Therapy for word finding difficulties using phonological and orthographic cues: A clinical application in progress.

Semantic therapy for anomia is well established both in research and in clinical practise (e.g. Howard *et al.,* 1985a; Marshall *et al.*, 1990; Horton and Byng, 2000). Research into phonological therapy is more limited and the results more equivocal (e.g. Howard *et al.,* 1985b; Raymer *et al*., 1993). However, a recent therapy study using a choice of phonological or orthographic cues reported significant improvements in word finding for 7 out of 8 aphasic participants (Hickin *et al*., 2002). This paper will describe the adaptation of this therapy programme for a clinical setting (the UK National Health Service). Adaptations include the use of combined orthographic and phonological cues to reflect usual clinical practice and a comparison of the effectiveness of a single, correct cue with the provision of a choice of cues. The effect of repeated exposure of a picture for naming on word retrieval is also assessed (Howard et al., 1985a). Finally, a criticism of the existing research has been the lack of evidence demonstrating the impact of anomia therapy on everyday communication (e.g. Lesser and Algar, 1995; Nickels 2002). This study addresses this weakness by assessing noun retrieval in natural conversation using a measure specifically designed for the purpose: the POWERS (**P**rofile **o**f **W**ord **E**rrors and **R**etrieval in **S**peech (Herbert *et al*., in preparation).

Method

Participants

Ten people with aphasia are participating in this ongoing study. The results for two participants will be reported here. ET is a 69 year old man who had a single, left hemisphere CVA 15 months prior to the study. His spontaneous speech is characterised by syntactically complex utterances, but frequent phonological errors primarily on nouns (anomic aphasia). VC is a 56 year old woman who had a single left hemisphere CVA 2 years prior to the study. Her spontaneous speech is non-fluent, with marked word-finding difficulties and conversation is characterised by long pauses and hesitations (Broca's aphasia).

Assessment results for ET and VC are given in Table 1. ET has good semantic processing and makes primarily phonological errors in naming with good access to output phonology from input phonology. The locus for his word retrieval difficulties appears to be accessing the phonological output lexicon and/or with post-lexical phonological assembly. VC has difficulties with semantic processing and makes semantic errors in naming. Her predominant naming error is however 'no response'. She appears to have difficulties with both semantic processing and in accessing the phonological output lexicon during word retrieval.

Insert table 1 about here

Procedure

Conversation Analysis

Participants were asked to record a conversation with their usual conversation partner on two occasions prior to therapy (A1 and A2) and after therapy (A3). Five minute samples of these conversations were analysed using the POWERS (Herbert *et al*., in preparation). The POWERS quantifies various features of conversation (e.g. Boles and Bombard, 1998) indicative of ability to retrieve words (e.g. production of nouns, paraphasias and pausing). Qualitative research has also suggested that it is important to look at the balance within

conversation between an aphasic person and an able speaking partner (e.g. Perkins *et al*., 1999). The number of minimal and substantive turns produced by each person is therefore also counted, as are instances of collaborative repair.

Picture naming

Participants' ability to name a set of 200 pictures was also assessed at A1, A2 and A3. The 200 pictures were divided into two sets of 100 matched for baseline naming performance. One set was treated and the other untreated. Each set was further divided into two sets of 50, again matched for baseline naming performance. In the untreated set, 50 items were not seen during the course of therapy (untreated-unseen set), and 50 items were shown to the participants who attempted to name them. If the naming attempt was unsuccessful, no cue was given and the next picture was shown (untreated-seen set). In the treated set, 50 items were treated with a single, combined orthographic and phonological cue (treated-single set) and 50 with a choice of combined phonological and orthographic cue (treated-choice set). The progress of items through therapy is shown in Figure 1.

Insert figure 1 about here

The procedure for the single cue condition was as follows: if a picture was not named within 5 seconds the participant was shown the first letter of the word and simultaneously heard the first phoneme. If the picture was still not named, the first syllable was seen and heard, and finally, if needed, the whole word was shown and heard. The procedure for the choice of cue condition was exactly the same except the target cue was presented together with distractor cues which were semantically and phonologically unrelated to the target. Figure 2 shows examples of pictures with a single cue and a choice of cues. Each item was presented once per session, and sessions were once a week for eight weeks.

Insert figure 2 about here

Results

Picture Naming

The effect of therapy on picture naming for ET and VC for each of the four sets (treated-choice, treated-single, untreated seen and untreated-unseen) is shown in figures 3 and 4. (Assessments A1 and A2 are pre-therapy and A3 is post-therapy). Whilst therapy improves naming for both individuals, the pattern of improvement across the sets differs. ET shows improvement in all four sets, indicating that therapy has resulted in generalisation of improved word retrieval to untreated items. For VC, despite the unstable pre-therapy baseline (A1 to A2), there is a clear effect of intervention at A3 but this is restricted to treated items. However, VC also shows some effect of repeated attempts at naming.

Insert figures 3 and 4 about here

Conversation

Examples of changes in conversation following therapy for ET and VC are shown in figures 5 and 6. These indicate that for both individuals positive changes have occurred: the number of content words produced by ET has increased as has the number of nouns for VC, and for both individuals the number of word retrieval errors decreased.

Insert Figures 5 and 6 about here

Discussion

These preliminary results from an ongoing therapy study demonstrate encouraging improvements in picture naming and conversation from a relatively small amount of therapy. They add to the evidence that anomia therapy which focuses on the word form can be effective, and begin to address the lack of evidence demonstrating the impact of therapy on everyday communication (Nickels, 2002a).

Regarding improvements in picture naming, the differing patterns of response for each individual are of great interest. ET shows generalisation of naming improvement, which may indicate the locus of the therapy effect is post lexical phonological assembly, an area of difficulty for him. In this regard, he may mirror the response to phonological therapy of MB (Franklin *et al*., 2002) and GF (Robson *et al*., 1998). VC shows an item specific response to therapy and is similar to most individuals in the previous, related study where therapy appeared to work by improving mapping between semantics and phonology (Hickin *et al*., 2002). It is also of interest that repeated attempts at naming without cues improve VC's word retrieval (see Nickels, 2002b for a related effect). Analysis of results for the remaining participants will reveal the prevalence of this potentially clinically significant response pattern.

References

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Table 1

Test	**n**	**ET**	**VC**
Picture naming (mean A1 and A2)	200	0.74	0.56
Semantic processing:			
Spoken word to picture matching test	30	1.0	1.0
Written word to picture matching test	30	1.0	0.73
Pyramids and Palm Trees	52	1.0	0.65
Picture naming: semantic errors as a proportion of total errors		0.17	0.25
Phonological output:			
Repetition of words	182	0.87	0.89
Repetition of nonwords		0.50	
Reading real words	182	0.88	0.78
Reading nonwords	182	0.27	0.35
Picture naming: phonological errors as a proportion of total errors		0.48	0.0

Table 1 shows participants performance on the following tests: CAT (Comprehensive Aphasia Test: Swinburn, Howard & Porter, 2004); Pyramids and Palm Trees (Howard & Patterson, 1992).The remaining assessments are unpublished.

Figure 1 Progress of items through therapy

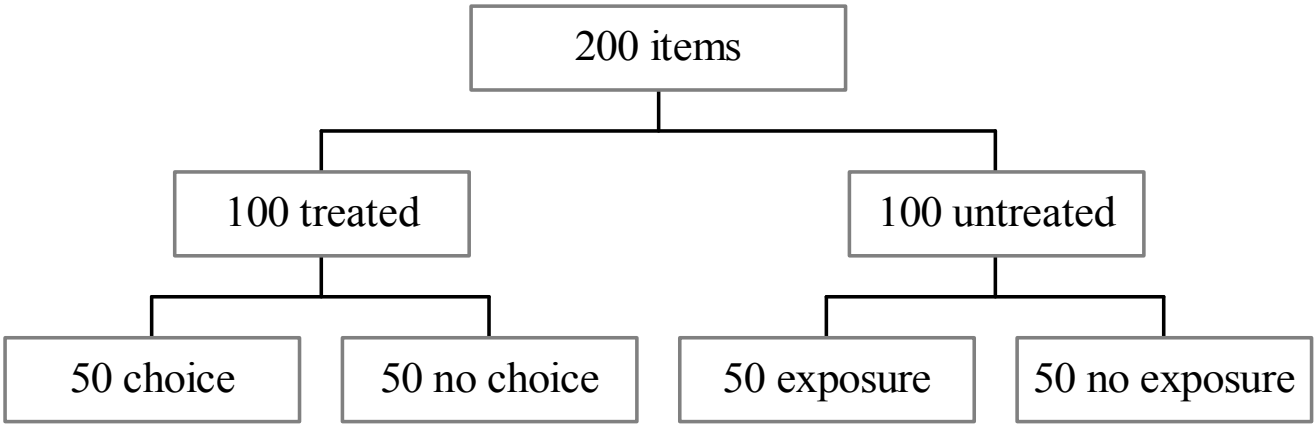


Figure 2 Example of a picture with a single cue and a choice of cue.

C	T	B	P
CAR	TOR	BAN	PI
CARNATION	TORNADO	BANANA	PIANO

Figure 3 Results for picture naming for ET

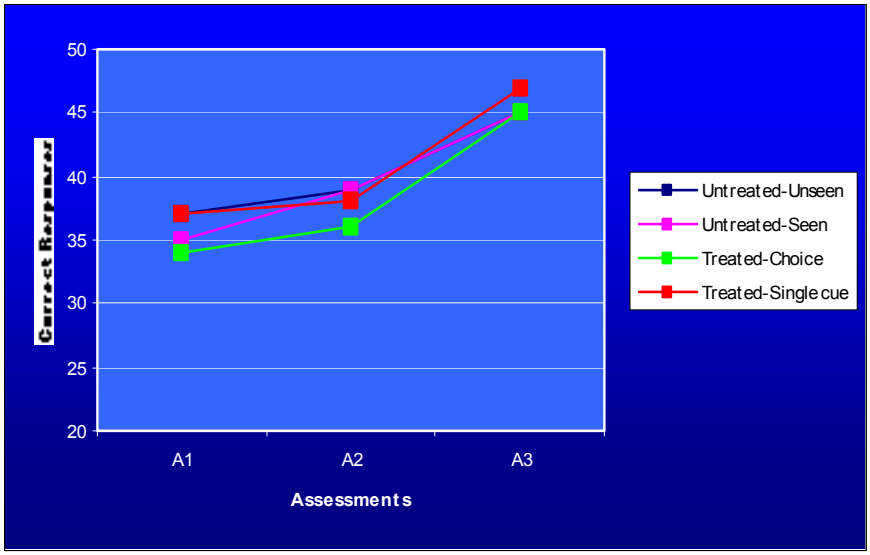


Figure 4 Results for picture naming for VC

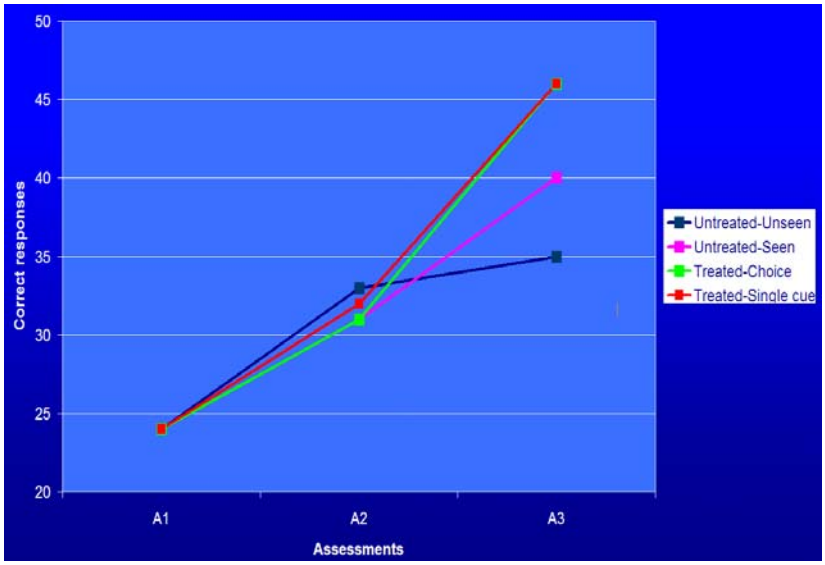
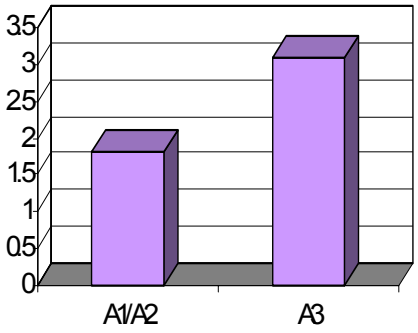


Figure 5 Effect of therapy on conversation for ET: a) content words/total turns and b) total word errors/content words

a)



b)

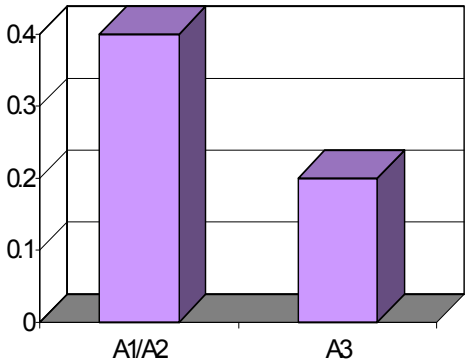
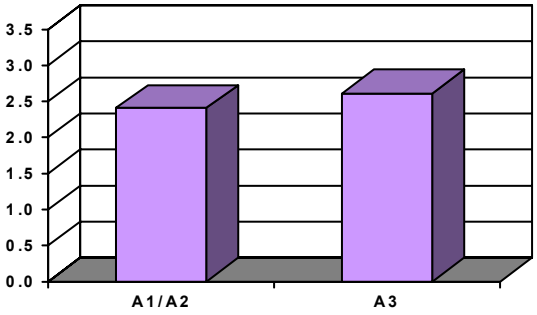


Figure 6 Effect of therapy on conversation for VC: a) nouns/substantive turns and b) total word errors/content words

a)



b)