Developing a web-based stimulus selection hub for anomia treatment using R and Shiny

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Introduction

- Anomia, or word retrieval difficulty, is ubiquitous across all aphasia diagnoses, and treatment for anomia remains a staple in clinical practice for persons with aphasia.
- In order to address the role of stimulus properties on treatment outcomes, it is imperative that researchers and clinicians have available the necessary word-level data (e.g., lexical frequency, age-of-acquisition, typicality, etc.).
- While there are many openly available resources to obtain these psycholinguistic properties of words, it often remains burdensome to collect all the necessary variables, and many times the words vary from database to database, leading to difficulty finding a common set of stimuli.
- Furthermore, it can be difficult to determine what might be appropriate related and unrelated generalization words for person-specific treatment targets.
- **The aim of this study was to develop a web-based tool that could be used by clinicians and researchers to obtain a variety of commonly used psycholinguistic properties of words. This would provide a one-stop-shop approach for users, particularly those who may not have the coding and data scraping skills or the time available for data extraction and comparison.**

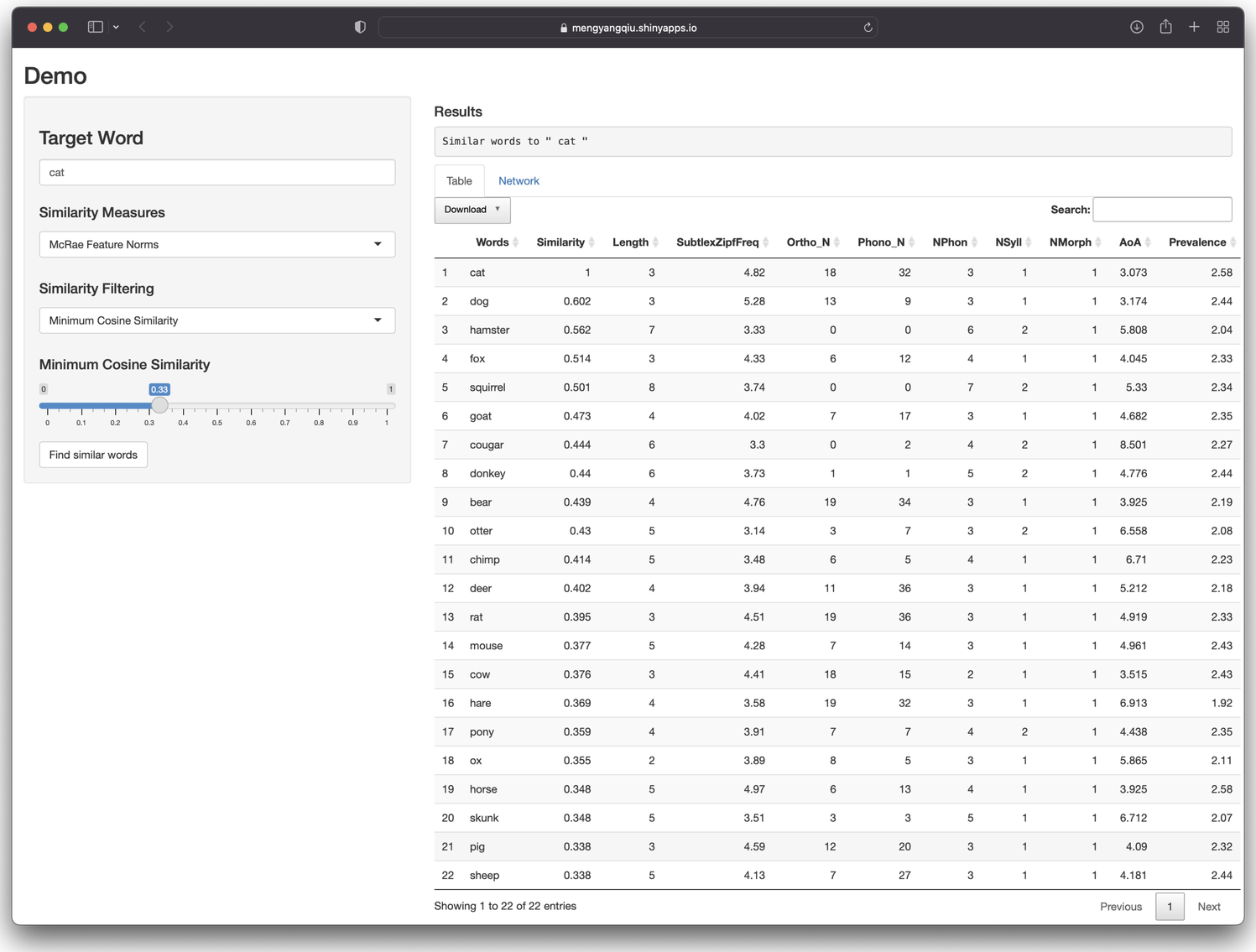
Method

- Two main priorities in the tool development: 1) **provision of psycholinguistic data** on not just target words, but also identification of and data on potential generalization words, and 2) **visualization of stimuli** that could provide novel and intuitive insight into stimuli selection decisions.
- The web-based tool was implemented using the Shiny package in R. Shiny allows users to easily manipulate and visualize data in web browsers, and has been used for data sharing and analysis in several language studies.
- The tool contains two panels. The left panel is a user input panel, where users can specify the target word, type of similarity measure (to obtain related words to the target), and similarity filtering method. The right panel is an output panel that can display a table of psycholinguistic properties or a visualization.

Selected References

- Castro, N., Nadeau, S. E., & Kendall, D. L. (2022). The challenge of achieving greater generalization in phonological treatment of aphasia. *Aphasiology*, *36*(2), 170–197.
- Chang, W., Cheng, J., Allaire, J., Sievert, C., Schloerke, B., Xie, Y., … Borges, B. (2021). *Shiny: Web application framework for R.*
- McRae, K., Cree, G. S., Seidenberg, M. S., & McNorgan, C. (2005). Semantic feature production norms for a large set of living and nonliving things. *Behavior Research Methods*, *37*(4), 547–559.
- Vitevitch, M. S. (2008). What can graph theory tell us about word learning and lexical retrieval? *Journal of Speech, Language, and Hearing Research*, *51*, 408–422.

Results



Discussion

- We developed an initial tool that could aid in the selection of stimuli for anomia treatments.
- The tool is available https://mengyangqiu.shinyapps.io/shiny_stimuli/.
- We anticipate inclusion of more variables and visualizations as this tool develops.
- Such a tool will be useful to both researchers and clinicians who seek to enhance current stimuli selection methods for treatment of anomia.