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INVITED KEYNOTE ADDRESS

Mainstream School Services for Children with Primary Language Impairment - Implications from Research

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On behalf of the trial collaborations

In 2002, I presented a paper to NAPLIC's annual conference at the University of Oxford, outlining a clinical trial that was about to begin on developing language interventions for children in mainstream primary schools in Glasgow and Edinburgh. This trial is now completed and published, as are two further related studies on the same topic. I would like to review what we found, and discuss the implications for the development of mainstream school services.

The Three Studies

The studies were carried out in Scotland by varied research collaborations amongst the Universities of Edinburgh and Strathclyde and NHS PC trusts in Ayrshire & Arran, Edinburgh, Greater Glasgow, and Forth Valley. Each study has been given a short title to distinguish amongst them: the NCCHTA trialⁱ, funded by the National Co-ordinating Centre for Health Technology assessment; the cohort studyⁱⁱ, and the Forth Valley-Ayrshire & Arran studyⁱⁱⁱ, both funded by the Chief Scientist Office Priorities and Needs Programme. Thanks are offered to the funding bodies, but the views presented here are those of the presenter, and do not necessarily reflect those of the funding bodies.

For all three studies, the children involved:

- were aged 6 - 11 years.
- attended mainstream primary school.
- were known to SLT services.
- had no neurological deficits or pervasive developmental disorder.
- had documented normal hearing.
- had non-verbal IQ scores > 75 (WASI)^{iv}.
- had receptive and/or expressive language scores < -1.25 SD on the CELF 3^{UKv}.
- did not require the specific skills of an SLT.

The children therefore had expressive or mixed receptive-expressive language impairment.

Such children are numerous - around 5 - 7% of the population at school entry^{vi}, and their language impairment having persisted after age six often continues into adult life, affecting literacy and access to the school curriculum as well as social activity and wellbeing^{vii}.

Many of these children in the UK are offered indirect therapy in schools from SLT services. This can involve either a consultancy mode via schoolteachers and other classroom staff, or a transfer mode via speech and language therapy assistants (SLTAs). Such modes aim to capitalise on the social environment and language curriculum of the classroom to provide an excellent language learning environment, although service capacity and cost limits can also be relevant^{viii}. However, at the start of our studies there was no firm evidence of the efficacy of indirect modes of service delivery (and indeed limited evidence of efficacy for any interventions) or of cost implications.

The NCCHTA Trial

This trial therefore investigated modes of intervention by comparing language outcomes for children undertaking:

- individual language therapy from an SLT, or
- group language therapy from an SLT, or
- individual language therapy from an SLT assistant (SLTA), or
- group language therapy from an SLTA, or
- continue with their 'usual therapy', as a control.

This was why the children were selected did not need the specialist skills of an SLT – they could be randomised to SLTA intervention. Group therapy was included to consider both the role of groups in extending access to service and to capitalise on children's enjoyment of group learning. The outcomes were children's standardised language scores on CELF-3^{UK}, with secondary outcomes measures of parent and teacher satisfaction, and a cost-benefit analysis was carried out.

The design was a randomised controlled trial, with children randomly allocated to one of the five research conditions. The four research intervention modes were compared to each other and to the control group of children receiving their ongoing therapy. There was 'blind' assessment of outcomes by SLTs who did not know which mode of therapy any child had undertaken. 124 children were randomised to one of the four research therapy modes and 28 to receive their 'usual' therapy as follows:

SLT individual	N = 34	SLTA individual	N = 33
SLT group	N = 28	SLTA group	N = 29
<i>Total SLT</i>	<i>N = 62</i>	<i>Total Assistant</i>	<i>N = 62</i>
<i>Total individual</i>	<i>N = 67</i>	<i>Total group</i>	<i>N = 57</i>

A language therapy manual was specially written for the project to make sure that the therapy could be tracked, and was replicable^{ix, x}.

Research intervention was delivered, in line with suggestions from the literature of the amount and pattern of therapy needed to be efficacious, 3 times per week for 15 weeks in 30 - 40 minute sessions. It took place within the child's school or in another school for some children in groups, who were transported by taxi. This gave a possible total of 45 sessions, and the research intervention average attained was 38 sessions in 15 weeks: around 22 hours of therapy.

An audit of the control group showed much more limited contact with SLT services compared to research modes. Half of the control group children got no SLT intervention during a school year. The other half averaged 16 contacts with an SLT and/or SLTA in a school year which would equate to 5 or 6 contacts over 15 weeks. Classroom staff may also have offered language learning activities on a consultancy model. As children were allocated at random to the control mode, and no differences were identified between modes in terms of language scores at the start of the project, these low amounts may be typical of 'usual therapy' for these children.

Post-intervention results of language measures (CELF 3^{UK}) showed:

- no difference in outcome amongst the four research intervention modes (SLT, SLTA, group and individual).
- benefits to expressive language immediately post-intervention, found when comparing the four research intervention modes combined to the 'usual therapy' control children, even after controlling for each child's language score at the start
- an indirect effect of research intervention at follow-up 12 months post-intervention. This means that the language scores of children receiving research intervention were better than the control group post-intervention and stayed a little higher, but their progress had not continued to accelerate away from the control group.
- no significant benefit to receptive language for research intervention children compared with control group children.
- no significant language gains for control group children.

All four research intervention modes were acceptable to parents, teachers and project SLTs and SLTAs. Unsurprisingly, group intervention modes were cheaper in this study than individual modes, and SLTA delivery cheaper than SLT. However, although there

were no significant differences in outcome amongst research intervention modes, there were some slight differences, so that per CELF 3^{UK} Total Score point, an SLT working with a group of children was most cost effective.

Mean costs and change in outcomes for each therapy mode.

Mode	Mean cost per child (£)	Mean change in CELF-III ^{UK} Total Language Score	Cost per unit increase in CELF-III ^{UK} Total Language Scores (£)
Control Group	181	0.75	241
SLTA Group	493	1.59	310
SLT Group	519	4.50	115
SLTA Individual	900	2.45	367
SLT Individual	1144	3.32	345

These figures apply only to the exact circumstances encountered in this trial however, and local factors could alter the outcome, which may not translate to other services.

The trial therefore gave support for all research intervention approaches (SLT or SLTA, individual and group). The large amount of therapy offered to research intervention children may have been an important factor in gaining a significant outcome. And this amount may be seen as very large in the current UK context.

The Cohort Study

SLTs often work with school staff including teachers, learning support teachers and classroom assistants in an indirect ‘consultancy’ mode to support children with language impairment. Indeed, this mode may still be more widely employed than indirect work via SLTAs^{xi}. But despite its widespread use, no full-scale trial of outcomes had been undertaken.

This mode was therefore investigated for children with language impairment in one local authority. Participating children were recruited to the same language and non-verbal IQ criteria as participants in the NCCHTA, study but were referred either by SLTs services or by learning support teachers. They were also receiving learning support for literacy difficulties.

The design was a cohort study, where each child recruited was offered intervention, with historical control from the NCCHTA study. Language outcomes (again CELF 3^{UK}) were assessed by SLTs who did not know the children, but who could not of course be blind to their participation in intervention. 42 children received intervention, with post-intervention language test results obtained for 40 children. The therapy was taken from the language therapy manual produced for the NCCHTA study, but activities were

delivered by school staff, guided by the research SLT and by draft language support materials written for teachers. Language and reading outcomes were assessed after about 16 weeks, to compare with the previous study. Teachers were asked to log language activities from the manual as they were carried out, and it was suggested that they were carried out as in the previous study three times a week for 30 – 40 minutes.

At the end of intervention, results showed that logs were maintained throughout the intervention period for only 29 children (69%): logs for the others were incomplete or not returned. Of the 29 complete logs, the number of language learning sessions recorded ranged from 8 - 70. This is a very large difference: the children who received most intervention had almost nine times as much logged as the child who got least, suggesting that highly variable amounts of language intervention activity had been undertaken. However, it is possible that language work could also have been carried out in class without being logged.

In this study, no significant language or reading gains were made by the cohort, although some individual children did make progress. This result was comparable to the control group in the NCCHTA trial. Despite the opportunity to work in the rich language environment of the classroom, gains in expressive language comparable to those made by the children who received research intervention in the NCCHTA study did not take place.

The Forth Valley – Ayrshire & Arran study

There are very few studies that take the opinions of mainstream classroom teachers into account when devising language support packages. In light of the variability in language teaching that had occurred in the cohort study, the third investigation used qualitative approaches and talked to teachers about what could help them to undertake language learning activities. It used these views to develop a model of language intervention more useful to teachers, with supporting materials. Participants here were not children, but teachers who had worked with children with primary language impairment. Four teachers who had participated actively in the cohort study the previous year and the research SLT met as a group to reflect upon their experiences, evaluate the draft language support materials for teachers they had used, and revise and improve them towards a teacher-friendly language support package that would support consultancy approaches.

Fifteen teachers from the three education authorities within Ayrshire and two SLTs from Ayrshire & Arran PC NHS Trust then participated in a separate set of meetings. They were new to the research studies although they had previous experience of working with children who had language impairment. They undertook group discussion, summarised and fed-back for member checking at later meetings; completed short questionnaires, and made written comments to further critique and develop the language support materials for teachers. The aim was to produce a package for mainstream teachers working with SLTs that could be used with minimal training and maximum flexibility. The package was intended to give principles of learning for the areas of language

developed in the NCCHTA study, and to accompany games and activities from the language therapy manual developed for that project.

As a result of these teacher meetings, a set of documents was produced for teachers giving information on how to:

- schedule language learning activities
- help a child to monitor their level of comprehension
- create a communication - friendly classroom.
- develop a child's vocabulary, grammar and narrative as appropriate^{xii,xiii}.

The study participants welcomed the materials developed as helpful in operating a language support model in mainstream schools, and in explaining the principles of language teaching in a practical and focussed manner.

However, teachers in Ayrshire in particular remained concerned about the difficulties of finding time to carry out language learning activities, and about the need for ongoing support. The model remains to be formally evaluated in practice, and there remains a need to develop a more comprehensive model of consultative language support in schools, with further consideration of teachers' perspectives.

Implications

This rapid summary of three studies leads to some implications for services and many, many questions.

It was possible in the NCCHTA trial to improve the expressive language, although not the receptive language, of children with severe and persistent language impairment over a relatively short time period and against the most stringent criteria. They did not however continue their accelerated progress when therapy stopped; maybe further intervention would be useful?

We do not know what would have happened if twice as much therapy had been offered, or the same amount on a different weekly schedule, or indeed a bit less. Further study of minimal and optimal patterns of intervention is needed. However, the NCCHTA study suggested that systematic, planned language intervention, sustained over time and delivered consistently, was efficacious against the most stringent of measures.

The four modes of service delivery employed in the NCCHTA study gave similar results, with well-trained, well-supported assistants obtaining good outcomes, as did small group work. This is a comfort as indirect approaches continue to spread – it appears that some may be made to work, given enough support.

However, the situation is less rosy when considering children receiving 'consultancy' approaches through classroom staff, which is perhaps the more common UK model.

Three sets of children using such approaches failed to make significant gains in the two trails described:

- the control group children during the NCCHTA study research intervention period
- the whole group of children in the NCCHTA study by follow-up one year after research intervention had ceased
- the children in the cohort study.

These relative lack of language gains may be related to the relative lack of language learning activity offered to children, as evidenced by the low amount of contact that control children in the NCCHTA study had with SLT services; the similarly low amount of contact experienced by most children in that study during the one-year follow up period, and the low levels of language learning activity logged for many children in the cohort study. We do not know how much language-learning activity is needed for significant change, but it may be a good deal more that those children were getting. Scheduling and monitoring language learning activity would appear to be an essential part of consultancy approaches (and a format for doing so appears in the web-site version of the language support model). Aiming somewhere around the one-and-a-half hours per week delivered in the NCCHTA trial would be prudent, and continuing beyond the fifteen weeks offered there. Children may need continued support to make continued progress.

The big question is whether or not such time can be found within mainstream schools, even using consultancy approaches, support workers and groups. The teachers in Ayrshire were not certain that it could, and the staff and transactions costs are indeed high. However, the evidence is pointing towards the need for sustained interventions. ‘Footering about’, with services spread too thinly and children receiving patchy and sub-optimal interventions, could simply be wasting a lot of professional and child time. If we are serious about including children with language impairments in mainstream schools, we have to ensure that they receive appropriate teaching.

ⁱ The NCCHTA trial: Boyle, J., McCartney, E., Forbes, J., O’Hare, A. *Health Technology Assessment*, 2007; Vol. 11: No. 25
<http://www.hta.nhsweb.nhs.uk/fullmono/mon1125.pdf>

ⁱⁱ The cohort study: McCartney, E., Ellis, S., Boyle, J., Turnbull, M., Kerr, J. (2005) *The Development and Validation of Materials for Use by Classroom Teachers Working with Children with Primary Language Impairment*. Final Report to the West of Scotland Research and Development Partnership. November 2005. Available from E. McCartney, SLT Division, Strathclyde University, Glasgow G13 1PP.

ⁱⁱⁱ The Forth Valley/Ayrshire & Arran study: McCartney, E., Ellis, S., Boyle, J., Turnbull, M., Kerr, J., 2005, *The Development and Validation of Materials for Use by*

Classroom Teachers Working with Children with Primary Language Impairment. Final Report to the West of Scotland Research and Development Partnership. November 2005. Available from E. McCartney, SLT Division, Strathclyde University, Glasgow G13 1PP.

^{iv} WASI: Wechsler, D. (1999). *Wechsler Abbreviated Scale of Intelligence (WASI)*. London: Psychological Corporation.

^v CELF-3^{UK}: Semel, E., Wiig, E., Secord, W. (2000). *Clinical Evaluation of Language Fundamentals – Third Edition UK (CELF 3^{UK})*. London: Harcourt Assessment/The Psychological Corporation.

^{vi} Tomblin, J. B., Zhang, X., Buckwalter, P., & O'Brien, M. (2003). The stability of primary language disorder four years after kindergarten diagnosis. *Journal of Speech, Language and Hearing Research*, 46, 1283–1296.

^{vii} Young, A. R., Beitchman, J. H., Johnson, C., Douglas, L., Atkinson, L., Escobar, M., & Wilson, B. (2002). Young adult academic outcomes in a longitudinal sample of early identified language impaired and control children. *Journal of Child Psychology and Psychiatry*, 43, 635–645.

^{viii} Gascoigne, M. (2006). *Supporting children with speech, language and communication needs within integrated children's services*. London: RCSLT

^{ix} The Language Therapy Manual be downloaded as a PDF file from <http://www.strath.ac.uk/eps/centresdivisions/slt/teachingresources/lsm/>

^x McCartney, E., Boyle, J., Bannatyne, S., Jessiman, E., Campbell, C., Kelsey, C., Smith, J., O'Hare, A., (2004). Becoming a Manual Occupation? The Construction of a Therapy Manual for use with Language Impaired Children in Mainstream Primary Schools. *International Journal of Language and Communication Disorders*, 39, 135 – 148.

^{xi} Law, J., Lindsay, G., Peacey, N., Gascoigne, M., Soloff, N., Radford, J., & Band, S. (2002). Consultation as a model for providing speech and language therapy in schools: A panacea or one step too far? *Child Language Teaching and Therapy*, 18, 145–163

^{xii} McCartney, E., Ellis, S., Boyle, J., Turnbull, M., Kerr, J. (2005). *The Development and Validation of Materials for Use by Classroom Teachers Working with Children with Primary Language Impairment*. Final Report to the West of Scotland Research and Development Partnership. November 2005. Available from E. McCartney, SLT Division, Strathclyde University, Glasgow G13 1PP.

^{xiii} The materials produced may be downloaded as PDF files from <http://www.strath.ac.uk/eps/centresdivisions/slt/teachingresources/lsm/>