INTRODUCTION

We know that persons with aphasia (PWA) respond differently to language therapy. Factors such as age, education, months post onset, lesion size/location, and baseline language ability may play some role in a PWA’s response to therapy but cannot account for all of the observed differences in improvement between individuals (e.g. Lazar & Antoniello, 2008).

What other factors may be at play?

In order to show improvement over time in a therapy program, an individual must be able to attend to stimuli consistently from session to session. Attention has been found to be impaired in PWA (e.g. Murray, 2012), and it has in fact been theorized that attentional impairment is central to language deficits (Hula & McNeil, 2008). Our goal in this study was to measure day-to-day variability in attentional resources by using repeated sampling. We chose to measure attention in as a pure a form as possible by using simple visual and auditory nonlinguistic stimuli.

RESEARCH QUESTIONS

RQ1. Reaction Times
A. How well do PWA and age-matched controls perform on a non-linguistic attention task, and how is this related to task complexity? Hypothesis: PWA will show relatively longer reaction times on more complex tasks. Controls will also show relatively longer reaction times on more complex tasks.

RQ2. Variability
A. How much day-to-day intra-individual variability (IV) do PWA show on this task, and how is this related to task variability? Hypothesis: PWA will show more IV on more complex tasks.
B. How does IV in PWA on this task differ from IV in age-matched controls? Hypothesis: PWA will show more IV than controls on any given task.

METHODS

Participants:
- 16 individuals with chronic aphasia from a unilateral stroke (5F, mean age = 61.3, sd = 8.2)
- 4 age-matched controls (2F, mean age = 64.5, sd = 8.2)

PWA: Additional Info

<table>
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<tr>
<th>Aphasia Types</th>
<th>mean age</th>
<th>MPO</th>
<th>AQ*</th>
<th>BNT*</th>
<th>mean CLGT*</th>
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<tbody>
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<td>15% Conduction</td>
<td>61.1</td>
<td>55.8</td>
<td>80.1</td>
<td>39.0</td>
<td>84%</td>
</tr>
<tr>
<td>63% Transcortical Motor</td>
<td>57.7</td>
<td>58.6</td>
<td>59.1</td>
<td>66.6</td>
<td>66% - 100%</td>
</tr>
</tbody>
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AQ = Aphasia Quotient from the Western Aphasia Battery
BNT = Boston Naming Test
CLGT = Composite score from Cognitive Linguistic Quick Test

Tasks:
- Each task ran about 4 minutes, and each was administered 4 times on non-consecutive days.
- Visual stimuli consisted of dots on the R/L side of the screen; auditory stimuli consisted of tokens played in the subject’s R/L ear.

RESULTS

LOOKING AT RT 2-SCORES

RQ1. RT-2 scores were longer on more complex tasks across PWA. Additionally, PWA showed longer RTs on auditory tasks than on visual tasks of corresponding complexity.

LOOKING AT VARIABILITY

To examine intra-individual variability, a coefficient of variation (COV, or sd/mean) was calculated for each subject, each task (13 pts x 5 tasks = 65 COVs total). A high COV indicates a higher degree of day-to-day variability.

RQ2A. One-way ANOVA revealed a significant effect of Task on COV across PWA, F(4,80) = 5.08, p = .001. A Tukey post-hoc analysis revealed that the COV for Task 1 differed significantly both from the COV of Task 4 and from the COV of Task 5, suggesting that day-to-day IV in PWA is associated with task complexity. No complexity effect was observed for control subjects.

RQ2B. Next, we compared each patient’s COV for a given task with the control mean COV + 1sd for that Task.

Findings:
- In general, PWA were likely to perform more variably than controls on Task 2, Task 4, and Task 5.
- In general, PWA were likely to exhibit a level of variability similar to that of controls on Task 1 and, to some extent, Task 3.
- PWA also differed from each other, with some performing similarly to controls across tasks and some exhibiting higher variability on multiple tasks.

CONCLUSIONS

- On a non-linguistic attention task, RTs are associated with task complexity for both PWA and controls, such that both groups show relatively longer RTs on more complex tasks.
- Both PWA and controls also show longer RTs on tasks requiring them to attend to auditory stimuli than on tasks of corresponding complexity that require them to attend to visual stimuli.

VARIABILITY

- PWA show more day-to-day variability on most non-linguistic attention tasks than do age-matched controls, particularly on more complex tasks and/or tasks requiring them to attend to auditory stimuli.

These results have implications for PWA’s performance in both testing and treatment situations. Since therapy requires an individual to attend to and integrate auditory and visual information during each session, as well as to build on the progress made from session to session, we believe that there may be an association between variability on more complex tasks (particularly Task 5, which requires auditory/visual integration) and ability to improve in therapy, such that individuals exhibiting high day-to-day attentional variability may progress more slowly in a therapy program.

REFERENCES