms that intervention is more effective in achieving change in expressive language than in receptive language. Finally, the study design included a 12-month follow-up of outcomes.

TABLE 37 *Standardised effect sizes × intervention condition*

Direct intervention		Indirect intervention	
Individual	**Group**	**Individual**	**Group**
+2.37[101] +1.00[104]	+0.80[105] +2.50[106]		+1.05[102]

Data from five RCT and quasi-experimental group designs, 1970–2001, involving 139 children in the 6–11 years age group.

The finding that expressive language showed improvement but receptive language did not is consistent with the literature and has been commented on in recent reviews.[20,94,172] Law and colleagues concluded from their systematic review that there is a differential effect of intervention, with intervention in the main being more effective for those children who do not also have receptive language problems.[94] While Leonard has suggested that most studies look at expressive language as more children with SLI have problems with the production of language than have problems with comprehension,[20] Law and colleagues note that most of the controlled studies in the published literature explicitly exclude children with severe receptive language problems.[172] In any event, there are few studies of the effects of intervention on children who have primary problems in receptive language. By way of support for this, a literature search carried out as part of the present study identified only two published controlled studies which showed receptive language gains, and both of these were with preschool children.[112,173]

In regard to the present study, this resulted in an element of circularity. The clinical trial was conducted using therapies with a published evidence base as described in Chapter 2, and so the therapy manual reflected the lack of detail regarding practice effective in changing receptive language scores. Nonetheless, during project therapy children worked on monitoring their level of comprehension and seeking clarification, and on understanding the meanings of words, grammar and narrative sequences, and there was the possibility that this would alter their language comprehension scores. However, the results revealed this did not occur to a significant extent and there are implications for the need to identify effective interventions for children with a receptive component to their primary language difficulties, in the light of emerging evidence for a distinctive aetiology in regard to lower heritability and the involvement of more generalised processing deficits relative to specific expressive delay,[174–176] and in view of the poorer long-term outcomes and of the more persistent nature of mixed receptive–expressive impairment.[37,42,177–181]

The children in the present study with specific expressive delay had higher expressive and receptive language scores on average at T1 compared with the children with mixed receptive–expressive delay and made significantly greater progress, providing further evidence that the improvements in their scores following

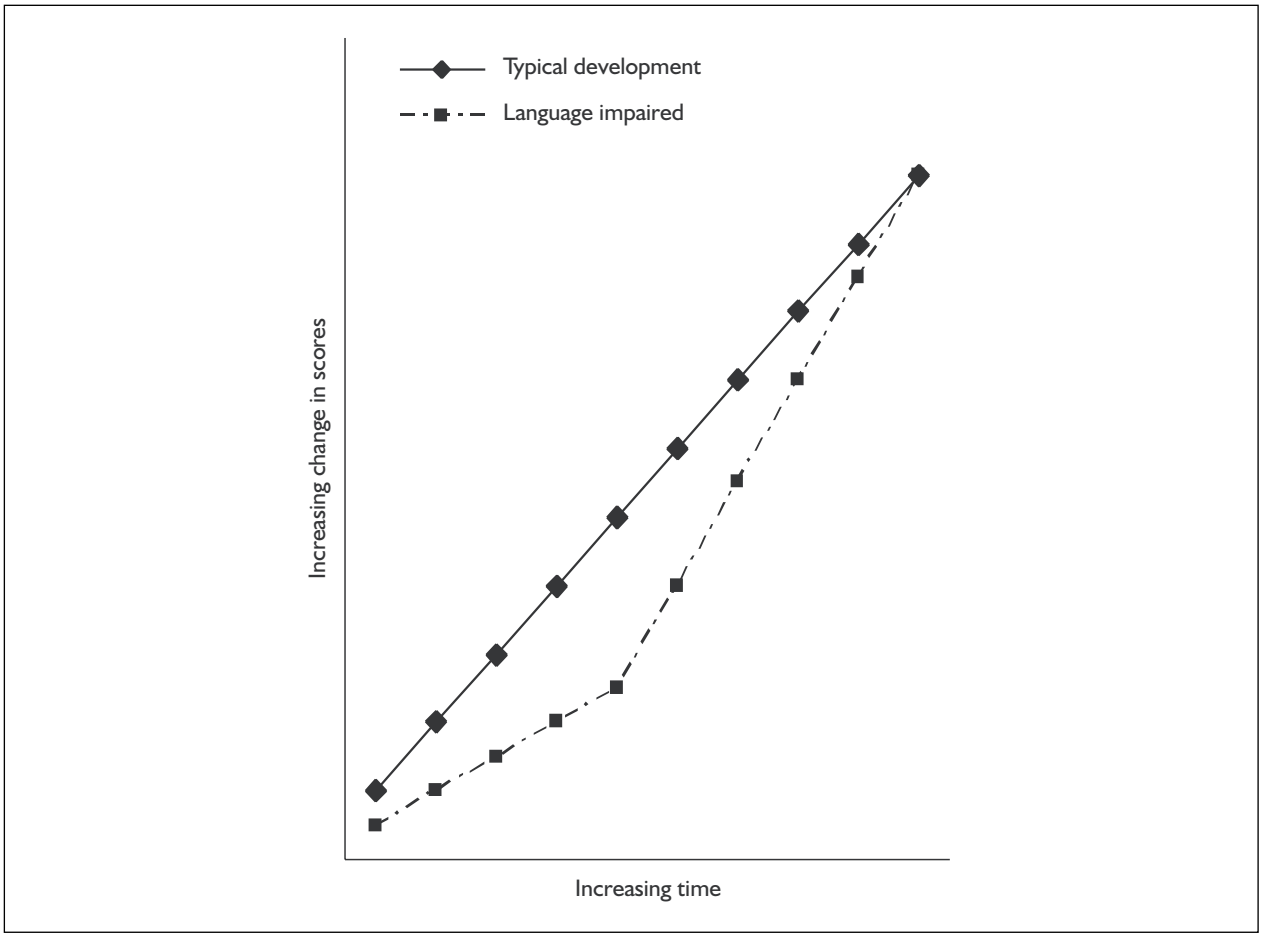

FIGURE 13 *Developmental trajectory for language impairment: model 1 (after Leonard, 1998[20])*

intervention cannot be accounted for merely by regression to the mean.[20]

The finding that non-verbal cognitive ability as measured by the WASI was not a significant mediator of progress for either expressive language or receptive language outcomes is consistent with earlier findings,[182] but extends these to a sample of older participants. Such results are of interest because they pose questions of the utility of measures of non-verbal ability in definitions of specific language impairment such as the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV)[183] if they are not predictive of responsivity to intervention, on the one hand, as shown here, and are also subject to marked fluctuations over time, on the other.[184–186]

As Law and colleagues note,[94] few controlled intervention studies in this area report longer term outcomes. Of those that do, the evidence for maintaining gains arising from intervention is mixed, with Fey and colleagues, for example, reporting that progress was maintained some 5 months postintervention,[187] while Law and colleagues[188] and Whitehurst and colleagues[189] reported the 'washout' of such progress after 6 months and 3 years, respectively, in the absence of sustained therapy.

However, expectations in regard to the maintenance of progress from intervention are shaped by expectations derived from models of developmental trajectories and linked to underlying models of the nature of intervention itself. *Figures 13* and *14*, after Leonard,[20] show two models of the developmental trajectories of the effects of intervention over time. *Figure 13* illustrates the outcomes of an initially slow rate of development, where the child with language impairment initially falls behind, but intervention (introduced at time-point 5 in the figure) results in an acceleration of development greater than that of typically developing children, and the language-impaired child catches up with non-affected children and normalisation occurs.

Figure 14 shows another possibility. As before, the child's rate of development is slower than that of typically developing peers. When intervention is

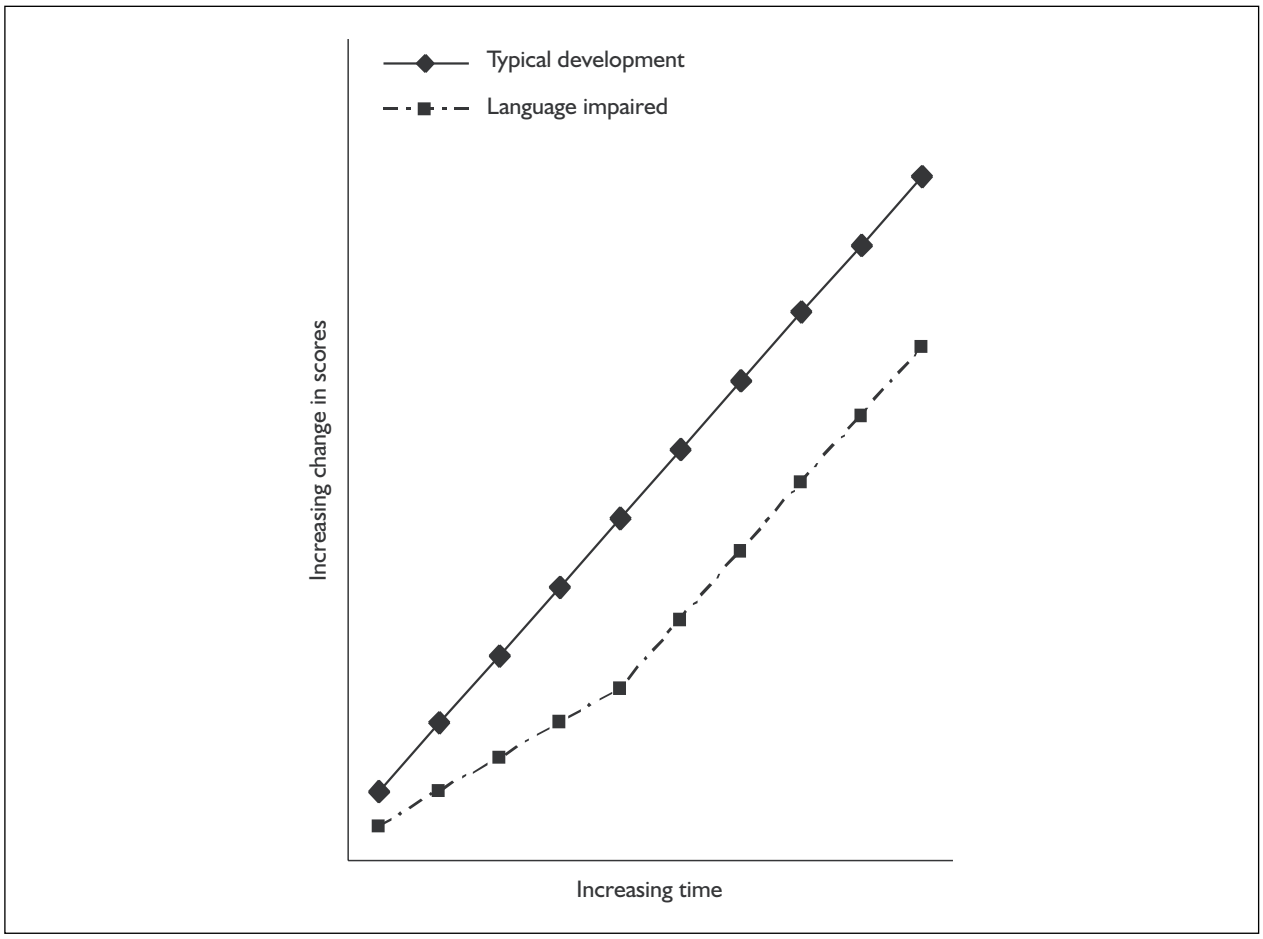

FIGURE 14 *Developmental trajectory for language impairment: model 2 (after Leonard, 1998[20])*

introduced, again at time-point 5 in the figure, there is acceleration in the rate of development, in this case to the same rate as typically developing children; thus, the language-impaired child progresses at a faster rate in response. However, because of the initial slow start, the child can never catch up with non-affected children, although greater progress is made than would be the case in the absence of intervention.

Leonard reports findings from studies with preschool children which reflect *Figure 13*, but also studies from school-age children, which are more reflective of *Figure 14*.[20] As a further complicating factor, results from intervention studies suggest that rates of change may vary with the duration of programmes,[111,187] with higher effect sizes from programmes lasting for 4–12 weeks, in the case of the meta-analysis reported by Nye and colleagues,[111] and a slowing of the rate of progress in the second 4-month treatment block relative to a first block, in the case of the study carried out by Fey and colleagues.[187]

Turning to modes of intervention, an 'inoculation' model[190] assumes that early intervention, possibly preventive, at a presymptomatic stage, will have a long-lasting positive effect upon subsequent language development, while in contrast, a 'dosage' model[190] assumes that a package of postsymptomatic intervention would be required to sustain change. Scarr and Weinberg identify a third model, a 'nutritional' model,[191] which assumes that long-term ongoing intervention is required to maintain progress. Applying these models to the present study, the data reported here provide evidence for the effectiveness of a 'dosage' of 15 weeks' intensive intervention in achieving short-term improvements relative to a control group, but the subsequent 'washout' of these gains in scores such that there were no lasting effects of intervention at T3 relative to the control group suggests that a 'nutritional' approach of delivering intensive therapy over a longer period may be necessary to achieve more lasting benefits. However, there is a need for more studies on the effects of long-term follow-up and

which take into account the length of treatment phase and the intensity of intervention.

Strengths and limitations of the trial

The present trial is the largest scale blind-assessed RCT study of the efficacy of speech and language therapy for children with primary language impairment with long-term follow-up and low levels of attrition. However, several limitations should be borne in mind:

- The study failed to recruit the 250 participants required by the initial power calculation. This larger sample size would have provided a more powerful test of the hypotheses, and would further have permitted tests of the interactions between modes of therapy. However, it should be noted that in the case of the 2×2 analyses of modes of therapy, the largest standardised effect size, between direct and indirect modes of therapy in the case of the CELF-3 receptive language scores, was +0.15. With power of 0.80, and alpha of 0.05, two groups of 699 would be required to detect a statistically significant effect at conventional levels. The situation is even more marked in the case of the second largest effect size, that of –0.10 between individual and group modes of therapy in the case of the BPVS II. This confirms that the differences between the therapy modes in terms of primary and secondary outcome measures are not of practical significance and that they can be regarded as equivalent, notwithstanding the reduced sample size.
- The intervention period of 15 weeks, occasioned by the delays in recruiting participants to the study, was somewhat lower than the 19 weeks originally envisaged in the proposal. As noted above, there is a dearth of evidence regarding the systematic manipulation of the intensity and duration of speech and language therapy. Most published studies are of short-lived therapy programmes, with durations of more than 8 weeks associated with better outcomes than shorter interventions.[94] In any event, while it is unclear whether longer or more intensive intervention would have had different effects, it seems unlikely that much shorter interventions would have been more beneficial.
- There was a significant degree of between-group variability in the T1–T2 intervals owing to operational constraints as a result of the need to fit assessments around the children's school attendance and school holidays. However, the differences, while systematic, were small, and did not account for significant levels of variance in the ANCOVAs, suggesting that they were not of practical significance.
- A requirement of the project for the efficient recruitment of participants was that SLTAs should be psychology graduates able to carry out cognitive ability assessments. The fact that the SLTAs had a degree was not in itself particularly unusual. In the UK, applicants to professions with postgraduate entry routes, such as educational and clinical psychology, speech and language therapy and teaching, frequently seek to demonstrate working experience with children in addition to possessing a relevant first degree. Some obtain this experience by working as assistants, including classroom assistants and SLTAs. For such individuals, work as an assistant is a short-term step to career advancement, and they do not intend to remain long in assistant posts. The project was unusual in recruiting in the first place from this pool of workers only, as in contrast, there are individuals who view their work as assistants as a more permanent position. Such a person was seconded to the project when one of the first group of SLTAs resigned.
- SLT/SLTA pairs were set up from the start to encourage the formation of strong working relationships. It was intended that the pairs would be maintained throughout the project, but one SLTA left towards the start of phase II and was replaced by a trained and experienced SLTA seconded from the local SLT service, where she was in the process of being graded as a technical instructor. The change had some adverse effect on the continuity of the delivery of intervention, although sessions were made up to the required total as far as possible.
- There were problems in the practicalities of the organisation of the groups. More children dropped out from the group conditions ($n = 7$) than from the individual conditions, where none withdrew, although this difference was not statistically significant ($\chi^2_{(1)} < 1$, not significant). There were also problems matching children by age, and two older children could not be grouped because there were no children of an appropriate age with whom they could be placed. Further, in addition to the costs of escorted transport by taxi, there was the inconvenience for the children of travel time and loss of time in the classroom. Some of the parents expressed anxiety about these factors, which may have affected the numbers of children who were withdrawn. However, the

parents and children who persevered indicated that they saw the value of the groups, and the parents who participated in the focus groups indicated that they saw the benefits for their children.
- Finally, although information was gathered from parents regarding their children's perceptions of therapy, it would have been useful to have gained insight into the views of the children who undertook project intervention. This was not attempted owing to the difficulties of constructing reliable and valid instruments for children with PLI, but understanding children's views and incorporating them with information from self-reports of self-esteem and confidence would add a dimension helpful to service planners.

Clinical effectiveness

There is evidence that the 15-week intervention yielded outcomes better than those achieved in the case of the control group. However, this effect should be regarded primarily as a demonstration of the effectiveness of the therapy approaches of the manual. There is no sense in which 15 weeks of some 20–25 hours of therapy in total should realistically be held to change the children's case status in the light of the pervasive and persistent nature of language impairment in the primary school years.[42] Only a dosage approach was feasible with a time-limited RCT approach and the results fit in with the literature on the amount of therapy time required to make significant gains.[94] The much smaller number of therapy sessions offered to the control group, and to all children between T2 and T3, did not show significant changes, despite the possibility that work was carried out between sessions by teachers and parents.

However, the study suggests that well-educated, well-trained, well-supported and well-motivated assistants with good interpersonal skills can safely act as surrogates for SLTs in the delivery of services in primary schools to children with primary language impairment who have been selected not to require the specialist skills of an SLT. Some of the factors that may need to be taken into account to sustain such practice have already been published,[124] but include sufficient time for discussion and preparation, good and regular reporting on child engagement and progress within sessions, and time for SLTs to get to know each child. It is not possible to comment from this study about the effectiveness of SLT work with other forms of assistant, such as classroom assistants employed by education services, or about other forms of indirect work through school staff. Many of the same principles of maintaining good working practices may well pertain, but were not investigated in this study.

Cost-effectiveness

Indirect therapy, particularly indirect group therapy, was the least costly of the four intervention modes investigated in the study. However, travel costs and costs of escorting children receiving group mode therapy require careful consideration alongside other direct salary costs.

Generalisability of results

In regard to the generalisability of the results from this study to current practice, three issues should be borne in mind. First, two groups of children who make up a significant part of the caseloads of speech and language therapists, children with phonological or articulatory difficulties and those with secondary language impairments, were excluded from the study because of their needs for specialised therapy which could not be feasibly delivered by an SLTA without appropriate training and expertise.

Further, the therapy in this study was more intensive than that generally provided by community services, as the data presented in *Table 6* (p. 25) confirm. The study could be regarded more as an efficacy study, evaluating the outcomes from a more optimal level of intervention, than an effectiveness study, which reflects current practice.[94]

Finally, the constraints of the RCT raised practical problems for the organisation of the therapy groups and may have an impact on the generalisability of the findings. However, more flexibility in the matching of children to groups on the basis of age and therapy needs would help to maximise the benefits of peer influences upon intervention, including the inclusion of typically developing children to provide good models of language.[106]

Finally, although all of the SLTAs in this project received ELKAN training, which is being introduced in some community services in the UK,[136] and all had experience of work with

children, only one (who joined the team as a replacement for the final phase of intervention) had specific experience as an SLTA.

Conclusions

This study has confirmed that PLI which persists into the school years is unlikely to resolve spontaneously, as the T2 and T3 data from this study have shown. Further, the correlations between change and nature of presenting difficulties highlight the fact that those with more severe problems and those with more pervasive problems affecting both receptive language and expressive language are the least likely to show improvement. This poses problems both for the individuals concerned and their carers, and for the education and health services in the light of the research evidence that reveals the long-term adverse outcomes for those with PLI.

The results from this RCT have demonstrated that intervention delivered three times a week for 30–40 minutes over a 15-week period can yield significant improvements in age-corrected standardised scores for expressive language, although not for receptive language. Parents and SLT/As also report additional functional benefits in the children's confidence, in their behaviour and literacy, and in their communicative interactions with others.

The findings also reveal that there were no differences in outcome for direct versus indirect, or for individual versus group modes of therapy, and that all four modes were acceptable to parents. The data thus support the adoption of indirect models of intervention delivered by trained SLTAs working under the direction of a qualified SLT, and also of group models of intervention. More traditional direct models provided less variable, hence more consistent, outcomes, but these were not significantly better than the outcomes from the other three modes.

However, there are three caveats. First, the above findings are generalisable only to those children with PLI which does not include severe phonological or articulatory difficulties. Direct models of therapy may continue to be required for those with speech problems. Secondly, it would be premature to translate these findings directly to classroom assistants, who do not routinely receive appropriate training. Thirdly, the findings are based upon a dosage approach, which was feasible with time-limited RCT methodology. The results are consistent with the research literature, but there are unresolved questions about the relationship between dose and treatment effects (e.g. would two sessions per week have delivered comparable outcomes, or four sessions a week better outcomes?), which require further investigation.

The results from the economic evaluation further reveal that the costs of providing intervention could be considerably reduced by means of delivering therapy, where appropriate, via groups formed within a school, to minimise travel costs, and via SLTAs.

The findings are of relevance to NHS commissioners and local authorities in the development of speech and language services. Further, the wide adoption of indirect approaches to intervention in this way may have considerable implications for the SLT profession, adding momentum to the shift to the supervisory role. This, in turn, is likely to lead to changes for SLT training programmes, not only in regard to outputting sufficient numbers of practitioners, but also in regard to modification of the basic training for SLTs, with more emphasis placed on teaching related to adult learning styles to reflect the shift in the focus of intervention from the child to the intermediary.

Finally, indirect methods are likely to need increased levels of active involvement in the therapeutic process on the part of the intermediary. Such an increase in responsibility has implications for the training and regulation of assistants.

Implications for future research

This study has confirmed the need for further research into effective interventions for receptive language problems and also for investigations of the efficacy of the relationship between dose and treatment effect in both expressive and receptive language.

There is also a need to investigate models of integrative service delivery; for example, the partnership between SLTs and schools, cluster models of delivery via integrated community schools, and the involvement of class teachers, classroom assistants and parents/carers.

Given the potential value of indirect intervention, there is a need for studies to identify the characteristics of children who are most likely to succeed with indirect intervention approaches, and also to evaluate alternative methods of working with those who may benefit from different modes.

Further research into the approaches and procedures used in the therapy manual developed for this project may help to refine both the delivery of the intervention strategies documented in the manual and an understanding of what components are most effective for particular presenting problems.

Acknowledgements

Thanks are due to Jane McArthur (Trial Coordinator), Susan Bannatyne, Cathy Campbell, Emma Jessiman, Cherry Kelsey and Jennifer Smith (project speech and language therapists), and Linda Anderson, Gillian Cross, Husna Hussain, Fiona Mackay, Brenda Porter and Jane Watt (project speech and language therapy assistants). We are also grateful to Christine McKendrick, Ruth McDonald, Elaine Allan and Susan Davidson (project secretaries). Pauline Beirne (former Speech and Language Therapy Manager for the Yorkhill Hospitals NHS Trust) was a grantholder and contributed to the design of the study and the interpretation of the findings. Professor Robin Prescott (Director, Medical Statistics Unit, Department of Public Health, University of Edinburgh Medical School) chaired the Data Monitoring and Ethics Committee, whose members were Pamela McIlwain (Senior Educational Psychologist, Edinburgh City Education Department Psychology Service), Irene Grant (Principal Officer SEN, Glasgow City Council Education Department), Marie Claire Leese (Speech and Language Therapist, Glasgow), Gerard Healy (Head Teacher, St Brigid's Primary School, Glasgow), Colin Wilson (Head Teacher, Duddingston Primary School, Edinburgh), Dr Susan Bloomfield (Consultant Paediatrician, Royal Hospital for Sick Children, Edinburgh) and Dr Jois Stansfield (formerly Head of Department Specialised Language Sciences, Queen Margaret University College, Edinburgh). Carolyn Anderson (Speech and Language Division, Department of Educational and Professional Studies, University of Strathclyde), Sue Ellis (Department of Childhood and Primary Studies, University of Strathclyde) and Gill Geliot (Speech and Language Therapist) provided comments on drafts of the therapy manual, with technical advice from David Alcock (Education Librarian, University of Strathclyde), and Marjorie Marshall, and Kirstin Dickson (Health Economists, NHS Ayrshire and Arran), and Pat Boreham (School of Clinical Sciences and Community Health, University of Edinburgh) contributed to the economic analyses. Maggie Johnson (Chief Speech and Language Therapist, Canterbury and Thanet) advised on intervention strategies, and Kate MacKinnon (Speech and Language Therapist, Glasgow) provided advice throughout the project. Finally, we are grateful also to our statistical consultants, Dr Rob Elton and Dr Bill Cheyne, to Lisa Cunningham and Liz Grant, who assisted with data preparation and analysis, and to Roberta Lees for reliability checks on qualitative data.

Contribution of authors

James Boyle (Reader in Psychology) jointly conducted the literature review and conducted the analyses of language outcomes and data from parent and teacher rating scales and focus groups. Elspeth McCartney (Senior Lecturer, Speech and Language Therapy) jointly conducted the literature review, supervised the construction and editing of the therapy manual, and conducted the analyses of questionnaire data. Dr John Forbes (Reader in Health Economics) conducted the economic evaluation. Professor Anne O'Hare (Reproductive and Developmental Medicine) contributed to the CONSORT diagram and to the discussion of the findings.

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Appendix 1

Case descriptions for primary language impairment

[Adapted from Law J, Boyle J, Harris F, Harkness A, Nye C. Screening for speech and language delay: a systematic review of the literature. *Health Technol Assess* 1998;**2**(9).]

School-age child with specific expressive language delay

David is the second of two children in a professional family with no family history of speech and language delays. Apart from brief periods of ear infection for which he received antibiotics, he had no significant medical history. He was a communicative baby, babbling by 1 year. By 18 months he relied entirely on pointing to have his needs met and this practice went on until his first word at 23 months. His vocabulary developed very slowly and he tended to use gesture accompanied by vowel sounds. It seemed fairly clear by 30 months that he wanted to say more than he was able to and his frustration often ended in tantrums. He started to use two-word utterances, "more ball" and "mummy car" by 3 years, and was stringing together short telegrammatic sentences by the time he went into nursery at $3\frac{1}{2}$. He seemed to have a reasonable level of single-word vocabulary at this stage, but word combination and particularly modifying words to mark tense, numbers, etc., were very difficult for him. Despite his single-word output he tended to use the same very limited range of verbs, notably *get* and *do*, at every opportunity. His parents reported that he was able to understand what was said to him, and assessment by a speech and language therapist indicated that his comprehension was indeed within normal limits.

In nursery his language developed, but he proved quite difficult to understand because his speech seemed very muffled. He appeared very self-conscious about speaking and tended to hold back in his peer group rather than commit himself to speaking in front of them at the request of his teacher. The initial response of his reception class teacher was to say that he was shy rather than delayed in his language development. However, his confidence developed through the year but he remained relatively monosyllabic and tended to express himself in boisterous games with the other boys rather than trying to respond verbally. Although relatively slow in acquiring literacy skills he moved from whole-word reading to the use of phonics by about the age of 7 years, much later than most other children in his class. His writing was better than his reading and there was some indication that he preferred writing to speaking as a means of expression in class. Nevertheless he continued to exhibit errors long after they had disappeared in the work of most of his peers. At 7 years he was still cause for concern to his teachers. He did not have a statement of educational need, but it was widely recognised that he was only able to perform appropriately if given plenty of time to formulate sentences. There was considerable concern that he would do very badly on the standard assessment tasks for speaking and listening tasks in the National Curriculum.

School-age child with mixed receptive expressive language delay

Natalie's birth was difficult. She was born at full term but spent a week in intensive care. She was discharged and not followed up by her local child development centre. Her mother reported that she was a quiet baby, something which she welcomed at the time. There was a family history of slow language development. Natalie passed her 8-month developmental check, but when she went back at 18 months her health visitor felt that she ought to be communicating more, and after reviewing her 3 months later, referred her for speech and language therapy. Assessment indicated that her parents found her to be a difficult child to communicate with, which resulted in their leaving her to her own devices. She had a toy doll which she enjoyed carrying around but she showed little evidence of exploratory representational and later symbolic play. She turned to her name, but found it difficult to listen to what was said to her, tending to flit from situation to situation without commenting on what she found. She was referred for audiology and was found to have normal hearing and middle ear pressure. She went into nursery at 3 years and observations revealed that she continued to spend a considerable amount of her time moving from

one activity to the next and interacted relatively little with the other children. She was referred to her local child development centre at 3 years where she was found to have a developmental quotient within normal limits, albeit in the low average range. Her behaviour was described by her parents as 'difficult'. She was prone to tantrums of frustration and went through periods of soiling. Occupational therapy and physiotherapy reports suggested that she was having difficulty with some hand–eye coordination tasks and was not generally very well coordinated in her gross motor skills. In both cases the level of difficulty was not sufficient to warrant intervention.

She attended for relatively brief speech and language therapy groups between 3 and 4 years and, although these often helped her parents interact more effectively with her and improved her listening and comprehension skills, she continued to have expressive and receptive language standard scores on the CELF-3^{UK} of 65 and 74, respectively, corresponding to –2.3 and –1.7 SDs below the mean. Her BPVS receptive vocabulary standard score of 69 also revealed marked impairment in her understanding of vocabulary. In addition, it was noted that her speech was not as clear as that of most of her peers and she had a tendency to stammer when under any sort of pressure. By 4½ she was put forward for a statement of educational need and was admitted to a language unit integrated within a mainstream school shortly afterwards. She responded well to the highly structured day of the unit because it seemed to enable her to predict more of what was expected within school. Her concentration began to become more integrated and she became more compliant within the class. Her comprehension on standardised testing improved somewhat, but the standard score remained well outside normal limits. Her speech improved, but her ability to convey concepts remained very limited. The more abstract the language required of her the more apparent her difficulties became. For example, while she could talk about a picture placed in front of her she found it very difficult to express temporal concepts, in part because she lacked the sequencing abilities, but also because she could not mark the necessary changes to the verbs concerned. Literacy presented a range of problems for her. Indeed, by 7 years of age she could do no more than recognise a handful of words. The only strategy she had for dealing with unfamiliar words was to identify the first letter and then search for a word of equivalent length which started with that letter. Natalie continued to experience difficulties related to her language, but these difficulties were often construed rather differently by her school teachers. She struggled with all areas covered by the standard assessment tasks at 7 years, most notably her speaking and listening skills, her literacy and her maths work. She found it hard to relate to many of her peers, preferring to spend time with children in the nursery, presumably because they had equivalent levels of communication skill. Many teachers expressed concerns that she was developmentally delayed. Full developmental review indicated that she continued to have disproportionate difficulties in her language relative to her non-verbal skills.

Appendix 2

The therapy manual: extract

The therapy manual comprises some 200 single-spaced pages, and cannot all be appended. The extract presented here gives an outline of the contents.

Contents of the full manual

1. Preface

The development of the manual

This therapy manual was written as part of the research project 'An RCT and Economic Evaluation of Direct Versus Indirect and Individual Versus Group Modes of Speech and Language Therapy for Children with Primary Language Impairment'. This project compared methods of speech and language therapy service delivery for children in mainstream primary schools, measuring the effectiveness of direct therapy delivered by SLTs compared with indirect therapy, delivered by SLTAs; and both modes delivered to children individually and in groups. This manual was constructed to guide the therapy offered, and was designed to be used both by the research SLTs and their SLT assistants. The process through which the manual was constructed and the therapy programmes adapted are described in McCartney and colleagues,[135] to which readers are directed for further discussion of its rationale and theoretical basis.

The manual is not designed as a 'do it yourself' therapy kit, or as a 'cookbook' of therapy activities. It was designed to support assistants who had undergone training, and who worked under the close direction of SLTs. In the research project assistants were mostly new to this role[124] and needed explicit information. Assistants delivered therapy, but did not have a decision-making role: the research SLTs decided upon the therapy activities to be used with each child, and when to move on to new activities.

Nor is the manual intended to be a complete therapy programme – it does not spell out each step of the therapeutic process, and there is considerable room for therapists' judgement to be used. It was intended as a guiding protocol, to

ensure that the therapy received by the research children could be planned coherently. To measure therapy effectiveness, which was an aim of the research study, it was also necessary to know what therapy was carried out, and to record and document the process. Careful records were made of the activities carried out during intervention and why children moved on to new activities. The manual proved helpful in facilitating therapy planning, language target setting, explanation to assistants and record-keeping during the research intervention period.

The manual made use of the available, but limited, research literature on therapy interventions for children with primary language impairment and the more extensive range of materials and ideas developed in the professional therapy domain, to provide guidance on implementing therapy useful for assistants. Activities are based on published materials and resources freely available for reproduction. Such published therapy materials and approaches are developed by practitioner authors and refined by publishers because they are considered sufficiently useful to share with colleagues. By using them the authors hoped to offer the research children therapy approaches that represent good practice having been validated 'in the field'. A list of materials used appears at the end of the manual. Other therapy materials have appeared since the research intervention and future users of the manual can incorporate whichever materials they find most useful.

The manual as presented here has been edited from the informal format used by the research team, to be interpretable to other readers.

The aims of the manual

The children in the research project had primary impairments in receptive and/or expressive language. They were aged 6–11 years in mainstream schools in Glasgow and Edinburgh. Intervention took place within the child's school three times per week in sessions of 30–40 minutes throughout a 15-week period. Some children had individual education plans (IEPs) which recorded the decisions of teachers and others about language development, and the actions needed to foster this. Some, in addition or alternatively, had speech and language therapy aims and plans serving a similar purpose. Other children did not have such plans in place.

This manual provided a set of guidelines for decision-making that could incorporate existing plans and be augmented by observation and further language analysis. The manual aimed for guidance, not constraint, in what was done, and allowed flexibility in choosing among materials and activities to deal with specific child impairment factors and to take account of child interests. This is a 'broad-brush' approach to choosing activities, focusing on relevant areas for each child as they move through therapy.

The language areas

'Therapy' in the manual includes both specified therapy interactions with a child and adaptations to the child's environment to improve their communication opportunities. This includes, for example, teachers adapting their own language and providing a 'communication-friendly' classroom environment, and adults accepting and encouraging a child's attempts to 'repair' communication breakdown. Each child's teacher was given information on how to develop an optimal communication environment, tailored to the child's needs, irrespective of the specific language activities undertaken by research staff.

Four language areas with specific activities were specified:

- Facilitating and monitoring comprehension and attention. Attention and good listening skills are needed to cope with comprehension difficulties and to access the school curriculum, much of which is delivered orally. This area is therefore a priority for many children. It was developed particularly using the work of Maggie Johnson.[130]
- Vocabulary development. Many schoolchildren will have difficulties in learning words, and in 'finding' words when they need to use them. This can also cause problems in the school curriculum, when new topics are introduced and new vocabulary is needed. Such children will need vocabulary development therapy.
- The comprehension and use of grammar. By school entry the development of spoken grammar should be almost complete, and children making errors may sound immature. For children who show obvious grammar problems, grammar therapy may be a priority over vocabulary development.
- The comprehension and use of narrative. Understanding and telling stories or narratives is important for understanding talk in school. This ability normally develops throughout the primary school years and interacts with grammar and vocabulary knowledge. The fourth intervention area was therefore narrative

therapy, where children learned to understand and use the structure of stories. It was developed using the work of Shanks and Rippon.[134]

For school-age children these areas are not independent, but interact. For example, a child who is habitually inattentive might not learn new words as they are presented in class, and grammar skill affects children as they construct narratives. Individual children may have needs in more than one area and some children will have needs in all of them. Published materials are available in these areas.

Choosing language areas for intervention

The following information was collected for research project children by the start of the intervention period:

- results from all age-appropriate subtests of the CELF-3^{UK},[119] including supplementary tests
- results from the BPVS II[141]
- a short tape-recorded language sample, to give information on grammar and narrative organisation
- teacher and parent responses to CELF observational rating scales[142]
- school IEP and speech and language therapy plans as available.

As a rule of thumb, a child was considered eligible for work on comprehension monitoring if:

- he or she had a standard score of 6 or less on any CELF-3^{UK} receptive sub-test, including listening to paragraphs, or
- he or she had a BPVS score of 80 or below, or
- he or she had a comment on a CELF observational rating scale relating to listening, or
- he or she had an IEP or therapy target concerning comprehension or listening.

A child was considered eligible for work on vocabulary development if:

- he or she had a standard score of 6 or less on any CELF expressive subtest, including word associations, or
- he or she had a standard score of 6 or less on receptive subtests concepts and directions, word classes or semantic relationships, or
- he or she had a BPVS score of 80 or below, or
- he or she had a comment on a CELF observational rating scale relating to words or vocabulary, or
- he or she had an IEP or therapy target concerning words or vocabulary.

A child was considered eligible for work on grammar if:

- he or she had a standard score of 6 or less on CELF subtests word structure, formulated sentences, recalling sentences or sentence assembly, or
- grammar errors were noted in the taped language sample, or
- he or she had a comment on a CELF observational rating scale relating to grammar or sentence construction, or
- he or she had an IEP or therapy target concerning grammar or sentence construction.

A child was considered eligible for work on narrative if:

- he or she had a standard score of 6 or less on CELF subtests listening to paragraphs, or
- if narrative organisation errors were noted in the taped sample, or
- if there was a comment on a CELF observational rating scale relating to organising talk, or
- he or she had an IEP or therapy target about narrative or story telling.

Prioritising language areas

Where a child had more than one eligible area (as was common), a sequence of intervention areas was suggested as follows:

- It was assumed that comprehension monitoring was a fundamental coping strategy, important for classroom success. It was therefore anticipated that this would be the first area of therapy tackled for the majority of eligible intervention children. Work in this area at the start of the therapy intervention would also 'set the scene' and introduce children to working with their SLT or assistant.
- Vocabulary development is an area of growth throughout the primary school years, and most language-impaired children require strategies for learning and retrieving new words. It was considered probable that vocabulary development would be important for most of the research children, and would be sequenced in intervention just after comprehension monitoring. However, its importance relative to grammar would vary from child to child.
- Spoken grammatical errors were considered important for several reasons: they were

developmentally inappropriate, they were noticeable and might serve to particularise a child, and they were unlikely to be dealt with other than by direct grammar therapy. This meant that grammar would normally be a priority for children showing marked difficulties, to be dealt with in parallel with, or instead of, vocabulary development.
- Narrative development depends on the use of relevant vocabulary and grammatical markers, and is also tackled, to some extent, in the Scottish 5–14 literacy curriculum. It was expected that narrative would be tackled if grammar was sufficiently well developed and, for many children, word knowledge would take precedence.

Once priorities were established CELF-3^{UK} item analysis was undertaken and the information available was used by research SLTs to set measurable intervention targets for each child. These were updated as the intervention period progressed.

Choosing language activities

There has been little research on the use of specific language materials and activities for children, and any research carried out has involved small numbers of children with limited language goals. There is therefore little evidence as to which activities or patterns of activity are effective in developing children's language skills. In this context, therapists made the best assumptions they could as to what language activity would be useful, using their own experience and inviting their colleagues' opinions. Published materials were used where possible, and general games developed, but children enjoy different things, and selection from the list was a matter of personal choice.

Around half of the research intervention children were randomly allocated to groups which took into consideration the child's age, so that the range in any group was not too extreme, and also geography, so that children did not spend too much time travelling. Groups were of three to five children. It was therefore unlikely that each child in a group would have identical language needs.

Research SLTs therefore chose activities specially relevant for each child across the 15-week therapy period, adjusting the language areas worked on over time. They also differentiated tasks within the group to suit individual children.

Moving on

SLTs made preliminary judgements towards the start of the intervention period as to how much therapy time to spend on each language area, and planned an outline sequence. However, task-specific probes were also developed to monitor children's progress and to suggest when to move on to new therapy targets. These were examples of the language target presented to the child unaided and without cues, to see how they managed without help. Decisions about changing therapy aims were made by the relevant SLT. Examples of probes appear in the manual at the end of each section.

2. 'Golden rules' for therapy – setting the scene

Introduction

There are factors that can be applied across a wide range of therapy contexts and language targets. They relate to having fun, using language that will help the child to understand and talk, and having a supply of adaptable games that can be set up quickly and used flexibly with a wide range of children. These aspects are discussed in this section as an introduction to therapy activities. They include 'golden rules' about varying the therapy context and using appropriate language, and some generally useful games that can be adapted for many children.

Golden rules for therapy

There are some 'golden rules' that apply to all therapy contexts, and help to make activities useful and fun for children. Seven rules are outlined here, with examples and suggestions.

Rule one: explain

Try and explain to the child what you are going to do in the session and why, even if this is at a very simple level, so that the child develops a clear idea about what his or her goals are. This can help a child to become more self-reflective about his or her learning, which in turn, can make learning more effective.

Rule two: make it fun

There are several ways of making therapy tasks motivating. You can build rewards into the task, so that an activity is *intrinsically* rewarding, or the child can get something nice for trying or succeeding on an activity – an *extrinsic* reward.

Intrinsic rewards

In many games the game and the therapy goal are not distinguishable to the child. The reward of completing (and perhaps winning) the game is built into the activity. For example, when the child

plays a lotto game classifying words into categories, they are both collecting pictures to be first to complete their lotto board, and fulfilling the language aim of naming the pictures and deciding to which category they belong.

Extrinsic rewards
Intrinsic reward is seen as the ideal method of making therapy fun, but it can be difficult to organise if you do not have highly rewarding games for the therapy target you are working on. Therefore, many SLTs use *extrinsic* rewards, sometimes called *motivators*. This is when something extra is used as a reward for 'having a go' at the task. For example, after making up a sentence with a past tense the child can have a turn on a board game, or be given a counter, for trying.

One difficulty with using extrinsic rewards is that the child can get too excited by the reward and not concentrate on the language target. It is therefore advisable to use motivators that are not *too* exciting for the child. They must also be used consistently either for trying or for succeeding – and the child must be told just what will be rewarded.

Role reversal is another useful way of making therapy fun. This happens when the child takes turns with the adult at giving instructions in a game.

Rule three: correct 'mistakes' systematically
In general, SLTs do not endorse overt correction of the kind: 'Say it properly. It's not runned, it's ran. You say it'. This is because getting a child to repeat something is not proof that he or she understands what they are saying, or are linguistically ready to say it. Furthermore, correction can be frustrating for the child and can damage confidence.

SLTs usually recommend the use of less direct approaches. In particular, *recasting* is useful. This is where the child says something 'wrongly' and the adult agrees with their meaning, but uses the correct version of the child's utterance. For example, if the child says 'I runned', the adult says 'Yes, you ran' or 'Yes, you ran fast'.

However, we are in the business of trying to modify children's language, so some element of correction may well be necessary. We can determine when to ask for change on the basis of how important it is for the child to get their meaning across at that moment. Within therapy tasks set up for the child to attempt to use a correct language target, and where the child knows this is the aim, correction may be useful if the child can succeed in making the required change. However, if it is important for the child to get a particular meaning across, then correction is probably not helpful.

Always bear in mind the aim of the therapy task when considering whether to use correction. We are not working on speech sounds in this manual, and it is best either to ignore pronunciation errors, or subtly to model the correct version. For example: if the child says 'Look at the f'ower' say 'Yes, that is a big flower'. In general, if the language feature targeted by the therapy activity is achieved, then 'errors' in other parts of the response may be acceptable. The following scenarios illustrate this.

Scenario 1
The aim of a language activity is to practise using the pronouns 'he' and 'she' in a sentence and the child makes a mistake with part of the language structure, saying: 'She goed (meaning 'went') to work'. Since the target is the use of 'he' and 'she', and the child has attained this target regardless of the use of 'goed', you would not correct 'goed'. You can, however, use the technique of recasting to respond, saying: 'Well done. She went to work'.

Scenario 2
The aim has been to practise using 'the' in front of a noun. The child has made good progress and has been able to use 'the' in phrases such as 'the book'. The aim is then changed to putting 'the' into a sentence, but the child omits 'the', saying 'Ball is red'. Merely recasting the utterance to 'The ball is red' may not be enough to move the child up to the harder task of using 'the' within sentences. Instead, some subtle challenge to what the child said may be needed; for example, by saying: 'Oh, ball is red, is it? Do we need to put a little word in there?' with the aim of encouraging the child to self-correct. If they do not, a recast can be made for the child to copy.

Scenario 3
In conversation with the child, you notice that he or she makes an error on a structure that you have been working on. For example they say: 'I working hard' when a current therapy target is use of auxiliary verbs, in this case, 'I'm working hard'. We need to remember that it is a very large step between using a target correctly in a therapy activity and remembering to use it in everyday

conversation. The response of the adult would therefore usually be to recast with emphasis, saying: 'Yes, I hear you *are* working very hard'.

Rule four: make tasks easier or harder

There are different ways to change the level of difficulty of a task. These include varying the amount of visual support given, and the language levels used. It is important to decide upon the level of difficulty when planning the activity, and upon what responses from the child might make you raise or lower the difficulty level during the activity.

Picture support

Where the activity is aimed at generating lots of words it will usually be easier for the child if they have a selection of pictures to choose from. For example, if the child is thinking of a category such as 'sea creatures', give them pictures including both sea creatures and other kinds of animals. If you later want to make the activity harder, take away the pictures.

Language support: comprehension

Activities can be made harder by giving the child a longer/more complex instruction. If the target is a preposition, such as 'between', initial levels can focus on the child following short instructions, such as, 'Put the pencil between the cup and the box'. Contrasting instructions would include other prepositions the child already understood, such as 'in front', for example: 'Put the dog in front of the car'.

To make the task harder, you can increase the length of instructions, saying: 'Put the pencil between the cup and the box, and put the brick between the knife and the spoon'.

Another way of increasing difficulty is to use 'between' in an instruction with another preposition, for example: 'Put the pencil between the cup and the box and put the wee lorry in front of the book'.

Language support: expression

Asking the child to put a target word into utterances of increasing length and complexity is the most common way of raising difficulty level in expressive language tasks. For example, if the target is to use the word 'because', ask 'Why is the boy eating the cake?' and expect the child to say 'Because he is hungry' (a clause-level response). A harder level is to ask 'What happened?' and expect the child to say 'I went home because I was poorly' (a sentence-level response).

Levels longer than this are harder to elicit within a specific activity, but the child can be encouraged to use the target at times within their everyday speech.

Rule five: be prepared to change the activity

An activity may not work for a number of reasons. The child may not be motivated, may be tired, or may just be 'playing up'. The activity may not be suited to the child: apart from being too easy or too difficult it may just not appeal to that child on that particular day. It is always worth trying to modify an activity by making it more fun or less demanding, but if you are not getting anywhere, it is all right to stop the activity and try another one. Just because you have planned a session with certain activities does not mean you have to stick rigidly to your plan. If things are not working out in the session you could try changing the aim, finding a more motivating activity, or changing the target itself.

It is worth remembering that even the most experienced SLT will have sessions when they feel that little has been achieved. This can lead to reflection on how to improve therapy.

Rule six: help the child to understand

How you present information to a child affects how well he or she can understand it. Short, clear sentences with pauses between them often work well. The sections on organising a communication-friendly classroom and on comprehension monitoring have ideas on how to help children to comprehend.

Rule seven: use talk within the therapy session that gets the response you want

It is important to use language in therapy sessions that will help the child to focus on relevant language features in their response. Sometimes we just give them good examples; at other times we use language which expects a response from a child. Forms of adult language use are discussed next.

Adult language that does not require a verbal response from the child

The following types of adult talk do not *require* the child to speak in response, although this is of course encouraged. The aim of these approaches is two-fold: to give the child a chance to contribute successfully by non-verbal means, and to let the child hear examples of appropriate language forms. Adult language is manipulated to allow the child the opportunity both to hear and to copy language structures in the least threatening way.

Modelling
Modelling is when the adult comments on what the child is doing, or on the current activity, using utterances at an appropriate language level for the child. The assumption is that a child will be more likely to use good sentences if they are exposed to good examples at the right time. This approach is often used interactively with the child, with an adult following the child's lead in a setting, or looking at a game or book with the child. The adult gives a commentary on ongoing events, in language pitched at, or just above the linguistic and developmental level of the child. This kind of approach is used frequently with young language-delayed children and is sometimes called general language stimulation. However, giving a good model can also be helpful for school-aged children.

Adults often repeat their models frequently so that the child is exposed to many good examples of sentence types and structures at the right level.

Focused stimulation
When a particular language structure needs to be demonstrated because it is the next target in therapy, the adult may focus quite specifically on that structure by modelling it as often as possible. For example, if the target was the regular past tense, the adult could choose to look at a story picture-card sequence with the child. They would comment on as many events in the past tense as possible, saying 'I think that girl walked very quickly to her friend's house. They played in the garden and they talked a lot. Then they helped make the tea'. Repetition is then used to maximise the number of times the structure is heard and bring it to the child's attention.

Recasting
Recasting (outlined above) is a useful technique for times when a child makes an error or says something ungrammatically. The adult then gives the 'good' version, what the child 'should' have said. For example, if a child said 'I not like that', the adult would rephrase the utterance by saying something like 'I see. You don't like it' or 'Oh, you don't like it?' Recasting often turns the child's statement into a question in order to sound more conversational and natural rather than overtly corrective.

Expansion
Expansion involves using the meaning of what the child has said but demonstrating slightly more complex language, to help move the child's own language along. It often concentrates on adding to or developing the child's meaning. For example, if the child commented on a picture of a castle by saying 'That's a big castle', the adult could expand by replying, 'Yes, it's an enormous castle' or 'I think it's a big castle, with lots of monsters inside'. The adult has therefore slightly altered the meaning of the child's utterance to make it more complex.

Adult language that does require a verbal response from the child
The following types of adult talk are useful for eliciting responses from a child. This adult language requires, or strongly expects, that the child will respond. These approaches therefore allow the child opportunities to practise talking. One of the main language forms which anticipates a response is the question.

Questioning
On the whole, speech and language therapists recommend that questions are used with discretion, so that conversations with the child do not become inquisitions! Modelling (as described above) and indirect questions (discussed below) are thought to be more effective in encouraging children to talk than drilling with direct demands for response.

Questions can be divided into *indirect* and *direct* questions. Indirect questions invite an answer but do not require one, so place less pressure on the child. Direct questions, which require an answer, place more pressure on the child.

Indirect questions. Indirect questions are subtle attempts on the part of the adult to get the child to talk. They are usually introduced by a phrase such as 'I wonder what …?' for example: 'I wonder what you did on your holiday?' 'I wonder what's happened here? Other structures the adult can use to similar effect are phrases such as 'I bet you …' and 'I don't know …', as in the following examples: 'I bet you had a nice time at the beach today'; 'I don't know what you did today, but I went to the cinema'.

Direct questions: open questions. An open question is a question form that asks for some details and not just a yes/no response. Examples are: 'What did you do at the party?' 'What is your favourite toy?' 'What's happening here?' Open questions can elicit a lot of information from a child. For example, a possible response to the first question could relate in detail the games played and food eaten at a birthday party. However, open questions may only elicit a one-word answer. In response to the first question, a child may just reply 'Play'.

Open questions do give the child a greater opportunity to talk than closed questions, but if the child is not forthcoming then a different approach is required.

Direct questions: closed questions. Direct closed questions require only a 'yes' or 'no' response, for example: 'Do you want to choose a toy?' They are useful for encouraging responses in children who, for reasons such as shyness or difficulty understanding or using particular language structures, find it difficult to answer a more open question. This is not to say that only closed questions should be used with shy or language-impaired children. However, they are a useful last resort if you do need to ask the child a question and other types of questions are proving difficult.

Direct questions: forced alternatives. A forced alternative is similar to a closed question in that the child is presented with a limited choice of response. However, alternatives are given, for example, 'Would you like the book or the game?' Forced alternatives can be a useful strategy if the child is not coping with open questions, and allow more information to be given than a closed question. The child still has a model of what to say, but is not just repeating what the adult has said.

Forced alternatives can also be used when working on aspects of grammar, for example, asking 'Is the man eating or is he drinking?' where the target is the 'ing' form in 'eating'. They can be used to elicit whole sentences as well, for example: 'Is the girl jumping or is the boy skipping?' where the target is the 'subject + verb' sentence 'the boy is skipping'.

Direct questions relating to what the child has said. Here the direct question asked of the child is relevant to what they have just said. For example, the child says 'I've got a new tractor' and the adult asks 'Who gave it to you?' Asking a relevant question after the child has said something is much more likely to encourage conversation than if the adult asks a less related question, such as 'What toys do you like playing with?'

Completion questions. Here a question is asked using 'question' intonation and the child has to know this means they are expected to complete the adult's utterance. The adult says, for example: 'This girl is riding her bike, these girls are riding …'. The aim is for the child to use 'their', saying 'Theirs' or 'Their bikes'.

False assertions
Here the adult says something that is deliberately false, so that the child will correct it. For example, The adult looks at the child's cup and says 'That's not your cup!' to get the child's response of 'Yes, it is'.

Verbal absurdity is a variation of this, when the adult makes a deliberate error that the child is encouraged to correct. For example: the adult points to a picture of a lorry and says 'This is a big bus' or, when talking about a giraffe, says 'Giraffes have short necks, don't they?'

Cueing
Cueing is mainly used in vocabulary work or in a situation where the child is having difficulty finding a word. The adult gives the child a prompt to help the child to retrieve the word. This is often the first sound of the word.

3. Useful games for therapy

Introduction

A number of games can be used to carry out many therapy activities, and can be tailored to suit particular language targets. This section gives a brief description of some of the more adaptable therapy games that are quick to set up and can be used with home-made pictures and materials. They can be used as group or individual activities, with more than one child taking turns or the child taking turns with the adult. They are presented here as individual games, for clarity.

Games

Hide and seek

Hide various pictures or objects around the room and ask the child to look for them. When the child finds one, encourage them to name what they found and, if appropriate, make up a sentence using the word.

Lotto

You will need large cards for each player with four to six pictures stuck on each, and matching individual little cards. Place the little cards face down on the table. Take turns at turning over a little card and finding where it matches on the large card. If the picture is not on the player's large card it is placed face down again, and the next person has a turn. Each little card turned over is named and/or described.

Pairs
Pairs of pictures are turned face down on a table. The child and adult take turns to turn over two cards, trying to find a pair. If a pair is turned over then the player keeps the pair and has another turn. If not, the cards are replaced face down and the next player has a turn. Each card turned over is named and/or described.

Odd-one-out
Give the child a choice of three or more objects or pictures, for example: 'chair', 'bed', 'apple', 'table'. The child has to guess which word is the odd one out, and say why.

I went to the market and I bought a …
One person says one item within a specific category, for example: 'carrot' within 'vegetable'. The next person remembers 'carrot' and adds another, for example: 'I went to the market and I bought a carrot and a cabbage', and so on. Other topics include 'I went to the seaside and I saw a …'; 'I went into the garden and I saw a …'.

Think of three
The adult gives a topic or category and asks the child to name a specified number of that category, for example: 'Fruit, name six'; 'Things you cut with – name three'.

Skittles
Place pictures underneath skittles so that when the child knocks the skittles over the pictures can be named, and the word put into a sentence if appropriate.

Hoops
Place pictures inside hoops. The child either throws a beanbag into one hoop and names the picture, or throws a beanbag into the appropriate hoop after answering a question relating to one of the pictures.

Give me a clue
Put an object or picture into a bag. Give clues, and the child must guess what it is, for example: 'I'm a fruit, I'm soft and I'm red' for 'strawberry'. The child checks by pulling out the object or picture.

Barrier games
These games develop the child's ability to give relevant and accurate information. The child sits behind a small screen facing the adult or another child. The child is given a simple picture or model that they have to describe in enough detail for the person on the other side of the screen to reproduce exactly. They might have to say, for example: 'Draw a house. Put a red roof on it. Make three windows'. At the end both drawings should look the same: any differences can be discussed.

4. The communication-friendly classroom

It can be hard for some children to cope with the language of the classroom.

There are several reasons that children may have difficulty listening and understanding in the classroom:

- They may find it hard to attend over background noise.
- The information they hear may be too long or too complex for them.
- They may not understand new vocabulary.
- They may not understand that words can have more than one meaning.
- They may not understand questions.

Children may also have difficulty talking and using their language in the classroom. For example:

- They may use words in the wrong order.
- They may use immature word forms or simplified sentence structure.
- They may have difficulty finding the words they want to use.
- They may have difficulty sequencing their ideas.

There are several ways in which adult language in the classroom can be adapted to ensure that it is communication friendly.

A useful list of points for teachers is given in *Support for Learning Part Three No. 7: Developing the 5–14 curriculum for pupils with language and communication disorders*,[148] published by Learning and Teaching Scotland. It gives important guidance on managing the curriculum and on setting the learning context, which is listed overleaf.

Principles and broad strategies to help listening and talking are then charted. These should be useful for all of the children in the research project.

More detailed strategies are then given to use with children who have considerable difficulty in listening and/or talking and finding words. The research SLT will highlight strategies specifically relevant to the child in your classroom.

[The Manual then lists Scottish Office guidance, and principles and strategies for teachers, then charts that SLTs would highlight to show detailed strategies to help individual children in a classroom.]

5. Comprehension monitoring

Introduction

Many children will have difficulty in 'keeping on track' when listening in classrooms. There can be many reasons for this, but we can help the children to recognise when they have not understood completely and to 'repair' the lack of understanding. This section is based on the work of Dollaghan and Kaston,[131] as adapted by Johnson.[130]

Rationale for comprehension monitoring

There are times when children do not fully understand what they have been told. This can occur for a number of reasons, relating either to the speaker or to the child listener.

Speaker problems can include:

- The message may be too long or too complex.
- The speaker may use vocabulary unknown to the child.
- The speaker may speak unclearly (too quietly, too loudly, and so on).
- Background noise may have been present, causing a distraction.
- The speaker may not give the child enough information to understand what they have said.

Child listener problems can include:

- The child may not look at the speaker.
- The child may not listen to the speaker.
- The child may not be able to process the length or complexity of the adult talk. This is hard to alter, and it may be easier to reduce the complexity of the talk.

Since the child cannot understand everything he or she hears, it is important that he or she is able to recognise when they do not understand, and learn to do something about it. Most children learn to do this naturally, but language-impaired children can find it difficult. Much of what they hear may not make sense to them and they may feel it is their fault that they do not understand. They will not want to appear foolish in front of their peers and so do not say anything. This does not let the speaker know that they have to repeat or give more information to help the situation.

There are two aims in working on comprehension monitoring:

- for the child to learn to recognise when they have not understood
- for children to learn to act upon this recognition by indicating to the speaker that they have not understood, and seek clarification.

Comprehension monitoring therapy

Specific plans and activities are provided to help shape comprehension monitoring, divided into group and individual work. There are also differences according to the age of the children. Younger children (aged 7 years and below) receive a slightly different approach to older children.

Plans are therefore presented for:

- younger children – individual work
- younger children – group work
- older children – individual work
- older children – group work

Each of these is presented as 'sessions' with a particular script. A session in the research project lasted for around 30–40 minutes. However, some children need to go over points from previous sessions rather than moving on to the next, and flexibility is needed.

[The manual then goes on to list the content of four sessions on comprehension monitoring for each of the above groups, giving scripts for SLT/As to follow, and activities and materials to use.]

6. Vocabulary development

Overview

All children in school need to meet new words as they progress in the curriculum, and so need to 'learn how to learn' words. This section discusses how this can be done, and gives activities which may be helpful to children.

To learn new words we need to do three things: make links with words that have related meanings (semantic links), discover the speech sound structure of the word (phonological pattern) and

practise ways of bringing the word to mind (word finding). This section discusses these factors. Principles are presented, followed by a list of useful games.

Semantic and phonological problems

Poor vocabulary development is common in language-impaired children. This can be due to factors such as:

- Semantic problems: issues relating to word meaning are called 'semantics'. The child may have problems understanding and linking the meanings of words. Semantic problems can hinder children in accessing the language of the classroom. This, in turn, further impedes their vocabulary development. A 'semantic error' is one where the child has wrongly used a word with a different meaning, for example, saying 'apple' instead of 'orange'. The 'wrong' word often has a similar, or associated, meaning to the target word. A 'semantic cue' is where the adult gives the child a prompt relating to the meaning of the word he or she is trying to say, for example, saying 'It's fluffy, with long ears' to help the child say 'rabbit'.
- Phonological problems: issues relating to the speech sound patterns of words are called 'phonological'. The child may have difficulties in analysing the speech sound (or 'phoneme') structure of words. This can be due to difficulties in being able to break words down into phonemes, and/or remembering the sequence and combinations of phonemes in words. Difficulties in these areas can make it hard for the child to build up 'phonological representations'. These are reflections of the phoneme patterns of words in the mind, and affect the ability to build words up and break them down. Much current research into language impairment is concerned with investigating the nature of these underlying phonological patterns, and finding out how and why they can be impaired. A 'phonological representation' problem results in the child being unable to break a word into sounds, or to say which is the first or last sound in a word. A 'phonological cue' is when the adult gives the child a prompt relating to the first sounds in the word, for example saying ' It's a ma-' (for magazine).

Word-finding difficulties

Semantic and phonological information may not be available in a complete form when the child needs to say a word, and the word may not be 'found' at the right moment. Children with difficulties in vocabulary development can therefore display 'word-finding difficulties'. This is when the child appears to know the word he or she wants to use but is unable to say it. Often, the child is able to use the word with no problem on some occasions, but struggles at other times. For example, if the child was trying to say 'caterpillar', the following are possible word-finding difficulties he or she could experience:

- a semantic error, for example a word with a related meaning 'pops up' instead of the target word, such as 'worm'
- a phonological error with the wrong speech sounds said, for example 'caterpillow'.

A word-finding difficulty can also result in the child seeming to be unable to get to the point, as he or she cannot find the word they want. This is sometimes called 'circumlocution', as the child 'goes around' the word, using a phrase. For example, the child says 'I got a new jumper and a hold your trousers up (for belt)'. An example, relating to 'caterpillar' as before, would be the child describing the caterpillar, saying: 'It's like … it's got lots of legs … it's hairy …'.

Overall aim for vocabulary development therapy

The overall aim of therapy to develop vocabulary is to improve the child's understanding and use of vocabulary, and to help them learn new vocabulary as necessary.

This can be tackled by:

- helping the child to build semantic and phonological associations among words, and
- helping the child to make helpful word associations when learning new items of vocabulary, and
- encouraging the child to use self-cueing strategies to retrieve words, and
- encouraging the child to use the skills learnt in real-life word-learning situations, and not just in therapy.

This involves teaching the child to reflect on their own word-learning, and to take control of how they learn words.

General principles for vocabulary work

- Select 'target' words to focus on. Although we are teaching strategies to help learn words we may as well choose useful words to practise these strategies.

- Associate the target word with related words that the child is already familiar with and discuss how the words are related, for example, if they are in the same category (a section on 'categories' is included) or if they have similar meanings (the section on 'synonyms' is relevant).
- Use the target word in a range of different contexts, with plenty of repetition and discussion, which is essential to strengthen semantic features of the word.
- Explain to the child why we are playing vocabulary games in therapy. It helps the child to realise he or she is learning skills to use in everyday life, as opposed to just playing games. It is particularly important in vocabulary and word-finding activities to discuss the reasons for games, to equip the child with practical strategies to help him or her to learn and retrieve words. This is important as they meet new words throughout their school curriculum and social lives. The sections on 'cueing' give advice on how to put this into practice and enable the child to reflect on his or her own word-learning.

Word features

All words are made up of semantic and phonological features; for example, two features of 'dog' are that it is an animal and that it starts with a 'd' sound. Features are usually divided into semantic (word-meaning) and phonological (word-sound) features.

A feature-map is a diagram that can detail the semantic and phonological features of a word. Feature-maps can be useful as a visual reminder of the important characteristics of a word. They can be used to consolidate and revise vocabulary as well as to learn about new words. They can also help the child to learn strategies for remembering words. Feature-maps can come in different formats and are known by different names, for example 'semantic webs' or 'word-maps'.

A list of possible questions can be asked about the word to allow a feature-map to be completed. Not all of the questions need to be asked – it depends on the word being described as to which are necessary.

Building a feature map

Ask and answer these questions:

Semantic features:
- description: what does it look like?
- location: where is it usually found?
- function: what do we use it for?
- group/category: what kind of thing is it?
- related words: what words mean (nearly) the same as it?/are opposite to it?/do any words often go alongside or near it?

Phonological features:
- syllables: what number of syllables does the word contain?
- length: is it long or short?
- rhyme: what does it rhyme with?
- words within words: are there little words within the word?
- sounds: what sounds are in the word, at the start and end?

Not all questions will have useful answers. The example of a feature-map for the word 'planet' illustrates this.

Semantic features for the word 'Planet'.
- description: what does it look like? round, big
- location: where is it usually found? in space
- function: what do we use it for? nothing (!)
- group/category: what kind of thing is it? space things
- related words: what words mean (nearly the) same as/opposite to it? none (!)
  do any words often go alongside or near it? star, moon, rocket

Phonological features:
- syllables: how many does the word contain? 2 syllables
- length: is it long or short? short
- rhymes: what does it rhyme with? 'Janet' (or with nonsense words if the child does not know any real rhyming words)
- words within words: are there little words within the word? plan
- sounds: what sounds are in the word, at the start and end: pl; t any other sounds in the word? n

For concepts and relational terms (like 'if' and 'unless') 'related words' is usually the only relevant semantic feature. For any target word we would develop semantic features, phonological features and retrieval strategies together at the same time. However, for clarity these are presented separately in this manual.

Semantic features

Semantic features are concerned with word meanings and also link with knowledge of the world. A child may be helped by thinking about all the semantic features of a word, as in the 'planet'

example. To work on these features we can ask questions and encourage the child to tell us what they know about the target word. Semantic features can be elicited with some of the following questions, arranged in groups of related questions. Not all need to be asked for every word! The adult can use common sense to pick the most appropriate questions for the word; for example, for 'planet', you would not need to ask what it was used for. Nor should the adult stick to a question–answer format for these activities: the questions below are to be used only as guidelines for the adult to structure discussion about a target word. At times the child may need more explicit teaching, with the adult giving them information about the word's features, as opposed to asking questions. This is especially necessary for words new to the child.

Types of semantic features

Examples of ways to think about semantic features and make links with world knowledge are listed here.

Description

- What does it look like? (for example, colour, shape, size)
- Does it make a noise/sound? What sound does it make? (for example, quiet, an animal sound)
- What does it feel like? (for example, hard, smooth)
- Does it have a smell? What does it smell like?
- What does it taste like?
- What is it made of?
- What do you use it for?
- When do you use it?
- Where do you see it?

Also, add any additional descriptive words that seem appropriate, for example: for 'sea creatures', a description could include 'slippery'.

Location

- Where do you find it?
- Where does it live?
- Where do you see it?

Function or use

- What group does it belong to?
- Is there anything else you can use it for?
- Sometimes children give unexpected responses; for example a child may say 'You wash it' as a use for 'cup'. You may need to follow up and discuss when this happens.
- When would you use it?
- What does it do?

Category or group

You may need to check the child understands what 'group' means. If this needs to be taught specifically, use the section on 'categorisation'.

- What group does it belong to? (or 'What kind of thing is it?') It will probably be necessary to lead the child in by an example such as 'Coat, sock, jumper are types of clothes. Orange is a type of ---?' expecting the child to complete using 'fruit' or 'food'. For a word like 'planet', where there is no category name as such, a more general one, for example: 'things in space' will suffice.
- Can you think of any other words in this group?

Related words

- Does this make you think of any other words?
- Try and have a picture in your head of this word. What else can you see? (For example, with 'planet' the child may 'see' 'sun, moon, rocket').
- Is there something that goes with this word? Or, simply, 'What does it go with'? Some words have strong associations, like 'fish and chips', 'knife and fork'. Others have weaker associations, but these still help to link the word with its semantic meanings. For relational terms, children might give simple definitions and this should be encouraged.

Synonyms

You may need to check the child understands that words can have similar meanings; for example, that 'cold' is similar to 'chilly', 'sofa' is similar to 'settee', 'computer' to 'PC', etc. See the section on 'Synonyms' for more advice.

- Can you think of another word that means nearly the same as (target word)?

Antonyms (opposites)

Antonyms will only need to be covered if working on a target word that has an opposite; for example, words like 'smooth', and 'lumpy' or 'bumpy'. These words are likely to be mainly adjectives, or conceptual words. Understanding that words can have opposite meanings may need to be taught; see the section on 'Antonyms'.

- Can you think of the opposite of (target word)?

Relevance

It is important to identify the most relevant semantic features of the target word and for the child to be able to recognise which features are of central relevance and which are not, in any particular contact. This will help the child to describe the word to the listener more efficiently

so that the target word can be identified. For example: if a child describes a word as 'It's food, it's red, it tastes sweet, it's in the kitchen cupboard', the word has been described by category, description and location, but the listener may not be able to identify it as 'jam', unless the child gives a more crucially relevant description, such as a function, 'You spread it on bread'.

This skill of being able to give relevant descriptions of semantic features will be highly useful when the child is struggling to find words in any situation, as it is more precise than saying everything known about the word, and should enable the adult/listener to come to a quicker understanding of what the child is trying to say. However, the most relevant semantic features of a word will vary with context. Discussion with the child, of what information results in the 'best guesses' will be helpful here.

Games for semantic features

Useful games for developing semantic features appear in the 'Vocabulary development: games and activities' section which follows.

Phonological features

As well as semantic features it is important for the child to be able to reflect on the phonological, or sound features of words. Important phonological features in a target word tend to be:

- the initial sound
- the onset [sound/s (if any) before the first vowel]
- the 'rime' (first vowel and end of word)
- any little words that are present within the word
- the number of syllables within the word.

The ability to identify and think about these features is called phonological awareness. Considering the phonological features of a word helps in both learning and retrieving words.

Types of phonological features

Syllable awareness

Dividing a word into syllables is the first step in learning that words can be broken down into smaller units. Developmentally it occurs before a child can split words into their individual sounds or phonemes. Compound words, for example: blackbird, sunshine, may be the easiest words for children to divide up. Children are often taught to clap once for each syllable.

Onset/initial sound awareness

After recognising syllables, the next stage in a child's phonological awareness is becoming aware that one-syllable words can be divided into their first sound/s, known as 'onset' and then the rest of the word, i.e. the vowel and final consonant/s, known as 'rime'.

Think of the first sound/s of the word and not their letter names. The adult can separate the initial sound from the rest of the word to make it more noticeable for the child, for example 't…able'. If there is more than one consonant before the vowel, i.e. 'sp-', 'fl-', 'cr-', 'str-', the whole cluster forms the onset, for example: 'trick' has 'tr-' (onset), '-ick' (rime).

As with syllable awareness, some children will be able to identify the onset of a word and others will need you to demonstrate it for them. Ask the children to say the onset first and if this is too hard, the adult can demonstrate it.

Rhyme awareness

Working on rhymes strengthens links among words and re-enforces the phonological form of individual words. For most activities the adult demonstrates a word that rhymes with the target word. This can be a real word rhyme or a nonsense (made-up) word. For example: to rhyme with 'dog', 'frog' is a real word and 'sog' is a nonsense word. For the child these can be called 'made-up' words. It is appropriate to encourage children to generate some made-up or nonsense words themselves as well as thinking of real-word rhymes. The ability to do this demonstrates that they have understood the principle of rhyme. Being able to produce a nonsense word in a rhyming task is difficult and a child who does this is showing skill. However, finding 'real' words when they exist shows that the child has searched successfully among the words in their head.

Word length awareness

Ask the child if the target is a long or a short word. You may need to check they understand these concepts first. Factors to consider are the number of syllables (for example, a three-syllable word is likely to be seen as a long word) and the spelling, if the child is aware of this. For example: 'hedgehog' may be seen as a long word, even though it only has two syllables, because of its spelling. As a general rule, words of over three syllables will be considered long words. Concentrate on the number of syllables.

Visualising parts of words

This uses 'mind-pictures' or 'visualisation' as an additional strategy to help with word-learning and word recall. The children practise visual imagery,

imagining pictures in their minds that relate to particular words. They link syllables with pictures and draw their ideas.

Games for phonological features

Useful games for developing phonological features appear in the 'Vocabulary development: games and activities' section which follows.

Putting semantic and phonological features together

So far, connections between the word and its semantic features and between the word and its phonological features have been discussed separately, with activities for children who need special help to develop one or both areas. However, many children will be helped in learning new words by thinking of both semantic and phonological features, and will be able to work on both simultaneously. Doing this will further strengthen the mental representation of a word. The adult can decide on a selection of semantic and phonological features to work on from the previous two sections, or using the games below that target semantic and phonological features together. By alternating as they do between semantic questions and phonological questions, the games help the children to link up these areas in relation to the words being used.

Helping the child to find words

Because semantic and phonological information may not be available in a complete form when the child needs to say a word, the word may not be 'found' at the right moment. Often, the child is able to use the word with no problem on some occasions, but struggles at other times. There are some strategies that can be used to help the child to say the word when he or she needs to. Some involve adult cueing, and others involve the child helping themselves.

Cueing strategies: for the adult to use with the child

When a child is struggling to remember a word, whether this occurs in a task aimed at vocabulary development or in a 'real-life' situation, you can use a variety of cues to help the child to access the word. Cues are questions that relate to the word causing difficulty. They invite the child to think of the semantic and phonological features that we looked at in the above sections.

Some cues will vary depending on whether the adult does or does not know the word that the child is trying to say. For example, you can only tell the child the first sounds of a word if you already know what word the child is trying to say. If you cannot tell from the context what the child's target word is, you would have to encourage the child to think of the initial sound themselves, or give a different cue. You can use both semantic and phonological cues, and you can use questions and give clues.

For example, if the child is trying to say 'chimpanzee' and the adult knows this is the child's intended word, the adult can:

- Give the child a clue for some of the word's semantic features, for example: 'It looks like a big monkey'.
- Give the child a clue about syllables, for example: 'It has three claps in it'.
- Ask the child a question about the word's semantic features, for example: 'Where does it live?'
- Ask the child a question about the phonological features of the word, for example: 'What sound does it start with?'

If the adult does not know the target word, only the last two questions are useful.

Obviously, it is harder for the child to answer a question about their intended word than to respond to a part-word clue about it. However, we are aiming for the child eventually to be able to cue him or herself by thinking of questions like this. It is helpful if the child hears cueing questions from an adult first. It is also important to tell the child that you are asking questions or giving clues because that is what we have to do to remember words. Emphasise to the child that it is important that they learn how to ask themselves these questions.

List of cues

Phonological cues

Examples of phonological cues are as follows:

- Giving/asking for the number of syllables/beats/claps in a word, for example: 'It's got four claps' for radiator.
- Giving/asking for the initial sound, for example: 'What sound does it start with?' You can also ask the child if they know any of the other sounds in the word.
- Giving/asking for a rhyming word, for example: 'It rhymes with late' for 'gate'.
- You can also give the child a 'forced alternative' as a phonological cue. This is when the adult gives the child two similar sounding words to choose from, one of which is the target word

known to the adult; for example: 'Is it a radio or a radiator?' when the target is radiator. Forced alternatives are more commonly used with semantic cues however – as outlined below.

Semantic cues

Ways of cueing the child to think of semantic links were listed in the section on 'Semantic features', above. They are listed again here for convenience.

Examples of semantic cues are as follows:

- Giving/asking for a description, for example: 'What does it look like?'
- Giving/asking for its location, for example: 'Where can you find it?'
- Giving/asking for its group name, for example: 'It's an animal'
- Giving/asking for its function, for example: 'We use it for sweeping the floor'
- Giving/asking for related words, for example: 'Can you think of any words to go with it?'
- Forced alternative, which can only be given when the adult knows the target word. An example would be: 'Is it a kangaroo or a monkey?' when the target is known to be 'kangaroo'.

Self-cueing: teaching the child to cue him or herself

We are aiming to enable the child eventually to have the skills to cue him or herself so that the child will eventually be able to help to remember words rather than depending on an adult to give clues or ask cueing questions. When working on vocabulary development tasks and using cueing it is therefore important to discuss with the child why you are doing it. For example, you can ask a child struggling to access a word 'What do you need to ask yourself, to help you remember the word?' The aim is that eventually the child will be able to ask him or herself these questions.

Brainstorming can be a way of encouraging the child to think about the relevant cue questions. The child can brainstorm, 'What do I know about this word?' to help learn the sort of questions to ask themselves to find a word. Self-prompts can be semantic, for example: 'What do I do with it?' or phonological, for example: 'What sound does it start with?' The child can be encouraged to think of the question prompts themselves.

Making a set of cue cards for the child, using cue questions or Boardmaker™ pictures to illustrate the questions, can be a useful visual reminder for the child.

Additional strategies for the child

There are some other things that children can do to help themselves to find words.

Rehearsing

The child can be encouraged to rehearse the word once it has been retrieved, for example: for the word 'orchard' the child could rehearse 'Apples grow in an orchard. An orchard has lots of trees'.

Miming and drawing

If the above strategies are not proving useful to help the child access a particular word, then encouraging the child to act out, mime or draw the word can be used as a last resort strategy. Sometimes you may want the child to do this, if you think you know the word he or she is trying to say, but want verification (you may or may not get this from a drawing or mime). You can help to cue the child when you know what they are trying to say.

Teaching the child to buy time and ask for help

Children can be taught some handy phrases to use when they are stuck on a word, for example: 'I'm just thinking of the word', 'I'm trying to remember the word'. This can give the child some time to cue him or herself. It is important to stress that it is all right to do this and that everyone has to do it sometimes when they forget a word, so the child does not give up when struggling with a word.

Finally, the child needs to be reassured that it is all right to ask for help when he or she is stuck on a word. Discussions appropriate to the child's developmental level can take place during therapy to the effect that lots of people forget or get stuck on words and that if the child can describe a feature of a word then the adult can help them find the word. For example, the child could say 'I'm thinking of the word … It's something we wear on our feet in summer' and the adult would be able to guess the target 'sandals'. Children with vocabulary and word-finding difficulties will need a lot of practice at describing word features, making feature-maps and playing vocabulary games, coupled with an awareness of what they need to do when stuck on a word, and discussing self-cueing during therapy, before being able to make a request for help.

[The manual then details games for semantic and phonological development, then presents detailed information on how to help children develop language under the headings listed as contents of the manual.]

7. Grammar therapy

Grammar markers

The aim of this section is to develop the child's understanding and use of grammatical markers. Grammatical markers are presented in the approximate sequence they appear in a child's development, but we will start intervention at a level appropriate to an individual child. The way to work on these structures is by the adult first modelling them and, when it appears that the child understands the structure, prompting them to use it, with the adult 'recasting' any errors (see 'Golden rule' seven). For example, the child says 'She eated her tea', and the adult says 'Yes, she ate it'. The activities described below for each structure are to be used flexibly, either for the adult to model the required marker, or for the child to practise its use. Whether they are used following modelling or as practice activities will depend on the stage of therapy that the child is at. It is unlikely that all of the following structures will need to be worked on. The starting point will depend on the child's level of grammatical development, and further markers, for example, more auxiliary verbs may need to be introduced.

Present progressive tense: -ing

Explaining the meaning

Explain to the child that '-ing' tells us that someone is doing something now. For example we say 'He is running' or 'She is swimming' right now.

Activities

Action verbs

Select action verbs to work on '-ing', for example: 'jump' or 'eat', not 'be' nor 'have'. Demonstrate and model verbs with '-ing' endings, either through acting out the verb or with miniature figures, saying: 'We're jumping'; 'We're hopping'. Action cards and selected pictures with people carrying out actions can also be used both for the adult to model the target to the child, and to ask the child to describe what is happening. Useful questions to ask the child are: 'What's happening here?' 'What's he or she doing?'

Published resources: please see appended list for full details

Transparent worksheet, pp. 6, 13, 27, 28
For further information and activities see Language therapy, pp. 147–149.

Regular plurals

Explaining the meaning

Explain to the child that when we have more than one of something, we have to use a special ending on the word, for example: 'cats'; 'horses'; 'books' could be two, or more, things and not one. (The sound of this grammar marker varies with the word it is attached to, but this need not be stressed.)

Activities

How many can you see?

Using pictures, demonstrate and model, for example, saying 'Here's a car, here are two cars', and so on. Useful questions for the adult to ask the child are: 'How many are there?'

Shopping game

Each player asks the shop-keeper, played by the adult or another child, for items from a display, for example: 'Can I have some books?'; 'Can I have three bananas?'

Published resources: please see appended list for full details

Practical language activities, pp. 92, 93, 94 (plural noun format, irregular and regular)
Transparent worksheet 29
Cambridge language activity file
Black Sheep regular plurals
CLIP morphology, pp. 1–15
Fundecks
Developing receptive and expressive language skills in young learners
Dotbot

Determiners: a, an, the

Explaining the meaning

Explain to the child that we need to put a little word before some words. This little word can be 'the' or 'a' (or 'an') when we are talking about 'things'. We say 'a' the first time we mention something, then we say 'the'; for example: 'A book was lying on the table. The book was about birds'. We say 'an' when the next word starts with a vowel, which just happens naturally.

Published resources: please see appended list for full details

Transparent worksheet, pp. 16, 17, 19, 22, 24, 59
For further information and activities see Language therapy, pp. 147–149.

Common irregular past tenses: went, came, etc.

Explaining the meaning

Explain to the child that when we talk about things that have 'finished', we have to change the way we say the action word, and some words have their own versions, for example: 'she went home', 'he came back'.

Activities

What they did

Enact little sequences with figures, for example: making one figure eat something, another go somewhere like school. Talk about what the figures are doing, saying for example: 'This girl is eating a biscuit'. Then ask 'What did she do?', to elicit the past tense from the child, who says 'She ate a biscuit'. If the child cannot answer any questions the adult should answer his or her own question, making it a modelling activity.

Toy stories

This is similar to 'What they did', but at a harder level. Miniature figures are used. The adult tells the child that he or she is going to tell a story with the toys and that afterwards the child will tell the story to a puppet who didn't hear the story the first time. The adult then acts out a short story sequence with the miniature figures, using verbs in the present tense. The story events are then repeated by the adult, pointing to the figures used, but speaking in the past tense to help the child remember what happened. If the figures are pointed to but do not carry out the actions while the story is repeated, it helps the child to realise that the events have already taken place. The child is then asked to tell the story to a puppet. The adult can prompt with 'And then …'. If the child is struggling, the exercise can be altered to the adult modelling the story again in the past tense.

An example of a story is: 'This little girl drank her juice, then ate her food, then stood up on her chair, then she fell down. She got up and went to bed'. The props needed would be: a girl figure, a small table, a cup, plate, chair and bed. The story could be made easier or harder. The child might need to enact the story again with the props before trying to verbalise it. Picture cards showing an event sequence could be used as alternative materials.

Published resources: please see appended list for full details

Transparent worksheet 70 'went', p. 94
Cambridge language activity file (various activities)
Practical language activities, pp. 95, 145
Black Sheep – irregular past tense packs
Dotbot
Rhodes to language, p. 71
Sequence cards (various)

For further information and activities, see Language therapy, pp. 193, 201.

[The manual then details similar activities for third person singular, –s (present tense); possessive –s; regular past tense –ed; copula – verb 'to be' (is, are, was, were); auxiliary verbs; pronouns; possessive adjectives; negatives; irregular plurals and future tense (going to).]

Colourful sentences

Introduction

Some children at school may have difficulties in constructing sentences. The aim of this section is to develop awareness and use of good sentence structure and word order for a range of sentence types.

This can be tackled:

- by explaining to the child that sentences are being targeted
- by introducing and developing the idea of different parts of a sentence, and labelling these with colour cues
- by encouraging use of appropriate word order in a range of sentence structures
- by reflecting on targets used within sessions and encouraging carry-over to other situations.

A system of colour coding words is used to help children to understand relationships and use words in sentences. It also aims to extend the length and grammatical complexity of their speech. This is based on the work of Bryan,[129] who coded semantic relationships, and a long tradition of colour coding syntactic form, since at least Lea in 1973.[192] The reason for colour coding is to give the child an extra visual cue to support the development of different and more complex sentence types. The colour helps to reinforce for the child elements within a sentence.

To do this sentences are broken down into the following elements:

'Subject' (the doer)	'*The boy* is running'
'Verb' (the doing)	'The boy *is running*'
'Object' (the done to)	'The boy is kicking *a ball*'
'Location' (where the verb is done)	'He plays *in the garden*'
'Instrument' (what is used to do the verb)	'I hit the ball *with a bat*'
'Indirect object' (who or what gets the object)	'I gave *her* a gift'
'When/time' (when the verb is done)	'*Yesterday* I swam'
'Why' (the reason the verb is done)	'I cried *because I was sad*'
'Adjective' (description)	'A boy *with blond hair*'
'How' (the manner in which the verb is done)	'She cheered *loudly*'

The system of colour coding can also be applied to any aspect of grammar which is targeted in the grammar markers section, for example auxiliary verbs can be coloured the same as the main verb.

For example:

The boy	is stirring	his drink	quietly	at teatime	in the kitchen
Subject	Verb	Object	How	When	Location

Each element is then colour coded:

Subject	orange
Verb	yellow
Object	red
Location	blue
Instrument	brown
Indirect object	pink
When	purple
Why	black
Adjective	green
How	turquoise

Conjunctions, negatives and anything else not colour coded are black words on a white background.

Each sentence element can be cued by using a particular question. These questions are presented on appropriately colour-coded cue cards to use as visual prompts with the child, when working on each sentence element.

Question	Element	Colour
what … doing?	verb	yellow
who?	subject	orange
what?	object	red
where?	location	blue
what using?	with	brown
who to?	indirect object	pink
how?	adverbial	turquoise
what like?	adjective	green
when?	time	purple
why?	reason	black

Explaining colour coding

Boardmaker™ symbols with words underneath are used to represent each sentence element when working on sentence construction. These are placed in appropriately colour-coded 'frames', i.e. coloured backgrounds. For children who can read it may be more appropriate to use colour-coded written words or to use coloured backgrounds with words written on top.

Questions are used as prompts to encourage the generation of sentences. Questions should be given verbally, with visual back-up in the form of Boardmaker symbols on the relevant colour.

Initially, Boardmaker pictures are used to build up descriptions using action pictures. Templates for sentences may be used by having coloured strips which can be assembled by the adult into the correct order for the sentence type being targeted, for example: 'orange – yellow – red' for 'subject – verb – object'.

There is a hierarchy of complexity of sentences and this should be followed carefully. For children who use simpler sentences but not complex ones, the early stages should be covered. For children at later stages they may be useful to introduce the colour-coding system.

Comprehension of each particular sentence type should be targeted first before moving on to the child using the form.

Any verb tense can be used and can be changed to give variety or if a child has verb tense as one of his or her therapy targets. However, each sentence level should first be introduced using a form of the present tense (for example; walks, is walking) to allow the child to understand the basic sentence structure.

Level 1: subject + verb

These are two-element 'person/thing acting' sentences, for example: 'The man walks'; 'The baby is crying'; 'The door shuts'; 'The cat is sleeping'.

Explaining the meaning

The adult introduces an action picture and explains to the child that a sentence is going to be made up to describe the picture. Boardmaker™ symbols are used to form the sentence visually. A simple example would be a symbol of a man (orange background) and walking (yellow background). If, however, the child is already able to use early principles of the sentence forms, these should be used to introduce the colour-coding system, but will not need to be covered in depth.

Understanding the sentence

The adult shows the sentence to the child and says, 'See, the man is walking'. They take time to draw attention to the colours, saying for example: 'The man is the person who is doing something, so this picture is orange. He is walking, so the picture of what he is doing is yellow.' Colour-coded question prompt cards are then introduced. The adult asks 'So, who (or what) was in the

picture?' (orange prompt card). 'What are they doing?' (yellow prompt card).

At this stage the adult produces both the question and the response, to model the targets for the child. Lots of examples are needed.

Using the sentence

Once comprehension practice has been carried out and the adult is confident that the child has understood the basic principles of building sentences and that each part of the sentence has a different colour, the child is ready to work on sentence production.

As before, an action picture is presented to the child, this time with the general prompt 'What's happening?' A basic 'subject + verb' structure is sought. This can be cued in several ways: by offering alternatives, for example: 'Is it a man or a lady?' 'Is he running or walking?' and by asking the appropriate questions, such as 'Who is in the picture?' 'What are they doing?'

If the child only gives part of the description, saying for example: 'man', then the appropriate question to elicit the rest of the sentence should be asked, for example: 'It is a man, but what is he doing?' or 'Yes, running, so can you tell me who is running?'

If the child uses pronouns to describe the subject, for example 'he' 'she' or 'they', the child should be prompted to give a more specific label for the subject.

If the child produces a sentence which misses out the 'little words' the adult should recast their sentence with the words inserted. For example, if the child says 'Man running' the adult says 'Yes, that's right, the man is running'.

Having worked with action pictures initially, 'subject + verb' sentences should be practised, in a different context using the activities suggested at the end of this section.

[The manual then details activities for other sentence forms.]

8. Narrative therapy

Overview

Narratives are a very important part of how we communicate. They are an integral part of everyday social interactions and the school curriculum. We relate events that have happened to us on a daily basis and are also able to create fictional stories. Both are narratives. Most school-aged children are familiar with the concept of 'stories' through repeated exposure to books, television and children's stories. However, they may find it difficult to structure made-up stories or real, true-life 'stories' about themselves. Narrative therapy gives the child a framework that can be applied to both real and made-up stories, to help them to organise narratives and to ensure that the child realises what information is required by the listener to allow the story to make sense. The work here is based on Shanks and Ripon.[134]

Structure of a narrative

We often think of stories as having a beginning, a middle and an end. These are useful ideas that have been refined to help us to teach children all the parts of a story.

The beginning

The beginning of a story allows the setting to be given and we usually need a beginning of some kind to set the scene. The setting can tell us 'who' the narrative is about, and 'where' and 'when' the story took place. The 'when' can range from the very specific ('at 10 o'clock yesterday') to the more general ('last summer'). Similarly, 'who' and 'where' can contain very detailed information ('Once there was a little boy who was very naughty. He was always getting into trouble at school. The teachers always had to get his mum and dad in. The boy was called Jonathon and he was six …') or be brief ('Once a boy called Jonathon did a naughty thing. He …').

The middle

The middle section of the narrative is where the story actually happens. It is where the central plot of the story occurs and where the exciting bit happens. It is clearly defined by a sequence of three parts.

What happens – 1

This is an initiating event that acts as a trigger for the narrative. It is an event/action/perception that causes the character(s) to do something, for example: 'One day, Susie the squirrel went to her friend's house for tea. But her friend didn't know where the nuts for tea were buried'.

What happens – 2

Following this there is the action that the character carries out because of the initiating event, for example: 'So Susie dug up some of her own nuts'.

What happens – 3
This part occurs as a result of 'What happens – 2'. This is the outcome, which may record a success or a failure of the characters' actions, for example: 'Susie and her friend had a delicious tea'.

When all three parts are present in the middle section it is known as an 'episode'. Most familiar stories have more than one episode, making them longer and more complex. This idea may be introduced once a child has understood the principles of an episode, but it is important to ensure that the most basic narrative structure (where 'the middle' is composed of one episode only) is understood first.

The ending
There is another section called the ending. This is an additional sentence that may or may not be essentially required. This is often where the general moral of the story is given or it is used to give a neat finish.

The complete structure of a narrative is as follows:

- Beginning: Who?
  When?
  Where?
  At least one of these is usually present

- Middle: What happened? – 1
  What did the character do about that? – 2
  What happened then? – 3
  Well-formed narratives need all of these 'middle' elements.

- End: This tells the listener that the story is now complete.
  It is not always necessary to have an 'end' as 'What happened – 3' may give enough information. For each story the child should be asked if an additional ending sentence is required.

Some children may need help to construct narratives. The aim of this narrative therapy is to increase a child's awareness and use of the structures required to form a complete narrative.

This can be tackled by:

- increasing awareness and use of the beginning, middle and end of a story
- learning that 'beginning' is often composed of three parts – 'who', 'when', 'where'
- learning that 'middle' is always composed of three parts
- learning how to conclude a story
- using visual prompts to aid narrative creation
- developing an increasingly complex narrative structure
- encouraging reflection on current narrative targets.

Materials
The child's awareness of stories should be checked first to ensure they have the basic concept of a story as a description of a 'happening'.

Refer then to the Black Sheep narrative pack. Introduce each narrative component, using a cue card listing 'who', 'when', 'where', 'what happened (1, 2, 3)', 'end'. These cue cards should be visible for the child at all times and should be highlighted by pointing to them when the part of a story which they relate to occurs. When therapy moves on to target specific aspects of a story, the cue cards should again be obvious and should be referred to frequently (for example, say: 'Now we are going to think about 'who' is in our story.' and show the 'who' card).

Brainstorming
Discuss and clarify with children that stories can be real (i.e. they really happened to someone) or made up (i.e. they didn't really happen). Stories can also be about the child themself or another person (real or made up) or about an animal or a monster and so on. Older children should be asked what they know about stories to discover if they are able to generate relevant ideas. Younger children may require more prompts and suggestions to be given to them.

Tell a short story
Using the prompt cards from the Black Sheep pack (or adapted versions), the child is asked if they can identify the key components of the story:

- who it is about (introduce the idea of 'character' as a person in the story)
- where it took place
- when it happened
- what happened
- what the character did about it
- what happened next/in the end.

For older children these prompt cards can be introduced before the story is told, to focus their listening.

Once these parts of the story have been identified, a child can point to one of the cue cards. The adult should then retell the story with emphasis on the key parts, asking 'Where is the … card?'

For example:

One day (That's 'when' the story happened, where is the 'when' cue card?)
in the forest (That's 'where' the story happened, where is the 'where' card?)
the three bears (That's 'who' the story is about, where is the 'who' card?)
found that their porridge was too hot to eat. (That is what happened, where is the card?)
So they went for a walk to let it cool down. (That is what they did about it, where is the card?)
But when they came back they found it had all been eaten up! (That is the consequence, where is the card?)
After that they always locked the door behind them when they went out! (That is the end – where is the card?)

In fact, the original story continues with another episode:

A little girl called Goldilocks had come into their house and eaten some porridge (initiating event – 'what happened – 1)
and fallen asleep in their bed. (her response – 'what happened' – 2)
so they chased her away. (consequence – 'what happened' – 3).

The whole narrative introduction session, or specific parts of the session, can be repeated as many times as is necessary for the child to gain an understanding of the whole 'story' concept, and the main parts within it. Alternative examples of stories should be used.

Once all of the labels and cue card for different parts of a narrative have been introduced and understood, specific work on each part of the narrative can begin.

[The manual then details how each story element can be developed.]

Appendix 3

Details of instrumentation

The Wechsler Abbreviated Scale of Intelligence (WASI)[154] is a recently standardised test which utilises two subtests, matrix reasoning and block design, to obtain a reliable measure of the non-verbal ability of children in the 6–11 years age group.

Primary outcome measure

The CELF-3^{UK} is a language test which has recently been standardised in the UK. It consists of the following receptive subtests.[140]

Sentence structure (ages 6–8 years)
This subtest assesses the child's understanding of grammatical rules regarding sentences. The child is presented with pictures and the tester says a sentence. The child's task is to point to the picture that best represents the sentence.

Concepts and directions (ages 6+ years)
This subtest uses pictures of different shapes to assess the child's ability to carry out verbal instructions of varying complexity and length.

Word classes (ages 6+ years)
This subtest assesses the child's ability to understand relationships among groups of words by requiring him or her to indicate which two (of three) words presented are conceptually similar.

Semantic relationships (ages 9+ years)
This subtest assesses the child's ability to understand semantic relationships in sentences.

The CELF-3^{UK} also has three expressive language measures.

Word structure (ages 6–8 years)
This subtest assesses the child's knowledge of word structure rules.

Formulated sentences (ages 6+ years)
This subtest assesses the child's ability to form and produce simple, compound and complex sentences.

Recalling sentences (ages 6+ years)
This subtest assesses the child's ability to repeat a spoken sentence.

Sentence assembly (ages 9+ years)
This subtest assesses the child's ability to construct meaningful and grammatically correct sentences.

Performance on the CELF-3^{UK} is indicated by the calculation of the following scores:

- receptive language score (mean = 100, SD = 15): calculated using the three receptive language subtests appropriate for the child's age
- expressive language score (mean = 100, SD = 15): calculated using the three expressive language subtests appropriate for the child's age
- total language score (mean = 100, SD = 15): an overall composite score indicating the child's performance on both receptive and expressive language tasks.

These three scores can also be converted to percentile ranks, *z*-scores and age equivalents. With standard errors of measurement ranging from 0.70 to 1.15, changes in standard score of around 3 would be outside the test–retest error range, indicating high levels of reliability.

Secondary outcome measures

The BPVS-II is a standardised test of picture vocabulary which is widely used in research as an outcome measure of general progress in receptive language. The children are presented with pages containing four outline drawings and have to indicate the drawing corresponding to the word spoken by the tester. Performance on the BPVS-II is indicated by standard scores and age-equivalent scores.

Linked to the CELF-3 are observational rating scales for completion by teachers and parents which provide evidence for agreement and disagreement on areas of language impairment and response to intervention.

Questionnaires for parents and teachers and the project SLT/As provide information about transfer and generalisation of any benefits from intervention and also about the acceptability of treatment and issues causing concern.

Enderby's Therapy Outcome Measures provide a standardised and reliable approach to reflecting changes in a patient's status following intervention based on the WHO (1993) classification of impairment, disability, handicap, well-being and distress.

Appendix 4

Form letter sent to parents inviting them to attend a focus group

HTA Research Project
Room 566
Graham Hills Building
University of Strathclyde
40 George Street
Glasgow
G1 1QE

0141 548 4036

DATEHERE

Dear PARENTNAMES,

Re: HTA Speech & Language Therapy Project

As you know, your child was recently involved in a study to compare different methods of speech and language therapy delivery within mainstream schools. Some children were seen individually while others were seen in a group; some were seen by Speech & Language Therapists and others by trained Therapy Assistants.

To complete our data collection, the project team are keen to seek the views of parents about the project and the intervention their child received. We would therefore like to invite you to attend a group discussion, with other parents on either:

DATEHERE
TIMEHERE
PLACEHERE

Both meetings will be held in Room 5.57 (on Level 5), University of Strathclyde, 40 George Street, Glasgow G1 1QE.

The meeting should last no more than an hour and your views will be kept confidential. Any travel expenses incurred in attending the meeting will be reimbursed. Car parking is available in the High Street Car Park (5 minutes walk) and Queen Street Station is close by (also 5 minutes walk).

In addition to any points that you may wish to raise, we would be interested in discussing the following:

(1) How did you feel about the therapy your child received?
(2) How did you feel about your contact with the project therapist or assistant?
(3) How did you feel about the progress made by your child over the course of the project?

If you have any queries about this meeting or your part in it, please do not hesitate to contact us. A reply slip is enclosed and we would be grateful if you could return this in the stamped addressed envelope provided to indicate whether you are able to attend. We very much look forward to meeting you.

Yours sincerely

Jim Boyle
Senior Lecturer/Research Team Leader

Appendix 5

Focus group coding categories

How did you feel about the therapy your child received?

1 Parent pleased about therapy child received (general comments, not covering any of the specifics below)
2 Positive aspects of the therapy:
  2.1 Benefits of being school-based
  2.2 Frequency of sessions/intensity of therapy/positive comments re length of sessions
  2.3 Timing of the sessions (e.g. at the end of the afternoon)
  2.4 Positive comments on modes of therapy (e.g. from therapist, or assistant, or group or individual)
  2.5 Benefits of being in another school
  2.6 Children enjoyed therapy and/or felt it was helpful
  2.7 Child had positive relationship with therapist
  2.8 Project provided support and/or advice for school
  2.9 Provision of taxis/escorts
3 Project received positive support from primary school
4 Parent didn't know enough about the aims of the project at the start
5 Parental concerns about therapy received (including child coming out of classroom or school, not enough project homework, concerns about child not doing project homework, concerns that child did not know why they were included in the project, concerns re length of sessions)
6 Problems in communication/liaison between school and therapist/assistant

How did you feel about your contact with the therapist/assistant?

7 Contact with project therapist/assistant helpful (including helpful advice or feedback given)
8 Could contact therapist/assistant if I needed to
9 Concerns about nature of contact or level of contact with therapist/assistant (including issues regarding communication at the end of the project)

How did you feel about the progress made by your child over the course of the project?

10 Progress evident (general comments, not including any of the following)
11 Areas where progress reported:
  11.1 Confidence
  11.2 Speech and language
  11.3 Reading
  11.4 Written language or writing
  11.5 Other curricular areas, including maths and 'schoolwork'
  11.6 Social benefits/improved behaviour/fewer tantrums/less frustration/increased motivation/happier/less bullying
12 Concerns about progress made by child over the course of the project (including concerns about effects of missing sessions, concerns about the therapy ending, concerns that teacher sees no progress, concerns about project efficacy)

Any other issues?

13 General comments or general concerns about schools, teachers, curriculum, educational psychologists, homework, reading, general points about school reports not relevant to specific areas of progress, etc. (including general comments about supportive schools not specific to liaison with the project, concerns about secondary schools)
14 General comments about SLI or characteristics of SLI or participating child
15 Comments about parents' feelings of frustration about their children
16 General comments about individual differences in children's maturity and rates of progress
17 Other children's views of the participants (e.g. other children positive or concerns that they are negative)

18 Explanations provided to child as to why they were included in the project
19 Issues regarding community SLT provision (including liaison with community SLT, and including Outreach support)
20 General comments on contact with other professionals not covered above (e.g. occupational therapists/physiotherapists/ doctors)
21 Questions about the continuation of the project
22 Other (e.g. non-evaluative comments not included elsewhere, or comments with unclear referents or requests for information or comments about siblings not pertinent to participating child)

Appendix 6

Form letter sent to head teachers inviting them to send a representative to attend a focus group

HTA Research Project
Room 566
Graham Hills Building
University of Strathclyde
40 George Street
Glasgow
G1 1QE

0141 548 4036

DATEHERE

Dear TEACHERNAME,

Re: HTA Speech & Language Therapy Project

As you know, one of your pupils was recently involved in a study to compare different methods of speech and language therapy delivery within mainstream schools. Some children were seen individually while others were seen in a group; some were seen by speech & language therapists and others by trained therapy assistants.

To complete our data collection, the project team are keen to seek the views of teachers about the project, the intervention their pupil received and about the collaborative aspects of speech and language therapy delivered in mainstream schools. We would therefore like to invite you to attend a group discussion on:

DATEHERE
TIMEHERE
PLACEHERE

The meeting should last no more than an hour and your views will be kept confidential. Any travel expenses incurred in attending the meeting will be reimbursed.

In addition to any points that you may wish to raise, we would be interested in discussing the following:

(1) How did you feel about the therapy your pupil received?
(2) How did you feel about the liaison with the project therapist or assistant?
(3) How did you feel about the progress made by your pupil over the course of the project?

If you have any queries about this meeting or your part in it, please do not hesitate to contact us. A reply slip is enclosed and we would be grateful if you could return this in the stamped addressed envelope provided to indicate whether you are able to attend. We very much look forward to meeting you.

Yours sincerely

Jim Boyle
Senior Lecturer/Research Team Leader

Health Technology Assessment Programme

Prioritisation Strategy Group

Members

HTA Commissioning Board

Members

Current and past membership details of all HTA 'committees' are available from the HTA website (www.hta.ac.uk)

Diagnostic Technologies & Screening Panel

Members

Chair,
Dr Ron Zimmern, Director of the Public Health Genetics Unit, Strangeways Research Laboratories, Cambridge

Ms Norma Armston, Freelance Consumer Advocate, Bolton

Professor Max Bachmann, Professor of Health Care Interfaces, Department of Health Policy and Practice, University of East Anglia

Professor Rudy Bilous Professor of Clinical Medicine & Consultant Physician, The Academic Centre, South Tees Hospitals NHS Trust

Ms Dea Birkett, Service User Representative, London

Dr Paul Cockcroft, Consultant Medical Microbiologist and Clinical Director of Pathology, Department of Clinical Microbiology, St Mary's Hospital, Portsmouth

Professor Adrian K Dixon, Professor of Radiology, University Department of Radiology, University of Cambridge Clinical School

Dr David Elliman, Consultant in Community Child Health, Islington PCT & Great Ormond Street Hospital, London

Professor Glyn Elwyn, Research Chair, Centre for Health Sciences Research, Cardiff University, Department of General Practice, Cardiff

Professor Paul Glasziou, Director, Centre for Evidence-Based Practice, University of Oxford

Dr Jennifer J Kurinczuk, Consultant Clinical Epidemiologist, National Perinatal Epidemiology Unit, Oxford

Dr Susanne M Ludgate, Clinical Director, Medicines & Healthcare Products Regulatory Agency, London

Mr Stephen Pilling, Director, Centre for Outcomes, Research & Effectiveness, Joint Director, National Collaborating Centre for Mental Health, University College London

Mrs Una Rennard, Service User Representative, Oxford

Dr Phil Shackley, Senior Lecturer in Health Economics, Academic Vascular Unit, University of Sheffield

Dr Margaret Somerville, Director of Public Health Learning, Peninsula Medical School, University of Plymouth

Dr Graham Taylor, Scientific Director & Senior Lecturer, Regional DNA Laboratory, The Leeds Teaching Hospitals

Professor Lindsay Wilson Turnbull, Scientific Director, Centre for MR Investigations & YCR Professor of Radiology, University of Hull

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The HTA Programme and the authors would like to know your views about this report.

The Correspondence Page on the HTA website (http://www.hta.ac.uk) is a convenient way to publish your comments. If you prefer, you can send your comments to the address below, telling us whether you would like us to transfer them to the website.

We look forward to hearing from you.

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ISSN 1366-5278