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Children with phonological problems:
A survey of clinical practice

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Key Words: articulation, phonological delay, phonological disorder, evidence-based practice, assessment, intervention.

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Abstract

Background: Children with phonological problems are a significant proportion of many therapist's caseloads. However, little is known about current clinical practice with these children or whether research on the effects of therapy have influenced this practice.

Aims: To investigate the methods of assessment and remediation used by therapists working in the UK.

Methods & Procedures: A questionnaire was sent to therapists working with pre- and primary school-aged children.

Outcomes & results: Ninety-eight clinicians of varying experience responded. Most used the South Tyneside Assessment of Phonology (Armstrong and Ainley, 1988) to assess children, were confident in choosing therapy and were aware of evidence that therapy is beneficial. They used a variety of therapies. Auditory discrimination, minimal contrast therapy and phonological awareness were popular and often used in combination. Most involved parents. In planning therapy, clinicians were more influenced by children's language and cognitive abilities and the motivation of parents than by the nature of the impairment.

Conclusions: Constraints upon clinicians make it difficult for them to convert research findings to practice. In particular, assessments that allow more individualised and targeted interventions appear little used. Clinicians are aware of research but there is a danger that clinical practice and research are diverging.

Introduction.

Clinicians working with children see many with disordered speech. Shriberg and Kwiatkowski (1994) estimated that 7.5% of children between 3 and 11 years of age are affected and Gierut (1998) suggests that they dominate the caseloads of therapists in schools. A survey in Australia by McLeod and Baker (2004) found that they are nearly half a typical caseload and Broomfield and Dodd (2004) estimated that forty eight thousand children are referred with primary speech difficulty in the UK each year.

There is a large literature on the treatment of these children reflecting the extent and visibility of the disorder and the concern it causes parents. Early approaches to therapy targeted errors in articulation and studies by Sommers (see Sommers et al, 1992) found this to be effective. In a review of studies, Almost and Rosenbaum (1998) found a mean effect size of 1.68 but caution that studies were of few children, were often case series studies (suggesting inclusion was non random) and lacked controls. They sought to rectify these problems in a randomised control trial. The percentage of correct sounds used by the children increased after treatment. However, treatment was extensive consisting of 2 sessions per week for 16 weeks.

Recent researchers have departed from this approach in several ways. A number have examined the effects of therapies targeting specific skills in speech processing. Rvachew et al (2004) compared two groups receiving therapy. One group, that received phonemic perception training as part of their therapy, had better perceptual skills and improved single word and conversational speech after therapy. Others have examined the effects of phonological awareness training (Gillon, 2000, 2002; Hesketh et al 2000). Although these studies have obtained positive (if sometimes, contradictory) results, they are open to the criticism that one approach, though successful for many children may not be optimal for all children. This suggests that we must analyse children's processing in some detail before determining the most appropriate therapy for each individual, a view taken by a number of researchers (Stackhouse and Wells, 1997, Bernhardt and Stemberger, 2000; Pascoe et al 2006). Others have examined the role that parents may play in

helping their children. Clinicians have less time to assess and treat children than do researchers. Parental involvement may compensate for this lack of time. Gibbard (1994) has studied the effects of parental intervention and Bowen and Cupples (1999, 2004) describe a program to train parents and report data showing that children who received this progressed more rapidly.

These findings are positive in the general sense that they show that therapy benefits children with phonological problems. Clinicians may, nevertheless, be uncertain as to the best way to treat individual children. It is unclear to what extent they are influenced by research or are able to implement its findings. A survey in Australia revealed gaps between research and clinical practice (McLeod and Baker, 2004). Here, we report a survey of clinicians working with children with speech and language problems in the UK. Knowledge of clinical practice in the UK is largely anecdotal. This survey sought more reliable evidence about the therapies that are used and the impact which research has had on clinical practice.

Method

A questionnaire (see appendix 1) was sent to therapists asking about their caseloads and experience with children with phonological problems. It was sent to mangers asking them to give it to therapists working with pre-school and primary school children. Respondents returned the questionnaires to the authors.

We asked clinicians how many children they see with phonological problems and whether they consider themselves to be specialists in the area. We also asked about the assessments they use, their impression of the research evidence for treatment in this area and their confidence in selecting treatment for these children.

Central to the questionnaire was a list of therapies, each well documented in the literature. These were auditory discrimination (Berry and Eisenson, 1956), maximal contrast therapy (Gierut, 1990), meaningful minimal contrast therapy (Weiner, 1981; Lancaster & Pope, 1989), articulation work/motor skills training

(Van Riper & Emerick, 1984), suck swallow breathe synchrony (Oetter et al, 1993), non speech oromotor work (see Lancaster & Pope, 1989), Nuffield Centre dyspraxia programme (Nuffield Hearing and Speech Centre, 2004), core vocabulary (Dodd & Iacono, 1989), whole language approach (Hoffman et al, 1990), auditory bombardment (Hodson & Paden, 1991), Metaphon (Howell & Dean, 1991), phonological awareness (Gillon, 2000), cued articulation (Passey, 1990) and the cycles approach (Hodson & Paden, 1991). Involving parents in therapy was also included in this list. Respondents were asked to indicate to what extent they used each of these approaches.

Further questions asked what assessments they used and explored their expertise and background and their understanding of phonological delay, disorder and of verbal dyspraxia. We also asked whether they feel that research has provided sufficient evidence for the treatment of children with phonological problems, what factors they take into account when planning therapy and how confident they are about their choice of therapy. Questions were of two kinds. Some asked respondents to tick responses to indicate, for example, how often they used a particular therapy or their level of agreement with statements. Others used an open-ended format allowing respondents to list, for example, reasons for their choice of therapies or the methods they used to identify children with particular problems.

Respondents were invited to give their names and the health trusts where they worked but were not required to do so.

Results

Ninety-eight clinicians responded. The response rate could not be calculated, as the number of questionnaires distributed was unknown. Respondents were from clinics across the UK and had a range of clinical experience making it likely that they represent current clinical practice.

Nine respondents were in their first year of practice, 25 had from 1 to 3 years experience, 13 from 4 to 6 years, 13 from 7 to 10 years and 38 more than 10 years. In the following analyses, we place them in 3 groups: inexperienced

therapists (1-3 years; n = 34), experienced therapists (4-10 years; n = 26) and very experienced therapists (>10 years; n = 38).

Only 7 respondents specialised solely in phonological delay/disorder. Forty-one specialised in this and other areas and 48 did not specialise. Ten said these children exceeded 70% of their caseloads and 33 exceeded 40%. Most (75) said less than 10% of their caseload had dyspraxia.

Specialists had more children with phonological problems in their caseloads (Chi Square = 24.64, d.f. = 6, $p < .001$). However, 13 respondents who denied being specialists had caseloads exceeding 40%. No relationship was found between specialisation and years of experience.

Seventy-seven respondents rated themselves very confident or confident about selecting therapies and only 3 were not very or not at all confident (but 2 were specialists!). Confidence increased with experience (Chi Square = 13.15, d.f. = 4, $p < .05$). Seventy one agreed or strongly agreed there was sufficient evidence that therapy was effective. This suggests that confidence and knowledge go together. However, 19 were confident about selecting therapy but ambivalent about the evidence and 11 acknowledged the evidence but were not confident about choosing therapy.

Many assessments (21) were used. STAP (South Tyneside Assessment of Phonology; Armstrong and Ainley, 1988) was by far the most popular. Eighty-three used it. Of the rest, only the Nuffield was used by more than 10 respondents. Some said that they wanted to try other assessments that were unavailable due to financial restrictions.

Insert table 1 about here.

Respondents were asked if they used the therapies always, often, sometimes, rarely or never. Table 1 shows that therapies are often combined. The mean number always used is just over 2, adding those often used increases this to nearly 5 and those sometimes used to nearly nine. There were favourites and

distinct also-rans. Table 2 divides the therapies into four groups by collapsing responses to 3 levels (always/often, sometimes and rarely/never). Auditory discrimination, minimal contrast therapy and phonological awareness are popular (used always/often by > 50%). Use of parents was also popular and used often or always by over three quarters of our respondents. Unpopular therapies (used always/ often by < 50%) are maximal contrast therapy, suck swallow breathe synchrony, cycles, core vocabulary, auditory bombardment and the whole language approach. Articulation work, non-speech oro-motor work and Nuffield dyspraxia programme are popular but optional (> 50% use them sometimes). Finally, cued articulation and Metaphon have adherents but a third or more never or rarely use them.

Insert Table 2 and 3 about here.

Table 3 shows that 82 therapists used all the popular therapies at least sometimes. This suggests that they form a core method (but asked if they had a core method, 62 said no). Those therapists not using them did not have a consistent alternative approach. Two worked with children with cleft palate. The others showed little enthusiasm for most of the therapies on offer.

We examined if choice of therapy changed with experience (a Bonferroni adjustment was used giving a significance level of $p = .0037$). Two gave significant results (others were not significant at the $p < .05$ level). Very experienced therapists used cued articulation less and non-specific oromotor work was popular with inexperienced therapists.

Asked what factors influence their choice of therapy, respondents gave very general criteria. Frequently mentioned were the child's age (56 respondents) and the parents' attitude (55). The latter mainly concerned the parent's motivation or ability to assist their children. Other factors were the child's language (21), cognitive abilities (17), listening ability (29) and hearing (9). These factors appear to outweigh any detailed assessment of the child's phonological skills. Here only severity was frequently mentioned (39). Few

appear to assess where the child's problems arose although 10 tested phonological awareness and 6 used psycholinguistic models.

We asked clinicians how they distinguish phonological delay or disorder. Eighty-two said errors in the former were developmental processes seen in younger children while the latter were deviant. In contrast, the differential diagnosis of DVD is a troubled one. Several respondents (unprompted) told us this. Features indicating DVD included inconsistent production (54), oro-motor problems (44), 'groping' or struggling to find sounds (38), sequencing problems (34), difficulty copying sounds (20), distortion of vowels (18) and a history of feeding and drinking problems (8). Twelve expected these children to make slow progress and be resistant to therapy.

Discussion

Our basic findings can be briefly summarised. Nearly half our respondents said that children with phonological problems were more than 40% of their caseload confirming previous estimates (Broomfield & Dodd, 2004; McLeod & Baker, 2004). A majority felt there was strong evidence that therapy was effective and became more confident about choosing therapy with experience. The STAP was by far the most popular assessment. Clinicians were familiar with the therapies (few failed to recognise a therapy) and combined different approaches in their treatment with auditory discrimination, minimal contrast therapy and phonological awareness being a popular combination. A large majority involved parents in therapy. There was agreement on distinguishing delayed and disordered speech but uncertainty about diagnosing dyspraxia.

These findings provide a fairly positive picture of the provision for children with phonological problems. McLeod & Baker (2004) suggest that a gap exists between research and therapy. Our respondents' positive view of research seems to contradict this. This is somewhat undermined, however, by a minority who express confidence despite being either unimpressed by or unaware of the evidence or who acknowledge the evidence without feeling confident. The former suggest that confidence results from clinical experience rather than research and supports the view of McLeod and Baker (2004).

This gap may arise because of contradictory findings such as those on the use of phonological awareness training by Gillon (2000) and Hesketh et al (2000). It may also mean that clinicians give research a low priority or have too little time to read its findings. We did not ask them about this. McLeod and Baker (2004), who did, found that many clinicians did little reading. Therapists' reluctance to call themselves specialists or to develop a specialist interest as they gain experience may also be relevant here. It may be that they regard the area as unchallenging or routine.

Three therapies---auditory discrimination, meaningful minimal contrast and phonological awareness—are widely used and are commonly used in combination. This is interesting as they incorporate different levels of input and output processing. The popularity of the minimal pair approach is replicated elsewhere (McLeod and Baker, 2004) and is unsurprising as it is commonly cited in the child speech impairment literature. The use of phonological awareness is also unsurprising given its prominence in literacy research. It should be recalled, however, that findings on its impact on speech, are inconsistent (Hesketh et al, 2000; Gillon, 2000) and Dodd and Gillon, (2001) caution against its adoption with all children with speech impairments. The inclusion of auditory discrimination is more surprising. Some children with speech impairment have strong auditory processing skills in the context of severe output difficulties (Stackhouse and Wells, 1997). In these cases, work on auditory discrimination may be unwarranted.

In one area clinical practice and research are more clearly incompatible. Our respondents use a wide variety of therapy approaches. In contrast, recent research has examined the effects of specific therapies. Clinicians may reason that this 'eclectic' approach is preferable because each child may receive some therapy that is beneficial. In contrast, researchers want to test the effects of individual therapies. Researchers are likely to continue to do so; indeed it is increasingly acknowledged that different methods may be appropriate for different children (Pascoe et al, 2006).

This division has implications for research design. Efficacy studies conducted by researchers are likely to examine specific therapies. In contrast studies of the effectiveness of clinical practice if conducted should reflect that practice. Our findings suggest that they should examine therapy that combines the three popular therapies above. While both types of study are of interest, they suggest that research and clinical practice may move further apart.

We did not ask our respondents how much therapy they offer children. A recent study by Glogowska et al (2000) suggests that it is much less than in research studies. Limited resources, no doubt, accounts for this and may be a further reason why clinicians favour an eclectic approach. Research studies (Almost and Rosenbaum, 1998; Gillon, 2000) often offer their participants substantially more therapy than is available in a typical clinical regime, making it difficult for clinicians to put research findings into practice. Indeed, a study by Denne et al (2005) which tried to replicate the findings of Gillon (2000) under conditions more compatible with clinical practice found the effects of the therapy substantially reduced. This problem will be compounded if detailed assessments to locate processing impairments are carried out before selecting therapy (Stackhouse and Wells, 1997, Bernhardt and Stemberger, 2000). Clinicians currently use the STAP to assess children. Its popularity is unsurprising. It is quick but unlikely to reveal the processes underlying a child's problems**.** Our respondents had little enthusiasm for more detailed assessments. Indeed one said, somewhat alarmingly, that she and other therapists she knew were 'terrified' by psycholinguistic models.

Involving parents in therapy offers a potential solution to the lack of clinical time and is used by a large majority of our respondents. A concern here is that too great a reliance on parents may disadvantage those children whose parents who are unwilling or unable to participate. There is a suggestion that this is the case as more than half of respondents gave the attitude or motivation of the parent as a factor in making decisions about treatment.

Clearly more research is required in this area. Given the potential divergence between current research and the realities of clinical practice identified above,

it is difficult to see how future research may best proceed. A helpful step, however, would be improved communication between clinicians and researchers and for the former to play a more influential role in the research process.

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What we know: Different interventions for children with phonological problems have been found to be effective.

What this paper adds:

Information on the current practices and beliefs of clinicians in the UK working with these children:

1. Most clinicians use a quick and easily administered screening tool to assess speech.
2. Difficulties exist in the differential diagnosis of phonological disorder and developmental verbal dyspraxia
3. Clinicians are confident in selecting a target intervention and believe that there is evidence that therapy is effective
4. Most clinicians frequently use a combination of interventions (up to five)
5. Three interventions: minimal pairs, auditory discrimination, phonological awareness are particularly popular.
6. A majority of clinicians involve parents in therapy when this possible.

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Table 1. Mean number of therapies used by respondents always, always + often and always + often + sometimes.

	Mean no. of therapies used	Std. dev.	Range
Always	2.18	1.63	0-8
Always + often	4.85	1.86	1-9
Always + often + sometimes.	8.86	2.00	3-14

Table 2: The percentage of respondents using individual therapies

	Rarely/ Never	Sometimes	Often/ Always
Popular therapies			
Auditory discrimination	2.0	10.2	87.7
Meaningful minimal contrast	12.2	26.5	61.3
Phonological awareness	5.1	22.4	72.4
Parental involvement	11.2	13.3	76.5
Unpopular therapies			
Maximal contrast therapy	77.5	17.3	5.1
Suck, swallow breath	79.6	8.2	12.2
Cycles	96.0	1.0	3.0
Core vocabulary	60.2	27.6	12.2
Auditory bombardment	67.3	22.4	10.2
Whole language approach	57.2	31.6	11.2
Optional Therapies			
Artic. work/ motor skills training	13.2	53.1	33.7
Non speech oromotor work	28.5	54.1	17.4
Nuffield dyspraxia programme	23.4	60.2	16.4
Divisive Therapies			
Metaphon	38.7	37.8	28.6
Cued articulation	42.8	26.5	30.6

Table 3: The number of therapists using one, two or three popular therapies: auditory discrimination, phonological awareness, minimal pair approach.

	No of therapists	Cumulative no. of therapists
Use each therapy often or always	47	
Use two therapies often or always and the third sometimes	29	76
Use one therapy often or always and the others sometimes	6	82

Appendix

1. How long have you been a speech and language therapist?

☐ less than one-year ☐ between one to three years

☐ between four to six years ☐ between seven to ten years

☐ more than ten years

2. What is/are your main area/s of specialism?

☐ phonological delay/disorder ☐ dyspraxia

☐ child language disorder ☐ fluency

☐ other, please state

3. What percentage of your caseload is taken up with clients with articulation and/or phonological delay/disorder?

☐ less than 10% ☐ between 10-39%

☐ between 40-70% ☐ greater than 70%

4. What percentage of children in your caseload would you identify as having developmental verbal dyspraxia?

☐ less than 10% ☐ between 10-39%

☐ between 40-70% ☐ greater than 70%

5. What articulatory and/or phonological assessment/s do you employ routinely with clients referred to you with phonological delay/disorder?

6. Do you have a core treatment approach/package of care that you routinely use with cases with phonological delay/disorder?

☐ yes ☐ no

7. Below is a list of common treatment approaches used to treat phonological disorders. Please rate how frequently you use **each** approach in your therapy using the numbers below?

5 always
4 often
3 sometimes
2 rarely
1 never

☐ Auditory discrimination

☐ Meaningful minimal contrast therapy

☐ Maximal contrast therapy

☐ Articulation work/motor skills training

☐ Suck swallow breathe synchrony

☐ Non speech oro-motor work
☐ Nuffield Dyspraxia programme
☐ Core vocabulary
☐ Whole language approach
☐ Auditory bombardment
☐ Metaphon
☐ Phonological awareness
☐ Cued articulation
☐ Cycles approach
☐ Parent-based work

8. What factors do you consider when deciding on an appropriate treatment programme in the remediation of phonological delay/ disorder?

9. What features would help you identify a child with:
a) Phonological delay
b) Phonological disorder
c) Developmental verbal dyspraxia

10. How confident do you feel about choosing an appropriate treatment option when planning a therapy programme for a client with phonological delay/disorder?

☐ very confident
☐ confident
☐ neutral
☐ not very confident
☐ not at all confident

11. Please state whether you agree or disagree with this statement.
‘ I feel there is sufficient evidence to show that intervention with phonological disordered clients is effective’

☐ Strongly agree
☐ Agree
☐ Neither agree or disagree
☐ Disagree
☐ Strongly Disagree