Therapy outcome in two individuals with jargon aphasia and neologisms

Abstract

Two individuals with jargon aphasia with similar clinical profiles received identical phonological therapy but responded differently to the therapy-P9 did not show any positive gains but FF showed improved naming. Analysis showed that FF and P9 had comparable performance in the semantic domain but P9 had poorer phonological skills. FF also showed a decrease in the number of neologisms and an increase in similarity with the target following therapy. Discussion will focus on the importance of exploring underlying linguistic processes before initiating therapy and the importance of analyzing both quality and quantity of errors to measure the impact of therapy.

Introduction

The investigation of naming therapy is an active research area in aphasiology and has provided clinicians and researchers with various techniques and methods to treat anomia (e.g., semantic feature analysis, phonological component analysis). Despite progress in the field, it is still difficult to match specific patients with particular therapy methods. This difficulty is in part due to the heterogeneity of aphasia and underlying linguistic processing differences.

This research reports two patients with jargon aphasia who produced a high proportion of neologisms (P9 from Leonard, Rochon, & Laird, 2008, and FF from Bose & Buchanan, 2007; Bose, Pietrangelo & Buchanan, 2008) and had similar clinical manifestations (both showed Wernicke's aphasia with poor auditory comprehension, naming and repetition). They underwent identical treatment (Phonological Component Analysis, PCA) to improve their anomia. In spite of the similar clinical profiles and identical treatment, they responded differently to the therapy- P9 did not show any positive gains but FF showed improved naming abilities.

This study explores the factors that might have contributed to this difference in therapy performance and attempts to chart other measures that might capture changes in therapy. Specifically, we raise the following questions:

1. What are the differences and similarities in the underlying linguistic abilities between P9 and FF that contributed to the differential performance in therapy?

2. Did P9 and FF show any change in quantity and quality of neologisms following therapy?

Methods

Background information: Participants, treatment procedure and treatment outcome

Participants. P9 and FF participated in the therapy study by Leonard et al. (2008) and Bose et al. (2008), respectively. P9 was a 72-year old woman who experienced a single left-hemisphere cerebrovascular accident (CVA) and was one and half years post onset. FF was a 77-year-old man and four years post onset of a single left CVA. They were classified with severe Wernicke's aphasia along with severe word finding difficulty and a high proportion of neologisms. They showed similar proportions[1] of neologisms on the Philadelphia Naming Test (PNT, Roach et al., 1996); 46% for P9 and 44% for FF.

Treatment procedure. A single-subject multiple probe design across behaviours was employed for both participants to evaluate the effects of PCA treatment on the naming accuracy for three sets of target stimuli. A phonological components analysis chart (i.e., based on Coelho et al., 2000) was used to identify five phonological components (i.e., rhymes, first sound, first sound associate, final sound, number of syllables) for each target stimulus. During a session, irrespective of their ability to name the picture, participants were asked to generate five

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[1] Proportion of neologism=(Total number of neologisms/Total number of errors)*100

phonological components, and subsequently, name the target (see Leonard et al., 2008 for detailed protocol). Treatment occurred three times a week for approximately 60 minutes.

Treatment outcome. P9 neither demonstrated a therapy effect nor did she meet the minimum requirement of at least 40% correct on the second list to move to the final list, hence her therapy was terminated after the second list. FF showed significant therapy gains on all three lists. Although FF showed improved ability to name pictures in therapy, neither participant showed any generalization to other naming tasks (i.e., no improvement pre and post therapy on the PNT). Overall accuracy on the PNT pre- and post-therapy for P9 was 9% and 8%, respectively and for FF 43.3% and 43%, respectively.

Tasks to identify differences and similarities between P9 and FF. Several linguistic tasks tapping into conceptual, semantic and phonological processes were administered to determine the loci of impairment for the participants. Please see figure 1 for the specific tasks.

Change in quantity and quality of neologisms. To explore the characteristics of the neologisms produced, errors made pre-and post- therapy on the PNT were analyzed. Change in the proportion of neologisms from pre- to post-therapy was used as a marker for quantitative change. The quality of neologisms was measured using the Phonological Overlap Index (Bose et al., 2007; Folk et al., 2002). Phonological Overlap Index (POI) considers the number of phonemes shared between target and neologism regardless of position (Nshared) as well as the phonemic length of target (LT) and error (LE). The POI equation = NShared*2/(LT+LE), results in values that range from 0-1 with 1 representing complete overlap.

Results and Discussion

1. *Differences and similarities in underlying linguistic abilities between P9 and FF*

Insert Figure 1 about here

Figure 1 shows comparable performance on conceptual and lexico-semantic tasks for P9 and FF, but greater difficulty with phonological tasks (word and nonword repetition), oral reading and naming. The analysis revealed that FF who had better phonological skills in terms of repetition and oral reading abilities showed positive gains in therapy. A positive correlation between oral reading and success in naming therapy has been noted by other researchers (e.g., Hickin et al., 2002). It is possible that by the virtue of better phonological skills, FF could utilize and consolidate the phonological cues provided during the therapy to help him name the pictures.

2. *Change in quantity and quality of neologisms following therapy*

Insert Figure 2 about here

The PNT was tested pre- and post-therapy to measure generalization and neither of the participants showed any change in overall accuracy. Figure 2 demonstrates a significant decrease in the number of neologisms for FF along with an increase in phonological overlap between the target and the neologisms post therapy. No such change was observed for P9. This highlights the inadequacy of depending only on overall accuracy measures for tapping into generalization or therapy effectiveness which may not provide adequate insight into how the linguistic system changes as a result of therapy. The fact that FF showed both qualitative (more target-like neologisms) and quantitative (fewer neologisms) change without any change in accuracy shows the importance of using a fine grained analysis of errors to tap into underlying linguistic processing abilities.

Summary

Two individuals with jargon aphasia with similar clinical profiles received identical phonological therapy but responded differently to the therapy-P9 did not show any positive gain but FF showed improved naming. Analysis showed that FF and P9 had comparable performance in the semantic domain but P9 had poorer phonological skills. Following therapy, FF showed a decrease in the number of neologisms and an increase in similarity with the target.

Treating individuals with jargon aphasia and neologisms presents a unique challenge as therapy outcomes with these patients are often poor (Marshall, 2006). This analysis demonstrates that even when a person shows a high proportion of neologisms in their naming, they can benefit from therapy, provided they possess specific linguistic abilities (in this case phonological abilities) that are targeted in the therapy. Theoretical and clinical discussion will focus on the importance of exploring underlying linguistic processes before initiating therapy, the importance of reporting and analyzing both quality and quantity of errors to measure the impact of therapy and the usefulness of phonological therapy for jargon aphasia.

Acknowledgments

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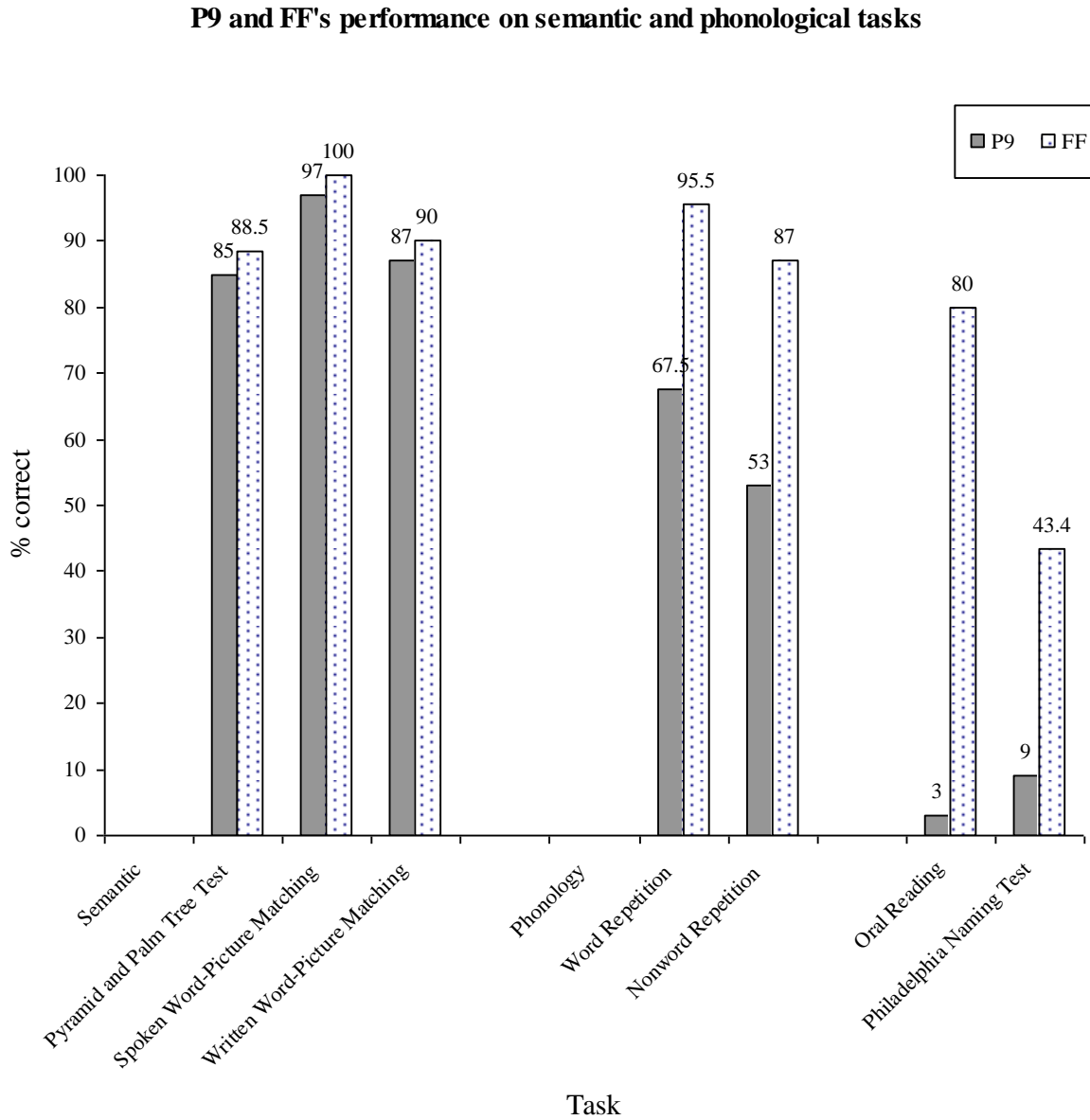
Figure 1. Performance on various linguistic tasks

P9 and FF's performance on semantic and phonological tasks

Figure 2. Change in quality and quantity of neologisms for P9 and FF

Change in Quantity of Neologisms following Therapy

Change in Quality of Neologisms following Therapy