**Summary (1200 words)**

Semantic feature treatment is a cognitive neuropsychological approach used to facilitate word retrieval by strengthening semantic features and their representations (Murray and Clark. 2006). Semantic treatment tasks in the past have generally used typical semantic exemplars before training complex items. However, Thompson et. al (2003) showed that when complex levels of syntax were addressed first, the results generalized to simpler levels. The opposite was not found to be true. They termed this effect as the complexity account of treatment efficacy (CATE). Kiran and Thompson (2003) extended the CATE effect to semantic lexical retrieval tasks. Their results indicated that atypical exemplars training resulted in improved lexical retrieval and generalization across all typicality levels. They also noted that the generalization was limited to the trained category. However, there have been few attempts to replicate the results of Kiran and Thompson's (2003) study. In addition, such attempts have produced mixed results (See Mayer, Murray and Karcher, 2004; Stanczak, Waters and Caplan, 2006). Therefore, further research is warranted to determine the effectiveness of semantic feature analysis (SFA) therapy with atypical exemplars.

The objectives of this study were as follows:
1. To replicate Kiran and Thompson's (2003) study and determine the effectiveness of SFA therapy with atypical exemplars.
2. To determine if training in one semantic category generalizes to a second semantic category when the two categories share common features.
3. To determine the role of phonological cueing along with SFA treatment with atypical exemplars.

**Method:**

*Participant:*

The participant was a right-handed 47 year old male, who suffered a left CVA 15 years ago. He was recruited for the study from the aphasia group where he has received group and individual therapies for the past three years.

*Stimuli:*

For the purpose of replication, the treatment category exemplars were selected from Kiran and Thomson's (2003) original study. Three categories (Birds, Animals and Instruments) were included, of which the bird category was the treatment category and the other two were the control categories. Eighteen of the original twenty-four birds, or six from each subset (typical, intermediate, and atypical) were chosen as treatment targets. Twenty semantic features describing the physical, functional, characteristic and contextual properties of the semantic items were selected to train the exemplars. Ten features were common to all the birds, and 10 features were common to at least two birds. In addition, some of these features were also common to some exemplars from the animal category.

*Procedure:*

The Western Aphasia Battery(WAB) and parts of the Psycholinguistic Assessment of Language Processing in Aphasia(PALPA) were administered. Before the first treatment session, five baseline probes involving a Naming task (including 30 items from all the three categories – Birds, Animals and Instruments) were completed.

Responses were considered correct when the item was named within 20 seconds of exemplar presentation, were self corrections, or contained a distortion/substitution of only one consonant or vowel. All other incorrect responses were identified as one of the following: superordinate label (e.g. bird/parrot); circumlocutory response; unrelated (e.g. cheetah/cardinal); no response (e.g. "I don't know); neologisms (i.e. less than 50% of the word correct); semantic paraphasia (e.g. ostrich/pelican); or phonemic paraphasia (e.g. palfon/falcon).

Treatment began with four atypical exemplars in the bird category once a week for one hour and was increased to twice a week after 6 weeks. During each therapy session, semantic therapy tasks were completed for all target exemplars. Therapy tasks for each target exemplar included category sorting, feature selection, and yes/no questions. The 18-item Bird category was probed every other session to determine training effects and generalization to untrained exemplars. When a target exemplar reached 80% accuracy across two consecutive probe sessions, the item was replaced by an untreated atypical item. If during probing, 80% accuracy was not maintained on a target exemplar, it was reintroduced as a therapy item. After the fourteenth week of the study, all 6 atypical exemplars were targeted once during each therapy session.

Generalization to untrained exemplars was determined by repeating the baseline treatment probe of all 30 items after the atypical exemplars met the 80% criterion. The generalization probes were critical to reflect any generalization effects across categories, given the fact that some common semantic features overlapped the Bird and the Animal categories. If the untrained intermediate and typical exemplars in the Bird category did not reach 100% accuracy through generalization, treatment focused on the intermediate and typical exemplars respectively. After forty sessions, the first and last therapy probes were transcribed and compared to determine changes in error patterns as a result of semantic therapy. The standardized language tests were re-administered to determine changes in overall language performance. The phonological cueing hierarchy (PCH) treatment (Raymer, et.al. 1993) was added after the forty sessions of semantic feature treatment was completed and the treatment is currently still in progress.

**Results:**

The results were tabulated after the completion of forty sessions of SFA treatment with atypical exemplars. The results showed that the participant's naming accuracy increased in the atypical category. The intermediate category was not trained but consistency of naming accuracy improved. No changes were seen in the typical category although the types of errors improved. The participant also showed improvements on pre-post baseline measures. On the pre and post testing, the participant showed no changes in the naming sections of the WAB and PALPA although marked progress was seen on the semantic subtests of PALPA. Results of the PCH treatment will be analyzed after completion.

**Discussion:**

The results of SFA treatment showed that the participant improved on the trained atypical exemplars without generalization to the typical category. While this was in contrast to the findings of Kiran and Thompson's results, it supported the findings of Plaut (1996) and Stanczak et. al (2006). Stanczak et. al. showed that with atypical

exemplar training their patient with semantic and phonological deficits had difficulty generalizing to the untrained typical items secondary to the phonological deficits, while their patient with only semantic deficits was able to generalize to the typical category. Further, Plaut showed that when the treatment method and deficits are matched, it results in better learning and generalization. Thus, in the present study, the semantic training perhaps helped improve the participant's semantic processing, without any effect on the phonological deficit. The participant is, therefore, currently receiving phonological therapy. The results will be analyzed at the end of the phonological treatment and results will be discussed further.

**References:**

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