Title: Reducing perseverations in a Spanish speaker with aphasia: A case study

Abstract: A single-subject design was utilized to examine treatment outcomes following implementation of an activation theory based treatment for perseveration. Treatment involved the use of systematic reduction of inter-stimulus interval paired with semantic feature analysis. The treatment resulted on a decrease in perseveration and increase in accuracy on trained lists. A decrease in preservations was evident from pre- to post- treatment performance on the BNT.

Perseveration, or the "inappropriate repetition or continuation of a previous response when a different response is expected" (Gotts, della Rocchetta, & Cipolotti, 2002) p. 1930), is a symptom often evident in individuals with aphasia. While there are different types of perseveration, of particular interest for this study is recurrent perseveration, or the "complete or partial repetition of an earlier response in a sequential task" (Moses, Nickels, & Sheard, 2004) p. 157).

The language processing mechanisms underlying perseveration are unclear. However, activation theories of lexical retrieval provide one avenue for explaining the linguistic breakdown (Martin, Roach, Brecher, & Lowery, 1998). Lexical retrieval results from increasing activation of target items occurring in parallel with the diminishing activation of prior responses. Perseveration errors may result due to weak activation of the target lexical item and/or a strong persistent activation of pervious response.

A single-subject design was utilized to examine treatment outcomes following implementation of an activation theory based treatment for perseveration. Treatment involved the use of systematic reduction of inter-stimulus interval (to reduce persistent activation) paired with semantic feature analysis (to strengthen the activation of target responses). The study was designed to address the following questions: Does the treatment reduce the frequency of perseveration in response on a picture naming task? Does the treatment increase the frequency of correct responses on a picture naming task?

Patient C participated in this study. C was a 43 year-old Hispanic male 8 months post onset of a single left CVA. He was raised and educated in Mexico. He began worked and learned English in the US for eight years. Since the stroke, he has been primarily Spanish speaking. All testing was conducted in Spanish. Attempts to asses in English were discontinued to lack of response.

Patient C exhibited a mixed receptive-expressive aphasia as indicated by performance on the *Boston Diagnostic Aphasia Examination-3*, Spanish. On the *Boston Naming Test (BNT)-Spanish* he correctly named 0/60 items and provided perseverative responses on 31/60 items (51.6%).

Fifty nouns were selected for treatment (Snodgrass & Vanderwart, 1980) and organized in 5 sets of 10 balanced for number of syllables and familiarity. English/Spanish cognates and words that appeared in the BNT did not appear in the lists. The black and white line drawings were presented on 4 X 3 sheets of paper. Performance as measured by number of perseverations and number of correctly named items.

The perseveration treatment consisted of two components. The first component involved the manipulation of the inter-stimulus (ISI) interval. The clinician increased or decreased the time interval between stimulus presentation as a result of the occurrence or absence of perseveration. Initially, an interval of twenty seconds was provided between stimuli. The interval

was reduced by two seconds if the participant responded without perseveration, regardless of the accuracy of the response. However, if the participant perseverated, the interval was increased for the next picture stimuli by 2 seconds. The timing intervals in subsequent trials/sessions began at the last interval recorded in the previous trial/session. During each trial, any items named incorrectly were reviewed using a semantic feature analysis technique. The participant was asked to identify attributes of the object such as the function and physical properties of the item. The attributes corresponding to the picture stimuli were recorded by the clinician on the sheet. The participant was encouraged to name the object during the description process. However, if the participant was unable to name the object, the participant was given an article cue (el/la, un/una), then an initial syllable cue, and then the whole word. Once the picture name was said, the participant used it in to sentences (A____ is_____, and I_____ with a _____).

A stable baseline was established over three sessions prior to the start of treatment (Mean Accuracy=0, Mean perseverations= 70%). At the start of each treatment session, performance on trained and untrained stimuli was probe. A list was considered mastered when C produced 0 perseverations with a 2 second ISI.

A two hour treatment session was conducted once a week for seven weeks. Additionally, the spouse was trained on the task and they practiced daily at home using the training materials used in treatment.

Data analysis was performed for the following dependent variables: number of items correctly names and number of perseverations.

C completed training with Set 1 and begun training on Set 2 in seven weeks. During that time, accuracy increased from 0 to 3, and perseverations declined from 7 to 3. A decline in number of perseverations on untrained sets was also evident.

Perseveration Treatment Baselines	**# Correct 9/16/09**	**# Correct 11/18/09**	**% Change # Correct**	**# Perseverations 9/16/09**	**# Perseverations 11/18/09**	**% Change # Perseverations**
Set 1	0	3	+100%	7	0	-100%
Set 2	0	2	+100%	8	1	-88%
Set 3	0	0	+0%	4	2	-50%
Set 4	0	0	+0%	5	3	-40%
Set 5	0	0	+0%	7	2	-71%
Total	0	5	+100%	31	8	-74%

The BNT was re-administered following at the end of the semester. Accuracy increased slightly (3/60) and perseverations decreased to 0/60. Additionally, the family reports increased verbal output of both words and sentences in functional contexts, such as ordering in a restaurant.

BNT	**9/2/09**	**11/18/09**	**% Change**
Number Correct	0	2	+3.3%
Perseverations	31	0	-100%

During the presentation, additional treatment data and analysis will be presented, including pre- and post- treatment comparisons of error type and discourse. The data analysis to

date suggests that the treatment may result in a generalized reduction in perseverations and a subsequent increase in expressive language.

References

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