

TREATMENT OF WORD RETRIEVAL DEFICITS IN APHASIA

A COMPARISON OF TWO THERAPY METHODS

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SUMMARY

The effects of two therapy methods in the treatment of picture naming problems are compared, using a within-patient design with 12 adult patients with chronic acquired aphasia. We contrast techniques that require the patient to process the meaning corresponding to the picture name (semantic treatment) with those that provide the patients with information about the phonological form of the name (phonological treatment). With each method, patients either had 4 sessions of treatment over one week, or 8 sessions over two weeks. Both methods caused day-by-day improvement that was specific to the actual items treated. Both methods resulted in significant improvement in naming when this was measured one week after the end of treatment, with a small, but significant advantage for the semantic treatment; this is mainly due to improvement that generalizes to untreated items. We conclude that specific and theoretically motivated treatment methods can cause significant improvement in the word retrieval ability of patients with chronic aphasia.

INTRODUCTION

As early as the 1860s, there were single case studies demonstrating that patients with chronic aphasia may show substantial improvement when systematic remediation is initiated, even where the patient's language disability has remained unchanged for a period of years beforehand (*see* Trousseau, 1865; Gutzmann, 1896; Mills, 1904; Singer and Low, 1933; Weisenburg and McBride, 1935). Some recent work reports similar observations of single cases who improved when treatment began long after onset (Broida, 1977; Basso *et al.*, 1979). This convincingly demonstrates that some aphasia therapy is effective for some patients, although the treatment techniques applied in these studies are not precisely specified.

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Over recent years a number of groups of researchers have attempted to apply the methodology of the 'clinical trial', which was mainly developed to assess the efficacy of drug treatment, to the study of aphasia therapy. The approach is, on the face of it, simple. This is to take a large number of aphasic patients, give some of them 'professional' treatment, and to compare the outcome for these patients with that of a second group who are denied professional treatment or seen by unqualified volunteers. The results of such studies are equivocal; some find highly significant effects of treatment (*see Hagen, 1973; Basso et al., 1979*), while others fail to find any differences (*Meikle et al., 1979; David et al., 1982; Lincoln et al., 1984*). Intriguingly, the studies that report beneficial effects of treatment involved more intensive and prolonged reeducation programmes than the studies that find no effect. These latter experiments are clearly susceptible to Somerville's (1974) accusation that they investigate treatment given in 'homeopathic' doses. In other words, inadequate therapy has no effect.

All 'clinical trials' of aphasia therapy suffer from a number of serious methodological flaws. These result, principally, from the application of a heterogeneous set of treatment techniques to a heterogeneous group of patients, where the differences between the actual treatments and between the patient groups are unspecifiable (*see Pring, 1983*). Without such information it is impossible for any aphasia therapist to apply these studies to the benefit of her own patients. The single cases mentioned above demonstrate that reeducation *can* be effective (and this is presumably related to the particular methods used); without knowing anything of substance about how patients were treated in these clinical trials, we do not know which are the ineffective techniques to avoid and which of the effective ones to adopt.

Some of the better recent studies have avoided adopting the 'clinical trial' approach, yet these encounter similar difficulties in interpretation because the investigators have accepted the importance of adopting a traditional 'multimodal' approach to aphasia therapy (*see Schuell et al., 1964; Luria, 1970; Eisenson, 1973, e.g.*). According to this view, a word should be elicited in any one of a variety of ways—repetition, phonemic cueing, reading, writing or listening—and its use practised in a variety of situational and grammatical contexts. While this may, in fact, turn out to be an appropriate plan for treatment, it is certainly not appropriate for the investigation of the effects of different treatment methods. This is because, as noted already, one cannot distinguish the effects of the different and, by definition, varied techniques. Thus Wiegel-Crump and Koenigsknecht (1973) and Seron *et al.* (1979) have convincingly demonstrated that the intensive elicitation of words using a variety of methods and practice in a number of different ways can result in improved availability of these names. It is not, however, clear that the improvement reported in these experiments is a specific consequence of the particular treatment regimes applied. The research designs do not permit a conclusion as to *which*, if any, of the many techniques that were used actually helped the patients to improve their naming. Some may have been beneficial, others useless or even, like Podraza and

Darley's (1977) associate prestimulation, actually harmful. We simply do not know.

The confused and inherently unrevealing picture emerging from 'clinical trials' of aphasia therapy contrasts with the clear and interesting results from a number of recent studies of specific, and theoretically motivated, treatments applied to single patients (Weniger *et al.*, 1980; Helm-Estabrooks *et al.*, 1981; Beauvois and Derouesné, 1982; Hatfield, 1982). Here problems due to the heterogeneity of the subject population are avoided by comparison of the effects of different treatment methods applied to a single subject (McReynolds and Kearns, 1983), and the methods of treatment are chosen because of their relationship to detailed processing accounts of patients' disabilities. All these studies show effects of treatment that are, in some cases, substantial. The study to be described here, although a group study, incorporates several features of these single case designs. First, we contrast the effects of two specific techniques for the treatment of word retrieval difficulties; secondly, we have adopted a design in which we compare different treatments applied to the same subject so as to avoid the problem of patient heterogeneity.

Our investigation of the treatment of word finding is based on picture naming, partly because this task permits a reasonable degree of experimental control and ease of scoring, but also with more respectable motivation. For many patients, finding names for real-world objects constitutes a genuine problem and a significant impediment to communication. Speech therapists devote considerable time and energy to work on naming problems. It therefore seems legitimate for research to focus on the treatment methods for such difficulties.

The therapy study reported here follows on from a series of studies on the *facilitation* of naming in aphasia (Patterson *et al.*, 1983; Howard *et al.*, 1985). By *facilitation*, we mean the effects of a technique, used once to prompt name retrieval, on the patient's ability to retrieve that name when presented with the same pictures again minutes, hours or days later. Our facilitation studies showed that techniques that require the patient to access the *semantic* representations corresponding to the picture name have substantial effects which are stable for at least 24 h (Howard *et al.*, 1985). Examples of such techniques are matching spoken words to pictures (pointing to a picture from a choice of four when its name is spoken by the examiner), matching written words to pictures (point to a picture from a choice of four when given its written name) and semantic judgements (answering a yes/no question about the semantic category or semantic properties of the pictured object—e.g. 'Is a cat an animal?'). Such effects can be shown to depend neither on seeing the picture nor on hearing its name, and none of these techniques requires the patient to say the picture name aloud. In contrast, techniques that provide the patient with information about the *phonological* form of the picture name have effects that are comparatively small and disappear entirely within a few minutes (Patterson *et al.*, 1983). The 'phonological' techniques used were phonemic cueing (the examiner gives the patient the initial phoneme of the name that cannot be found), repetition of the picture name when it is spoken by the examiner, and rhyme

judgements (deciding whether the correct picture name rhymes with another word). We have argued that these two classes of facilitation techniques are operating at different levels of lexical representation involved in picture naming. Semantic techniques are effective because the semantic representation accessed in the course of the technique is 'primed'. As a result, the full verbal semantic representation is more easily accessible when the patient subsequently needs to retrieve it in picture naming. Phonological techniques, whose effects are much shorter lasting, probably act at the level at which the phonological word form is stored—the phonological output lexicon. We suggest that the difference between the time courses of facilitation at the two levels reflects the properties of these two levels of lexical representation.

In contrast to facilitation studies which evaluate the specific effects of a single treatment event, therapy studies involve repeated use of treatment techniques over a period of time. In this experiment we contrast phonological and semantic techniques in a therapy paradigm to determine (1) whether facilitation effects are cumulative over sessions, and (2) whether such cumulative effects, if found, will result in genuinely lasting effects on the accessibility of picture names.

METHODS AND PATIENTS

Experimental Design

In this experiment we sought to compare the effects of two classes of treatment techniques. To do so, we required the data to distinguish between (1) specific effects of therapy, (2) general effects of giving the patient repeated opportunities to try to retrieve the picture names, and (3) general improvement unrelated to any of the treatment techniques, that might be attributable to interest and support from the therapist.

Semantically based and phonologically based treatments were kept separate since our facilitation studies had led us to expect differential benefit from the two types. On the other hand we combined three different techniques within each type, first to simulate more realistically the style of a genuine therapy session, and secondly to reduce the repetitiveness and boredom for the patients receiving multiple treatments on the same target words.

Each patient in the study participated in both types of treatment (obviously with different target sets); 4 weeks (without formal therapy) intervened between the two types. Half the patients had 2 weeks of treatment with each method and half had 1 week. Half of the patients began with semantic and half with phonological therapy; equal numbers of patients in each treatment duration condition received the treatments in each of the two orders.

Two control conditions provided essential comparisons for evaluating the effects of therapy. *Naming control* pictures were presented for *naming* during the week(s) of therapy with the same frequency of opportunities for naming as the treated items. Apart from these opportunities for naming, however, the naming control items received no treatment or attention. *Baseline control* pictures were presented for naming only in the post-therapy tests and so were not seen or named at all during the course of therapy.

A superiority in the patients' ability to name treated pictures as compared with the baseline controls would show that there are specific effects of treatment, and that the improvement cannot be attributed merely to 'the interest, support and stimulation provided by [the] speech therapist' (David *et al.*, 1982)—hypothesis (3) above. Better post-treatment naming of treated items compared with naming controls would show that effects cannot simply arise from opportunities to try to retrieve the picture

name—hypothesis (2) above. Examination of differences in naming of semantic-treated items and phonological-treated items, and, correspondingly, semantic-naming controls and phonological-naming controls will allow us to draw conclusions about the efficacy of the specific treatment techniques employed.

Subjects

Twelve adult neurological patients were selected who fulfilled the following criteria. They (1) all had specific word-finding problems, as a consequence of acquired aphasia; (2) were at least 6 months and mostly several years post-onset; (3) had no severe visual problems; (4) could repeat single words; (5) had no visual agnosia; and (6) they agreed to take part in the experiment. Assessment on the Boston Diagnostic Aphasia Examination (Goodglass and Kaplan, 1972) indicated that 6 of the patients could be described as Broca's aphasics, 4 as mild conduction aphasics and 2 as anomic aphasics.

Although all the patients had previously had substantial amounts of therapy, no patient was involved in any other formal treatment during the course of this experiment.

Material

The 'Cambridge pictures' are a set of black and white line drawings on 6 × 4 inch cards, for each of which at least 90 per cent of normal controls produce the same name. From this set we selected 300 pictures (set A) according to the single criterion that we could find another word that rhymed with its name. For each picture we prepared (1) a sheet with the picture randomly positioned on it together with pictures of three semantically related distractors, and a card with its written name (for spoken and written word-to-picture matching); (2) a semantic judgement, of either category or attribute (e.g. 'Is a cat an animal?'; 'Does a cup have a handle?'); all facilitating judgements had correct 'yes' answers, as in the examples; an approximately equal number of filler items with 'no' answers were included to make the task sensible; and (3) a second set of different pictures of the same objects (set B).

Procedure

Pretherapy procedures (over 3 sessions). Each patient was tested twice on naming the complete set A of 300 pictures. Between the two presentations of set A, set B was presented. The purpose of presenting this second set was to allow us to assess whether any improvement found on set A was specific to the particular pictures used in therapy, or whether it would generalize to other pictures with the same names.

Throughout the experiment the patients were given 5 s to name the pictures. Any response that included the correct name was counted correct; responses with an error in plural marking or with a single phonemic deviation (addition, substitution, metathesis or deletion) were accepted, as we were primarily concerned with word retrieval rather than the accuracy of phonological realization. The patients were given general encouragement but were never told whether a specific response was correct or not.

From pretest performance on set A, 80 failures were randomly selected for each patient, with all 80, or as many as possible, having been failed on both presentations of set A. These 80 target items were assigned at random to conditions as follows: semantic therapy, $n = 20$; semantic naming control, $n = 10$; phonological therapy, $n = 20$; phonological naming control, $n = 10$; baseline control, $n = 20$. Where we had to include any items that had been correctly named on one occasion, there were precisely equal proportions of such items in each experimental condition. As a result of this procedure, the items in each treatment condition have identical initial probabilities of correct naming.

Therapy procedures (over 1 or 2 weeks). Each day for either 4 consecutive days of 1 week or for 4 consecutive days in each of 2 consecutive weeks, each experimental target item was treated three times, once with each of the three techniques included in the type of therapy (semantic or phonological) being applied. Each treatment session was a carefully constructed sequence of training items and naming items with the corresponding target pictures being presented for naming 6 items after

treatment. The appropriate naming control pictures were also presented for naming three times each during the course of each therapy session. The three semantic techniques used were: (1) pointing to the picture out of a set of 4 semantically related pictures on spoken request; (2) matching the written word to the appropriate one in this same set of 4 pictures; (3) answering a yes/no question requiring the patient to access the meaning of the name (e.g. 'Is a cat an animal?'). The three phonological techniques were: (1) repeating the picture name; (2) attempting to produce the name with the aid of a phonemic cue; (3) judging whether the name rhymed with another word. The orders of the treatments within any one session were randomly assigned and for each patient they varied from day to day.

To evaluate day-by-day improvement, each therapy session was preceded by a *daily pretest*. On each day of each treatment period, the patient was first asked to name all the pictures in that treatment set and their naming controls, together with filler items that had been correctly named in the pretests (the purpose of these filler items was to sustain the patients' morale). We could not use the naming opportunities 6 items after treatment for measuring day-by-day changes, since any benefit there could be attributable to short-term prompting from the preceding treatment event. The daily pretest allows us to measure long-term effects of treatment sessions (i.e. approximately 24 h after each therapy session) and to assess whether any effects are cumulative. One-week patients were seen on the fifth consecutive day and two-week patients on the fifth day of the second week for administration of this same daily 'pretest' (though on this final day of course no therapy followed the test).

Post-therapy procedures. The specific post-therapy tests consisted simply of presentation of all 80 experimental and control pictures, interspersed with some pretest successes, for naming. This post-therapy test was administered 1 week and 6 weeks after the end of each therapy period.

More general post-therapy evaluation procedures took place in several sessions following the second post-therapy test. In separate sessions, the patients once again attempted to name all 300 pictures of both sets B and A.

In this experimental procedure we permitted differences between the experimental conditions in the number of times a patient saw a picture, and chose instead to equalize the number of opportunities to try to name the picture in the treatment and naming control conditions, while controlling for the effects of repeated presentation with the baseline control condition (which are not seen at all during the treatment periods). This is because we had several empirical reasons for believing that simply *seeing* a picture has no effect on subsequent naming, whereas the treatment techniques can have large effects, even where they do not involve seeing the picture: (1) In experiment 1 of Patterson *et al.* (1983) patients were given 6 spaced opportunities to name a set of pictures in one session; there was no change in naming success over the 6 trials. (2) In experiment 2 of Howard *et al.* (1985), seeing a picture without trying to name it had no effect on naming, whereas auditory word-to-picture matching (one of the semantic techniques in this experiment) had large and long-lasting effects. (3) Word repetition (which does not involve seeing a picture) has substantial (and short-lasting) effects on word retrieval (Patterson *et al.*, 1983); auditory semantic judgements (which also do not involve seeing the picture) have substantial (and long-lasting) effects on name retrieval (Howard *et al.*, 1985).

This shows that simply seeing a picture has no effect when done once (or six times); in contrast, the treatment techniques that were used in this experiment have large and measurable effects when used once. On these grounds it seems unlikely that any differences in outcome between the conditions can be attributed to effects simply of seeing the pictures, rather than the specific treatment techniques used.

RESULTS

Daily Pretests

The fig. presents the proportion of correct name retrievals on the daily pretests averaged over all 12 patients for tests 1 to 5 and over the 6 two-week patients for tests 6 to 9. Performance is shown separately for treated items and naming controls and for the two therapy methods.

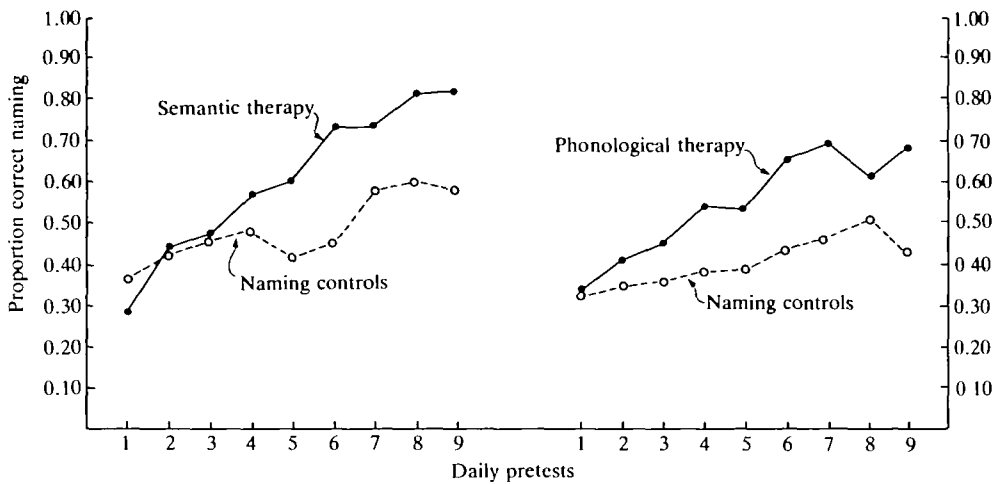


FIG. 1. Naming performance on the daily pretests.

Analysis of variance, performed separately for 12 patients over tests 1 to 5 and for 6 patients over tests 1 to 9, shows a significant advantage for treated items over naming controls ($F(1,11) = 5.80$ for tests 1-5; $F(1,5) = 14.25$ for tests 1-9, $P < 0.05$ in both cases) and that significant improvement occurred as more treatments were given (main effect of days, $F(4,66) = 13.12$ (tests 1-5), and $F(7,45) = 12.41$ (tests 1-9), $P < 0.001$ in both cases). Furthermore, there is a reliable interaction between conditions (that is, treated items vs naming controls) and days ($F(4,66) = 7.21$ (tests 1-5), $F(7,45) = 6.11$ (tests 1-9), $P < 0.001$ in both cases) indicating that the advantage of treated items over naming controls increased as treatment progressed. There was no significant difference between the semantic and phonological conditions, that is, the advantage for treated items over naming controls was no greater with semantic than phonological therapy.

Post-therapy Tests

Table 1 shows the average proportions of correct namings for the different conditions in the two post-therapy tests, 1 and 6 weeks after therapy had finished. Analysis of variance shows a main effect of semantic over phonological therapy ($F(1,10) = 6.79$, $P < 0.05$); this indicates that, combined over delays (1 and 6 weeks) and conditions (treated items, naming controls and baseline controls), post-therapy test naming performance was better after semantic therapy than after phonological therapy. There is also a main effect of treatment ($F(2,20) = 4.86$, $P < 0.05$); combined over therapy types and delays the treated items showed an advantage both over the naming controls and over the baseline controls. There is a significant interaction between intervals and conditions ($F(2,20) = 4.36$, $P < 0.05$);

this indicates that the decrease in performance from 1 to 6 weeks was greater for the naming control items (particularly the semantic naming controls) than for the treated items. If the relatively high success rate on semantic naming controls at 1 week reflects a generalized effect of semantic therapy, then this interaction may be sensible and predictable. Performance on baseline control items (which have not been encountered during therapy) would not be expected to deteriorate after therapy (and does not). If the specific benefit of therapy on treated items were more durable than improvement generalizing to naming controls, then we would expect the deterioration in performance between 1 and 6 weeks to be especially marked on the naming controls. The results therefore suggest that there has been some generalized benefit from therapy to naming controls (especially semantic) which may not be as durable as the effects on the treated items themselves.

TABLE 1. PROPORTION OF CORRECT NAMING ON TESTS AT 1 AND 6 WEEKS FOLLOWING TWO DIFFERENT KINDS OF INTENSIVE THERAPY

	<i>Semantic</i>	<i>Phonological</i>
One week post-therapy		
Treated items	0.55	0.51
Naming controls	0.49	0.38
Baseline controls	0.38	0.33
Six weeks post-therapy		
Treated items	0.46	0.45
Naming controls	0.39	0.38
Baseline controls	0.38	0.40

Evaluating the two delays separately, it is apparent that the meaningful effects (namely the difference between therapy types and the difference between conditions) are primarily characteristic of performance at 1 week post-therapy. At 1 week, all the following advantages were significant: semantic treated > semantic controls, semantic naming controls > semantic controls, phonological treated > phonological controls, phonological treated > phonological naming controls, and semantic naming controls > phonological naming controls. By 6 weeks no significant contrasts remained; the small trend towards better performance on treated items was unfortunately not reliable, although its direction is encouraging.

Post-therapy Assessment

At the very end of the experiment the patients were once again tested on naming the complete picture sets A and B. Set A was the one from which all experimental items had been drawn. The mean performance for the patients as a group on both complete sets both pre- and post-therapy is shown in Table 2. In accordance with our findings in the specific post-therapy tests 6 weeks after treatment, the overall

improvement is small but, with this larger set of items, it is statistically reliable for the patients as a group (set A pre- vs post-therapy $t(11) = 3.76$, $P < 0.01$; set B, pre- vs post-therapy $t(11) = 2.11$, $P < 0.05$). That the overall level of improvement is small should not be discouraging; in the course of this study, no patient had had more than 8 hours of therapy, half had had as little as 4 hours, and no patient had had any treatment in the 6 weeks preceding these final assessments. Furthermore the performance of patients on set A is a reliable guide to their performance on set B both pretherapy (Pearson $r(11) = 0.970$, $P < 0.001$) and post-therapy ($r(11) = 0.983$, $P < 0.001$), and improvement on set A is related to improvement on set B ($r(11) = 0.811$, $P < 0.001$); the gradient of the best linear fit for the final correlation is 0.77 which allows us to estimate that around 77 per cent of improvement on set A generalizes to set B, whose pictures were never seen during the treatment period. Improvement in treatment is not, therefore, picture specific.

TABLE 2. THE PROPORTION OF CORRECT NAMING ON THE COMPLETE PICTURE SETS PRE- AND POST-THERAPY

	<i>Set A</i>	<i>Set B</i>
Pretherapy	0.53*	0.50
Post-therapy	0.60	0.54

* The pretherapy scores on set A are the mean of the performance in the two pretherapy tests.

In an assessment of individual patients' performance, analysis (by McNemar's test) reveals that 8 of the 12 patients showed significant ($P < 0.05$, or better) improvement from pre- to post-therapy for set A, while 4 patients showed no change. For some patients, the improvement was considerable. One patient, after only 4 h of therapy was able, in the post-therapy tests, to name 40 per cent of the pictures that she had failed to name before therapy started. For the 8 patients who benefited from treatment, the mean percentage improvement was 26.2. The likelihood of significant improvement was unrelated to length of therapy periods; 5 of the one-week subjects had improved and 3 of the two-week subjects. Six of the 12 patients showed significant improvement from pre- to post-therapy on set B; these 6 patients are a proper subset of the patients who improved on set A. Subsequent analyses showed that the extent of improvement was unrelated to the 'category' of aphasia, the patient's age or the duration of the aphasia.

DISCUSSION

In this study, where specific theoretically motivated treatment techniques are applied using a within-patient design with assessment methods that are sensitive and closely related to the intended improvement, specific effects of treatment were found, even though the total hours of therapy were small. The contrast with other

studies (e.g. Meikle *et al.*, 1979; David *et al.*, 1982; Lincoln *et al.*, 1984), that apply nonspecific treatment to large heterogeneous groups of patients using a between-group design and nonspecific and insensitive assessment techniques, and fail to find specific treatment effects, will come as no surprise.

This evaluation of therapeutic techniques for aphasic naming impairments has produced evidence of reliable benefit from intensive therapy lasting over short periods. The results are encouraging in at least three senses. First, they imply that naming impairments, while not yielding readily to treatment, are at least not wholly resistant to it, even in chronic aphasic patients some of whom had had several years of treatment. The daily pretests demonstrate steady and substantial improvement that is specific to the treated items; after eight treatment sessions, the two-week patients were around 80 per cent correct in naming items that they had been entirely unable to name during the pretest procedures. Secondly, since the techniques which we evaluated are ones currently and typically used by speech therapists, our results are encouraging because they demonstrate that speech therapists are not wasting their (or their patients') time. While this does not, of course, imply that these are the best possible therapeutic procedures, it is comforting to know that they achieve some benefit. Finally, we note that our results suggested a small degree of benefit to untreated as well as treated items. This can be seen in increased performance on naming control items (especially the semantic naming controls). Not surprisingly untreated items benefited less than ones receiving therapy; but there appears to be some measurable generalization to untreated items. The correlation between improvement on the two picture sets suggests that the improvement is not tied to any particular picture, but represents a genuine change in the patients' ability to retrieve names.

There is also one disappointing, although perhaps not unexpected, aspect of the results. While performance was significantly augmented 1 week after treatment, the improvement was no longer significant 5 weeks later (6 weeks after therapy had ended). This suggests that the effects of our limited amounts of therapy, while long-term, are not permanent; it may be, as Rosenbek *et al.* (1977) suggested, that permanent effects of treatment are only found after a critical amount of treatment has been given. Most of these patients had sustained lesions many years before; with patients who have been aphasic for a shorter time it is possible that larger and more durable effects would have been found. It does however seem that, when this naming therapy ended, its effects were gradually lost.

It should be noted that the therapy used in this experiment implies a 'one stage' model of treatment. That is, we have assumed that the same techniques that are effective in enabling patients to gain short-term access to a word (i.e. that are, in the terminology of Howard *et al.*, 1985, *facilitators*), will also be effective as therapy methods (i.e. in effecting a long-term change in the patients' ability to retrieve words when used repeatedly over longer periods). Instead, a 'two stage' model could be adopted. A patient's access to a word might be established by using techniques that are good facilitators (i.e. the methods used in 'semantic therapy' in this experiment).

In the second stage other techniques would be used to consolidate this access to a word; possible candidates include those techniques that emphasize the *use* of the word in a communicative context (*see* Davis and Wilcox, 1981), or the more traditional approach of producing the word in a wide variety of contexts and modalities. The resolution of such questions awaits further specific (and well controlled) studies of aphasia therapy.

Finally we note one aspect of the findings which surprised us. On the basis of our facilitation experiments (Howard *et al.*, 1985), we had anticipated a major advantage for semantic as compared with phonological therapy, especially in the first session, but we obtained only a small effect of this variable. Since there was a difference in the predicted direction, our recommendation from the facilitation studies stands. Wherever possible, therapy techniques for naming should include those emphasizing word reference and meaning rather than just pronunciation. It may be, however, that when intensive treatment is available, its precise nature is less critical.

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