Development of the Japanese Auditory-Perceptual Rating of Connected Speech in Aphasia

Erika Parisien[1], Kiiya Shibata[2], Kazuki Sekine[3], Stephen M. Wilson[4], Gerasimos Fergadiotis[1], & Marianne Casilio[1,5]

[1]Portland State University, Portland, Oregon, USA
[2]Vanderbilt University Medical Center, Nashville, TN, USA
[3]Waseda University, Shinjuku, Tokyo, Japan
[4]University of Queensland, Brisbane, QLD, Australia
[5]VA Portland Healthcare System, Portland, Oregon, USA

Background

- **Aphasia is a common, debilitating communication disorder caused by damage to the language regions of the brain, most often from left hemisphere stroke[1].**
  - Aphasia strongly impacts quality of life[2,3] and is a critical component of care for speech-language pathologists.
- **Measuring connected speech (the sequencing of words and utterances to convey meaningful messages) in aphasia presents significant challenges, with limited standardized systems available for quantifying relevant behaviors that are clinically feasible[4].**
  - Despite Japanese being spoken by approximately 125 million people worldwide[5] with 460,300 speakers in the U.S., no validated systems currently exist for quantifying connected speech in Japanese-speaking individuals with aphasia.
  - Clinicians are limited in their ability to accurately evaluate and treat Japanese speakers with aphasia, highlighting a need for more culturally and linguistically diverse measurement systems.
- **Auditory-Perceptual Rating of Connected Speech in Aphasia (APROCSA)[6] is a comprehensive and time-efficient system for assessing relevant behaviors in English speakers with aphasia.**

Purpose

- To explore whether APROCSA could be validated for use with Japanese speakers with aphasia.

Methods

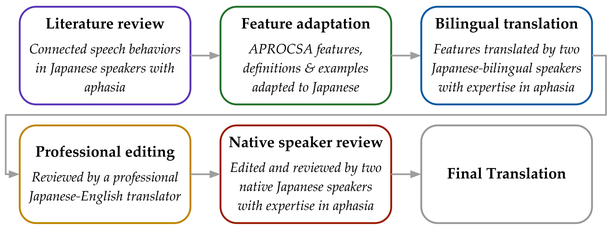
Participants and Procedures

- Data from nine monolingual Japanese speakers diagnosed with aphasia following a left-hemisphere stroke was extracted from a prior study[13].
- Audiovisual connected speech samples were collected following the AphasiaBank protocol[14] and clipped to contain the first three minutes of spontaneous speech, following our prior work[6,7].
- Samples were independently rated using APROCSA-J by authors EP and KiSh following standard APROCSA procedures[6].

Characteristic	Value
Age (years)	
Mean (SD), range	66.5 (7.6), 57.3–82.2
Education (years)	
Mean (SD), range	15.6 (2.5), 12–20
Race (%)	
Asian	100
Language (%)	
Japanese	100
Reported sex (%)	
Female	11.1
Male	88.9
Post-stroke onset (years)	
Mean (SD), range	10.5 (6.9), 0.3–23.3
WAB-R Aphasia Quotient (1–100)	
Mean (SD), range	76.7 (25.3), 13.8–92.4
Raven's Coloured Progressive Matrices Score (% Correct)	
Mean (SD), range	78.4 (11.4), 59.5–94.6
Not tested (%)	11.1
SLTA Naming (% correct)	
Mean (SD), range	85 (20.9), 50–100
Not tested (%)	11.1

Methods, cont.

APROCSA-J Development Procedure



Adapted Features

Original APROCSA Term	Original APROCSA Definition	Adapted term for APROCSA-J	Adapted Definition for APROCSA-J
Omission of bound morphemes	Inflectional (worked, slowest) or derivational (dishonest, drinkable) morphemes are not used when they should be. This includes collapsing an inflected verb to its present tense (e.g., saying *come* for *came*). Omission of these elements generally results in ungrammatical utterances (e.g., I am go to the store) and reduces the length and complexity of utterances.	Omission of particles	Particles are not used when they should be. Structural particles, particularly case particles are more likely to be omitted than nonstructural particles. Omission of these elements generally results in ungrammatical utterances and reduces the length and complexity of utterances.
Omission of function words	Function words (determiners, prepositions, pronouns, conjunctions, auxiliaries, etc.) are not used when they should be. Omission of these elements generally result in ungrammatical utterances (e.g., I going to the store).	Omission of predicates	Verbs with or without an obligatory object phrase are not used when they should be. Omission of these elements generally results in ungrammatical utterances and reduces the length and complexity of utterances.

Japanese Auditory Perceptual Speech Features of Connected Speech in Aphasia (APROCSA-J)

Anomia
Abandoned utterances
Empty speech
Semantic paraphasias
Phonemic paraphasias
Neologisms
Jargon
Perseverations
Stereotypies and automatisms
Short and simplified utterances
Omission of particles
Omission of predicates
Paragrammatism
Pauses between utterances
Pasues within utterances
Halting and effortful speech production
Reduced speech rate
Retracing
False start
Conduite d'approche
Target unclear
Meaning unclear
Off-topic
Expressive aphasia
Apraxia of speech
Dysarthria
Overall communication impairment

Scoring
Based on severity and frequency

Not Present (0) = not present or within the range of healthy, older speakers
Mild (1) = Detectable but infrequent
Moderate (2) = Frequently evident but not pervasive
Marked (3) = Moderately severe, pervasive
Severe (4) = Nearly always evident

Acknowledgements

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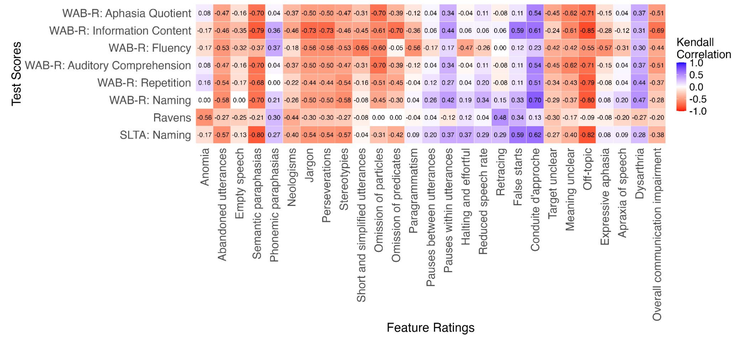
Results

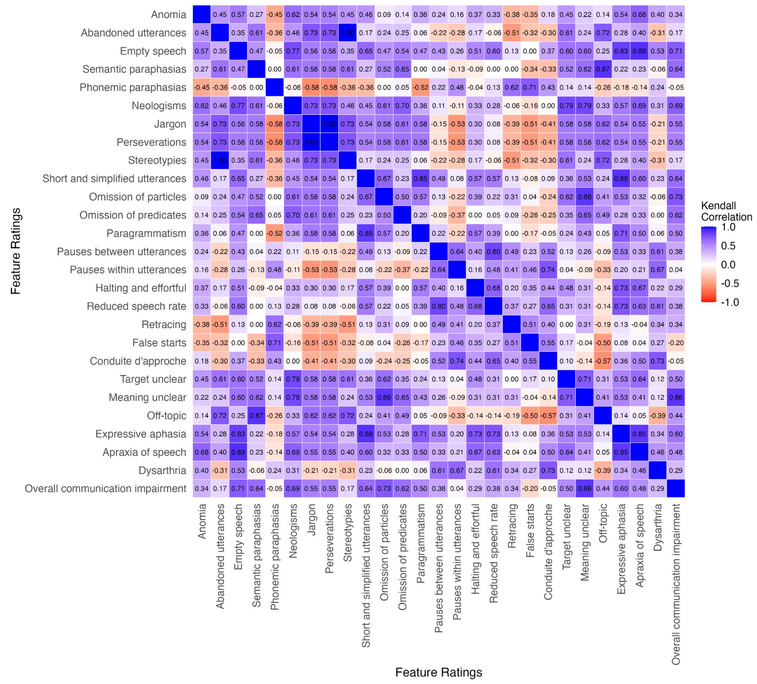
Interrater Reliability

- Interrater reliability was in the *fair* range (ICC: 0.532) with a 95% confidence interval that spanned the *fair*-to-*good* range with a 95% CI [0.415, 0.641].

Concurrent Validity



Dimensionality Exploration



Discussion

- **APROCSA-J shows good potential for quantifying connected speech in Japanese speakers with aphasia with:**
  - *Fair*-to-*good* reliability, only modestly reduced from prior reports on the original APROCSA[6,7]
  - Clearly interpretable associations among feature ratings and behavioral test scores, indicating *good* concurrent validity.
  - Clearly interpretable associations among feature ratings themselves.
- **Future directions for this project include:**
  - Backward translation of APROCSA-J features to English to ensure integrity of translation process.
  - Inclusion of additional experts and the creation of freely available consensus ratings[20].
  - Replicate and extend findings in a prospective study with a larger number of participants.
- **Results regarding APROCSA-J's utility are promising and warrant ongoing investigation.**