

Background:

Speech and language impairments are a common source of disability in some forms of frontotemporal dementia (FTD); however, there are no successful interventions for these disorders. Patients with the semantic dementia (SD) form of FTD are impaired in word retrieval-naming and comprehension (Hodges, 2003). In SD there is atrophy of the temporal lobe that often initially impairs naming (Grossman, 2002). The progression of SD later affects parietal and frontal regions that support both the perception-comprehension and the voluntary production of speech. Throughout most of the course of this disease, however, fluency and repetition remain relatively preserved. One goal of this case study is to determine the efficacy of a treatment that attempts to maintain functional vocabulary by using patients with SD preserved single word repetition and paired-associate learning (e.g., linking a picture to a name). In this patient, treatment used an errorless learning approach in which the patient advances to a more difficult cognitive task (e.g., naming) only after mastering a more basic stage (e.g., repetition) (Graham, Patterson, Pratt, & Hodges, 2001).

Participant:

The experimental participant (EP) is a 67 year old woman diagnosed with SD using the Neary criteria (Neary, et al., 1998). She first presented with cognitive problems in late 2000. Her Mini-Mental State Exam (MMSE; Folstein, Folstein, & McHugh, 1975) score was a 7 (severe cognitive impairment) and included disorientation to time, place, and impaired recall, attention and calculation. Her speech and language are consistent with that of a patient with SD with intact repetition and fluent speech; however as sentences became complex her word finding impairment often caused her speech to become non-fluent. She has severe naming impairment as evidenced by poor performance on the Boston Naming Test (0 of 60; Kaplan, Goodglass, & Weintraub, 1983) and inability to perform verbal (0 words in 60 seconds; Ivnik, Malec, Smith, & Tangalos, 1996) and category fluency tasks (0 words in 60 seconds; Gladsjo, et al., 1999). T-1 weighted MRI images of EP's brain demonstrated temporal lobe atrophy consistent with SD (see Figure 1).

Treatment Design and Methods:

This treatment study was designed such that EP acted as her own control by probing her performance on training items throughout the course of her treatment paradigm. CP was given a communication board with digital pictures of items of two principal categories SUBJECTS/AGENTS (n=7 people) and OBJECTS/THEMES (n=16). The OBJECTS/THEMES could be further broken into 5 semantic categories: foods, hygiene, places, clothes, kitchen implements. The choice of which SUBJECTS/AGENTS would be trained was made by including only the most frequently encountered family and EP herself. The choice of which OBJECTS/THEMES that would be trained was made with the help of EP and her family and was based on the selection of items that were the most personally relevant to EP. Before training, EP would be asked by either a Speech-Language Pathologist or her husband to name the items on the communication board. Whether she was able to do this correctly was recorded daily by her husband. The training would then proceed in stages beginning with repetition of single items. Once CP had correctly repeated all items on three successive presentations, CP would proceed to single word naming. This naming treatment continued for eight months.

Results:

Descriptive statistics were obtained for the percentage correct for all responses for each of the eight months of training (see Table 1). The means of the percentage correct per month were plotted on a line graph and are presented in Figure 1. The largest upward slope was 9.139 and was seen between the 3rd and 4th months. The largest downward slope was -16.732 and was seen between the 7th and 8th months. Descriptive statistics were also obtained for percentage correct for each individual item (see Table 2). The item with the highest percentage correct at 93.05% was pants and the item with the lowest percentage correct at 9.43% was dish. The items were also divided into their respective semantic category and descriptive statistics were obtained for the percentage correct for each semantic category (see Table 3).

Discussion:

This errorless learning-naming intervention led to improvement in EP's naming the trained items. This improvement leveled off during the middle months of the training and dropped dramatically in the last month. This drop in naming could have been related to the progression of her disease or due to the low number of training sessions in these months 5 (n=6) and 6 (n=9). This drop may also have been due to her frequently being away from her home, on vacation. Being away from home may have made it more difficult to learn paired-associations. It can also be noted that EP seemed to be unable to learn certain items. Dish and toothpaste were two items that she was unable to learn. These items, however, are ones that EP would interact with on at least a daily basis suggesting that amount of interaction with an item may not improve ability to name. This dissociation between frequency of observations and interactions and naming ability is contrary to most published studies of naming disorders. Another finding contrary to published thought was EP's high ability to name proper names as compared to objects (see Table 3). It is thought persons with dementia have more severe naming disabilities with proper names as compared to objects (Semenza, Mondini, Borgo, Pasini, & Sgaramella, 2003). This may suggest that EP does not represent the dementia population in this domain or possibly that proper names are one of the more sensitive semantic categories to the intervention. Future treatment studies of SD are needed. Although SD is uncommon future studies ideally should be performed with subject groups and naming on trained versus untrained words should be compared.

References:

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Tables and Figures:

Table 1

Percent Correct Per Month on All Items

Month	N	M (SD)
1	16	52.21 (10.86)
2	27	54.18 (13.10)
3	23	62.46 (9.35)
4	22	65.45 (12.90)
5	9	63.06 (8.26)
6	6	68.27 (9.45)
7	23	68.12 (14.18)
8	25	62.26 (13.775)

Table 2

Item Percent Correct During Entire Training Session

Item	Semantic Category	N	M (SD)
Pants	Clothes	151	93.05 (25.19)

Carol	Proper Name	151	91.72 (25.88)
Tom	Proper Name	151	87.42 (32.26)
Bed	Places	151	84.11 (36.39)
Orange Juice	Food	151	82.12 (37.18)
Eric	Proper Name	92	82.07 (36.95)
Root Beer	Food	124	81.85 (36.73)
Apple	Food	151	81.79 (36.34)
Toilet	Hygiene	151	74.83 (32.08)
Comb	Hygiene	143	72.38 (43.07)
Bed Room	Places	151	70.53 (40.94)
Betty	Proper Name	150	65.61 (44.62)
Deodorant	Hygiene	151	62.25 (36.76)
Mom	Proper Name	151	59.81 (43.46)
Bathroom	Places	128	54.72 (43.36)
Glass	Kitchen items	149	50.67 (49.14)
Refrigerator	Kitchen items	135	49.63 (28.13)
Poppy	Proper Name	151	47.35 (29.97)
Tooth Brush	Hygiene	89	34.83 (25.03)
Blouse/Top	Clothes	151	16.89 (35.75)
Tooth Paste	Hygiene	89	11.24 (24.72)
Dish	Kitchen items	122	9.43 (26.76)

Table 3

Semantic Category Percent Correct During Entire Training Session

Semantic Category	N	M (SD)
Food	426	81.92 (36.67)
Proper Name	846	71.66 (40.11)
Places in Home	430	70.59 (43.72)
Hygiene	623	56.42 (43.76)
Clothes	302	54.97 (48.69)
Kitchen Items	406	37.93 (40.80)

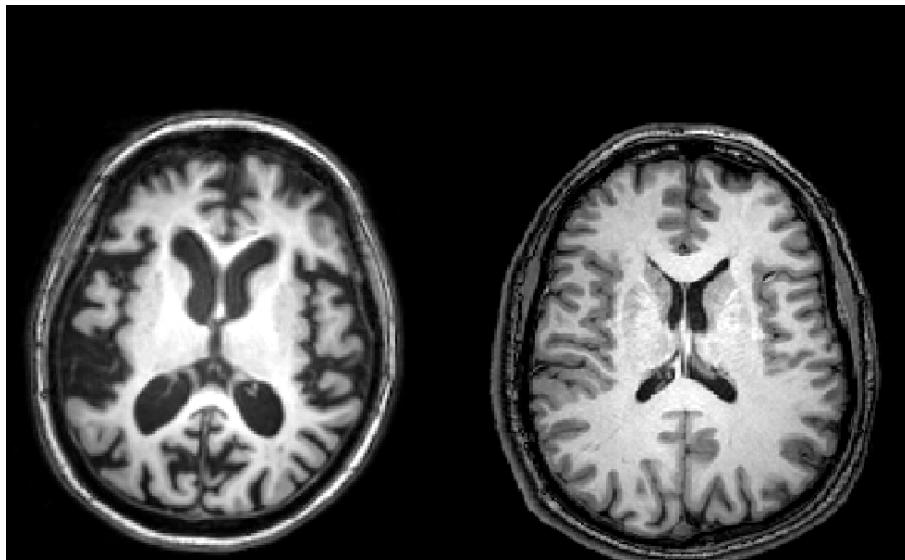


Figure 1. MRI image of EP's brain (left) with considerable temporal lobe atrophy compared to normal brain (right).

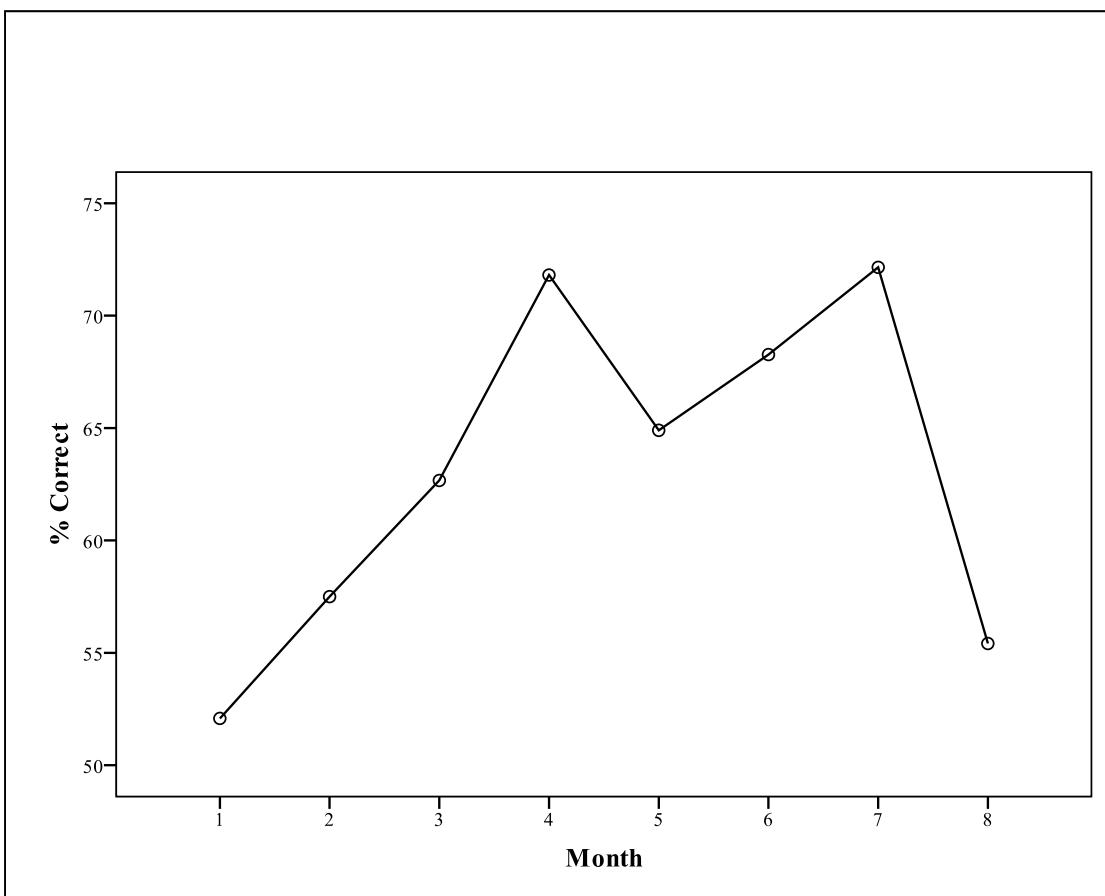


Figure 2. Percent correct per month for all items.