Preliminary results from the Semafore study: a comparison of word retrieval treatment with semantic feature analysis and repetition in the presence of the picture.

Introduction.
There is abundant evidence from single-case studies and case series that some treatment methods for word retrieval can result in substantial improvements, at least with target words (see e.g. Nickels, 2002 for a review).
But there is still a question of which method is best, and for which participants.
Since Howard et al (1985) there has been a broad distinction between 'phonological' and 'semantic' therapy; the first emphasising the word form of the target, while the second uses techniques designed to activate/explore its semantic features. Nettleton & Lesser (1991) were the first of many to argue that semantic therapy methods would benefit most people with aphasia with a semantic deficit and phonological therapy would benefit those with a post-semantic deficit. This view was challenged by Howard (2000) who argued that there was no good evidence that either approach was better and that both provided the participant with the information needed to link a semantic representation to a phonological representation. Facilitation experiments reported by Howard et al (2006) supported that view: semantic facilitation resulted in the greatest improvements for the participants with post-semantic difficulties in word retrieval.
On the issue of generalisation, the evidence is conflicting. With phonological therapies there is no strong evidence of generalisation except for people with post-lexical difficulties in phonological assembly (Best et al., in press; Franklin, Buerk, & Howard, 2002). With semantically-based therapy, several studies have reported generalisation to untreated items, particularly when these are drawn from the same semantic category as the treated targets. More specifically, Kiran & Thompson (2003) have argued that there is only generalisation to other category members when atypical items are treated.
Semafore is designed as a pilot cross-over RCT, comparing semantic feature analysis (SFA) with repetition in the presence of the picture (RIPP) for the treatment of people with aphasia after stroke. These two approaches were chosen because both have a reasonable evidence base for their effectiveness; SFA is maximally strategic and semantic in emphasis with evidence of generalisation, and RIPP is relatively simple, automatic and phonological, with no evidence of generalisation. The experiment is designed so that it can be analysed as a series of single subject experimental treatment designs (SSETDs) as well as an RCT. The objectives are:

(i)   To get the information needed to design and power a definitive cross-over RCT.
(ii)   To compare the effectiveness of SFA and RIPP
(iii)   To evaluate whether the effects of either treatment generalise
(iv)   To explore whether there are predictors of how much individual subjects benefit from each treatment approach.
(v)   To explore whether the degree of generalisation with either therapy method depends on the typicality of the treated items within their category.

Here we present data from three completed participants. By May we should be able to present complete data from 7-9 participants.
Method.
Participants: We recruit people with aphasia at least 6 months post onset, who score between 10% and 60% on a screening naming assessment. We collect detailed

background data across a range of language, executive function and memory assessments.

Study design:

The primary outcome measure is picture naming for a set of 150 items. An item is scored correct if a correct name is produced as a first attempt within 5secs of presentation. Assessment and scoring is blind, and subject to reliability checking. Naming of these items is assessed on seven occasions; all are six weeks apart except assessment 7 that is 3 months after the last assessment.

There are a variety of secondary outcome measures, including word retrieval in spontaneous speech, quality of life, and semantic abilities not discussed here.

On the basis of the results of the first two assessments, items are randomly assigned to three sets of 50: (i) Items treated in phase 1; (ii) Items treated in phase 2; (iii) Untreated items. The sets are matched for performance on the first two assessments, frequency, typicality and length.

Treatment.

This was for 3 sessions per week of 45 mins over 6 weeks. There were strict treatment protocols. Protocol adherence was ensured by a further assessor.

Treatment occurred between assessments 2 and 3 and between 4 and 5.

Results.

The proportion correct for each of the three participants in naming the target pictures on each of the seven assessments are shown in Figure 1; for reasons of space the background data are omitted.

WMO shows no overall improvement over the 7 assessments ($t(149)= -0.18$, $p=0.57$; 95%CI for improvement rate -0.007-0.006), though his improvement is greater during therapy periods ($t(149)=1.94$, $p=.027$ (one-tailed; 95%CI 0.014-0.173).

ML shows highly significant overall improvement ($t(149)= 3.54$, $p=0.0003$, 95%CI 0.012-0.032), and greater improvement during the treated periods than the untreated ($t(149)= 5.48$, $p<.0001$, 95%CI 0.25-0.48). There is some evidence that there may be greater improvement during RIPP than SFA, this is not significant ($t(149)= 1.63$, $p=0.11$ two tailed). There is evidence that SFA in phase 2 resulted in significantly greater generalisation than was found in the first treatment period ($F(2,147)=8.73$, $p=0.0003$).

For PJM there is highly significant overall improvement ($t(149)=3.17$, $p=0.0009$; 95%CI 0.010-0.030) with greater improvement during treated than untreated periods ($t(149)=2.19$, $p=0.015$). There is no significant difference in the overall improvement in the two therapy periods ($t(149)=0.19$, ns). While it appears that the improvement during phase 2 (SFA) treatment is less item-specific the statistics show that this is not reliable.

Discussion and Conclusion.

These preliminary analyses of data from three completed participants show that:

(i) 2/3 participants show highly significant overall improvement, and all improve significantly more in the treated than the untreated periods.

(ii) There is a suggestion that RIPP might result in greater overall improvement than SFA, and that improvement during SFA is more generalised. Each of these are only tendencies in the existing data, and will need to be confirmed/extended with further participants

These data from unselected participants confirm that treatment for people with aphasia can reduce difficulties in word retrieval, though the changes are generally

small. While the amount of treatment is relatively small (13.5hrs with each therapy method), the assessments/outcome measure is directed specifically at the treated outcome. People with aphasia don't find it easy to re-learn words; there may be a more general learning difficulty.

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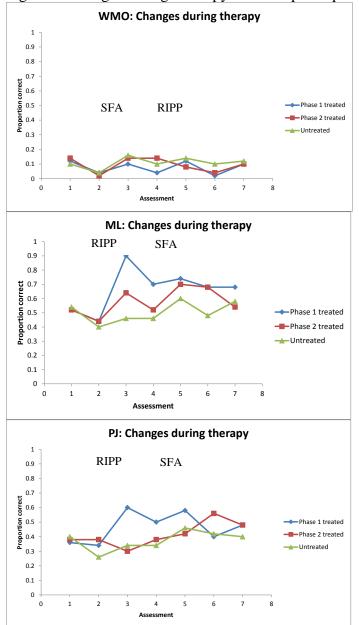Nickels, L. A. (2002). Therapy for naming disorders: Revisiting, revising, and reviewing. *Aphasiology, 16*(10-11), 935-979.

Figure 1. Changes through therapy for three participants.