

Background

Individuals with non-fluent aphasia experience difficulty producing grammatical sentences and particular difficulty using verbs in sentence contexts. Treatment studies have reported improvement of the production of verbs practiced in therapy but generalization to communication context outside the therapy sessions has proved challenging (e.g., Webster & Gordon, 2009).

In this paper we compare the results of three treatment approaches designed to improve verb production in non-fluent aphasia. All three approaches share features of Constraint Induced Aphasia Therapy, including high intensity (7-8 hours per week for 4 weeks) and an emphasis on verbal output. They differ in whether their procedures utilize (1) drill-based tasks with a pre-selected list of verbs, (2) non-drill, informative interactions with a pre-selected list of verbs or (3) informative interactions with no pre-selected list of target verbs, as further described below.

Methods

Participants

Three English-speaking individuals with non-fluent aphasia subsequent to a single unilateral left hemisphere lesion participated in the study. Each received all three therapeutic protocols for 30 hours each, in a counterbalanced order. All therapy sessions were individual.

Treatment Protocols

Treatment protocol 1: Drill

A pre-selected set of verbs (ranging from 40 to 60) was targeted. All productions by the participants were elicited in a drill-based format; that is, the clinician knew the target the participant was to produce. The clinician modeled the target response for the participant prior to the beginning of the activity and used standard scaffolding techniques to elicit the target verb and sentence structure. The procedure was designed to have a clear target, known by both the clinician and the participant. Nothing about the interaction was designed to simulate normal conversation in which novel information is exchanged. Included in the tasks of this treatment were repetition of verbs and verbs in sentences, reading target verbs and sentences aloud, and picture description with the picture in full view of the clinician and the participant with aphasia.

Treatment protocol 2: Informative

A pre-selected set of verbs (ranging from 40 to 60) was targeted. The activities in this protocol were designed to simulate informative verbal exchanges with a limited array of verb targets. Many of the tasks used a barrier so that the precise target/picture being described or asked for was not visible to the listener in the interactions. Structured game-like activities were used. For instance, in a "go fish" type game, the individual with aphasia and the clinician would take turns asking one another if they have a picture

depicting an action containing one of the targeted verbs. The use of a physical barrier in this and other similar tasks ensured that neither interlocutor knew the precise target for each utterance, although the list of acceptable targets was pre-determined and modeled prior to each task. Each interaction was informative insofar as each participant did not know the precise target being attempted by the participant. When the clinician did not understand the participant with aphasia or if the participant with aphasia did not use a verb in a sentence context to describe the picture, the clinician would use conversational corrections to scaffold and move the game/interaction forward (e.g., "Can you tell me in a different way?" "Can you say that in a complete sentence with a verb?"). The informative protocol differs from the drill-based protocol insofar as it simulates natural conversation and adheres to Gricean maxims of verbal interaction, albeit with a limited number of verbal targets.

Treatment protocol 3: Habit

The same structured activities and informative principles of the Informative treatment protocol were used for the Habit protocol, including the use of a barrier in many tasks. However, no specific set of target verbs was pre-selected or modeled prior to the therapy tasks. Rather, the participant with aphasia was encouraged to generate multiple new utterances (containing appropriate verbs in grammatical structures) in each turn and encouraged to produce verbs they had not used in prior turns. The emphasis in this therapy was to develop the habit of using appropriate verbs in sentences, rather than to practice reliable production of a limited set of pre-selected verbs. For instance, in requesting a picture of a man in a train station, the participant would be expected to produce two or three different grammatical and appropriate descriptions of the item, such as "the man is waiting for the train" and "he is sitting on a bench."

In all three protocols, cues and models were provided when the participant experienced difficulty producing the verb or the sentence. For each participant, the target complexity (e.g., a verb; subject-verb-object; subject-verb-object + prepositional phrase) was increased when the participant met the 80% accuracy criterion during regular probes.

A baseline of no treatment

To establish a stable baseline prior to any therapy (to assure us that the participant with aphasia was not in a phase of rapid recovery or decline), each participant was assessed before and after a period of about one month without any language treatment.

Outcome Measures

We administered a set of assessment measures before and after each treatment phase as well as before and after the period of no treatment. We report here analyses of two measures: (1) Treatment efficacy was assessed by accuracy performance on an action picture description task; and (2) Generalization to unpracticed contexts was assessed by analysis of utterance and verb production in personal narratives or

complex picture description. Pre- and Post- treatment assessment was conducted in three consecutive sessions at the beginning and end of each therapeutic protocol to mitigate the effects of daily fluctuations in performance.

Results & Conclusions

Participants showed variable performance in verb production in the action naming test following treatment. Improvement was noted for production of the targeted verbs and of verbs in grammatical clauses for some participants in some treatment protocols. When generalization was examined by analysis of narrative production in non-practiced contexts, greatest and most consistent gains were found following the Informative and Habit treatments. Improvements included (1) an increase in total verbal output, (2) a greater diversity of verbs, (3) more typical ratios between number of nouns and verbs produced (noun-verb ratio), and (4) more stable performance (less variability) across testing sessions. These data suggest that greater generalization of verb use in unpracticed (personal narrative and complex picture description) tasks can be best achieved in treatment protocols that focus on production of verbs in a functional/communicative context rather than drill-like activities.

For two of the three participants, the Habit therapy, in which no particular verb targets were pre-determined and in which verbs were elicited in informative interactions, was the only treatment that yielded improved verb production in narratives. We suggest that treatment protocols that exert tight experimental control by working with a limited number of target words and those that utilize drill-based activities may not be the most effective way of bringing about changes in non-treatment, real-life verbal interactions for people with non-fluent aphasia.

References

Webster, J. and Gordon, B. (2009). Contrasting therapy effects for verb and sentence processing difficulties: A discussion of what worked and why. *Aphasiology*, 23(10), 1231-1251