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Verb Tense Production Differences across Various Discourse Tasks in People with Nonfluent Aphasia

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Disclosure

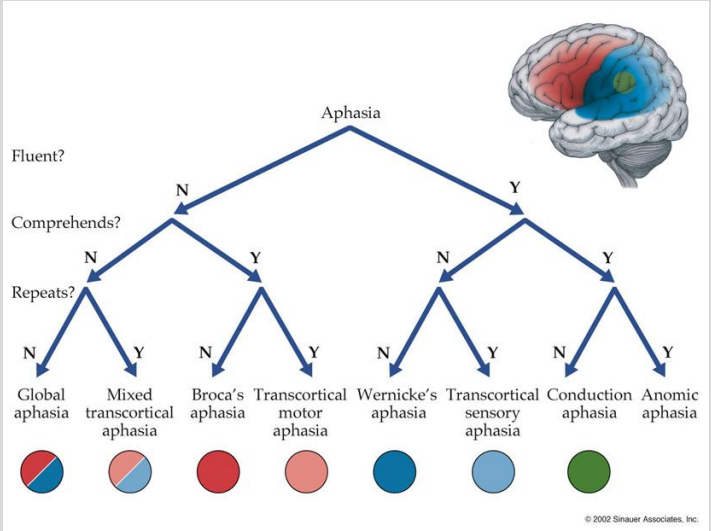
Dr. Park receives salary from the University of Mississippi, and there is no other financial or non-financial relationship to report.

Ms. Zurbrugg received travel scholarships from the Honors College at the University of Mississippi ($1,000) and from the Department of Student Affairs ($500). She has no non-financial relationship to report.

Introduction

Nonfluent Aphasia

- Acquired language disorder resulting from a lesion in the left hemisphere
  - Lesion in Broca's area, responsible for speech production
- Multiple types: Broca's, transcortical motor, and global aphasia
- Characterized by choppy speech with short utterances
- Comprehension not impaired
- Associated with agrammatism (difficulty with grammar and syntax) E.g., Verb morphological markings



Verb Tense Production Deficit

- More impaired verb tense than other morphological markers (Clahsen & Ali, 2009)

- Selective impairment of past tense
  - Requires more cognitive processing
    - Greater time between event and time of speaking (PADILAH)
  - Bos & Bastiaanse (2014) reported more impairment in past tense than non-past tense in people with aphasia in a sentence completion task

- Equivalent impairments between tenses
  - impairment in overall tense production in agrammatic aphasia but no consistent difference between tense (Faroqi-Shah & Friedman, 2015; Jonkers & Bruin, 2009).

Task Effects

- Task effects on the inconsistency:
  - Sentence production tasks with picture vs sentence completion tasks
    - Better tense production than comprehension due to freedom to choose verb form (Faroqi-Shah & Friedman, 2015)

- But, lack of discourse task effect evidence

Discourse

- Discourse is connected speech known as the language of daily life
- Methodological issues related to discourse task effects
    - Syntactic complexity (Glosser et al., 1988; Stark, 2019), lexical diversity (Fergadiotis & Wright, 2011; Stark, 2019), gesture (Stark & Cofoid, 2021), other linguistic variables.
    - Potential impact on tense production (Armstrong, 2000; Nerantzini et al., 2019; Stark, 2019)
        - Temporal organization of discourse
        - Instruction effects
        - Cognitive-linguistic demands

Current Study

Purpose: To investigate tense production between groups with and without nonfluent aphasia and different discourse elicitation tasks

Research Questions

1. whether people with nonfluent aphasia produce reduced verb tense compared to people without aphasia,
2. whether people with nonfluent aphasia are disproportionately impaired in past tense than present tense, and
3. whether reduction of verb tense production in people with nonfluent aphasia is different across discourse tasks

Methods

Participants

- Selected from AphasiaBank (MacWhinney et al., 2011)

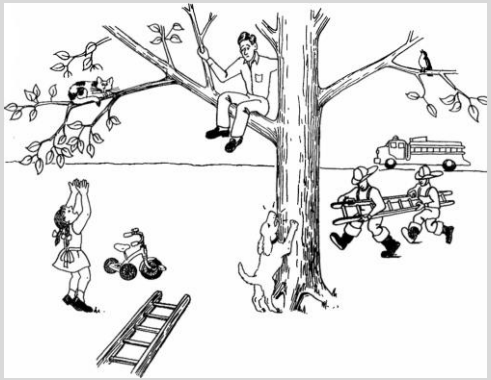
- 23 people with nonfluent aphasia (PWA-NF)
  - WAB AQ score between 25-75, Mean AQ = 58.60
  - 17 had Broca's aphasia and 6 had transcortical motor aphasia

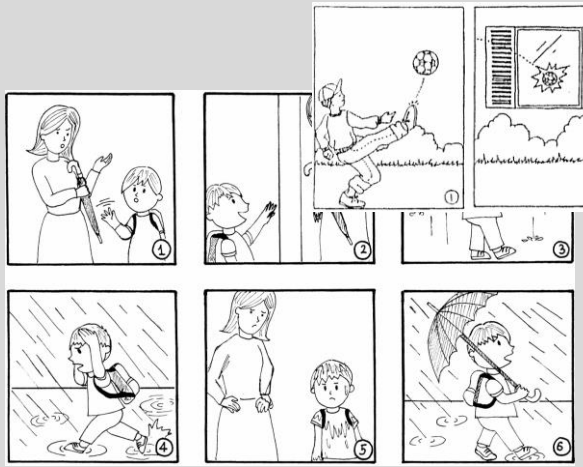
- 28 people without aphasia (PWOA)
  - Matched for age (65.02 for PWA-NF and 67.18 for PWOA) and years of education (14.17 for PWA-NF and 15.62 for PWOA)

- All participants were monolingual English speakers with adequate vision and hearing

Discourse Tasks

- Single picture description “Cat Rescue”
- Sequential picture descriptions “Refused Umbrella” & “Broken Window”
- Story retelling “Cinderella”
- Procedural “PBJ”
- Recount: Personal narrative “Important Event”





Verb Coding

- Include finite verbs (that mark for tense and agreement with a subject) in both main and subordinate/coordinate clauses

- Coded verbs for exclusion
  - “I guess” - not included because automatic/unrelated speech
  - “He wants to go” - “wants” is included but “to go” is excluded
  - “They are [/] they are fun” - only the last “are” would be included

- Coded verbs from each task into past, present, future, imperative, or unknown
  - Past: “He went there”
  - Present: “She likes that”
  - Future: “They will go”
  - Imperative: “Cut the sandwich”
  - Unknown: “I put it there” (ambiguous) or “He running” (error)

Analysis

- Coding reliability (between four researchers)
  - 94.05% for inclusion/exclusion of verbs for analysis
  - 95.02% for tense categorization

- Ratio of each tense type within each task
  - = # tense type / # total verbs

- Each ratio was compared by conducting a generalized mixed model and pairwise comparisons between groups and tasks

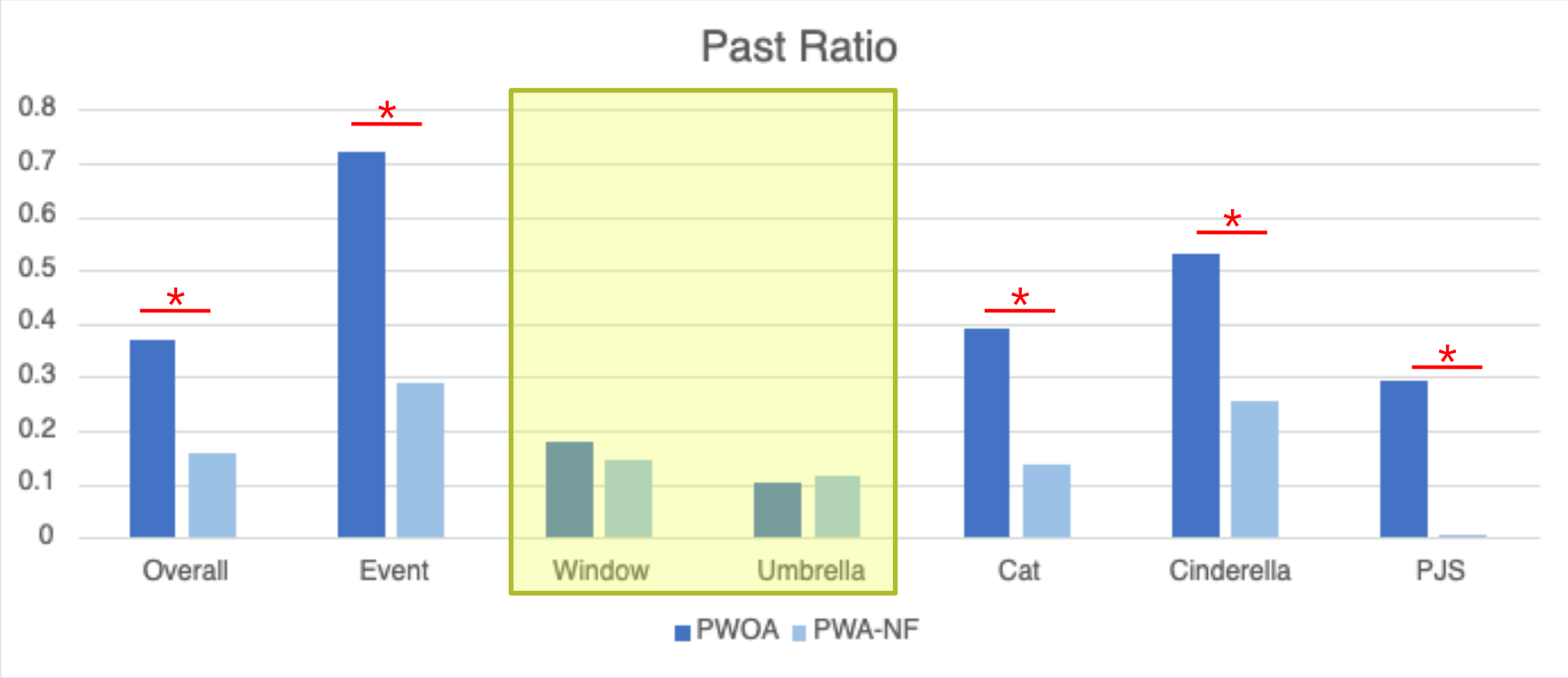
Results

Main & Interaction Effects

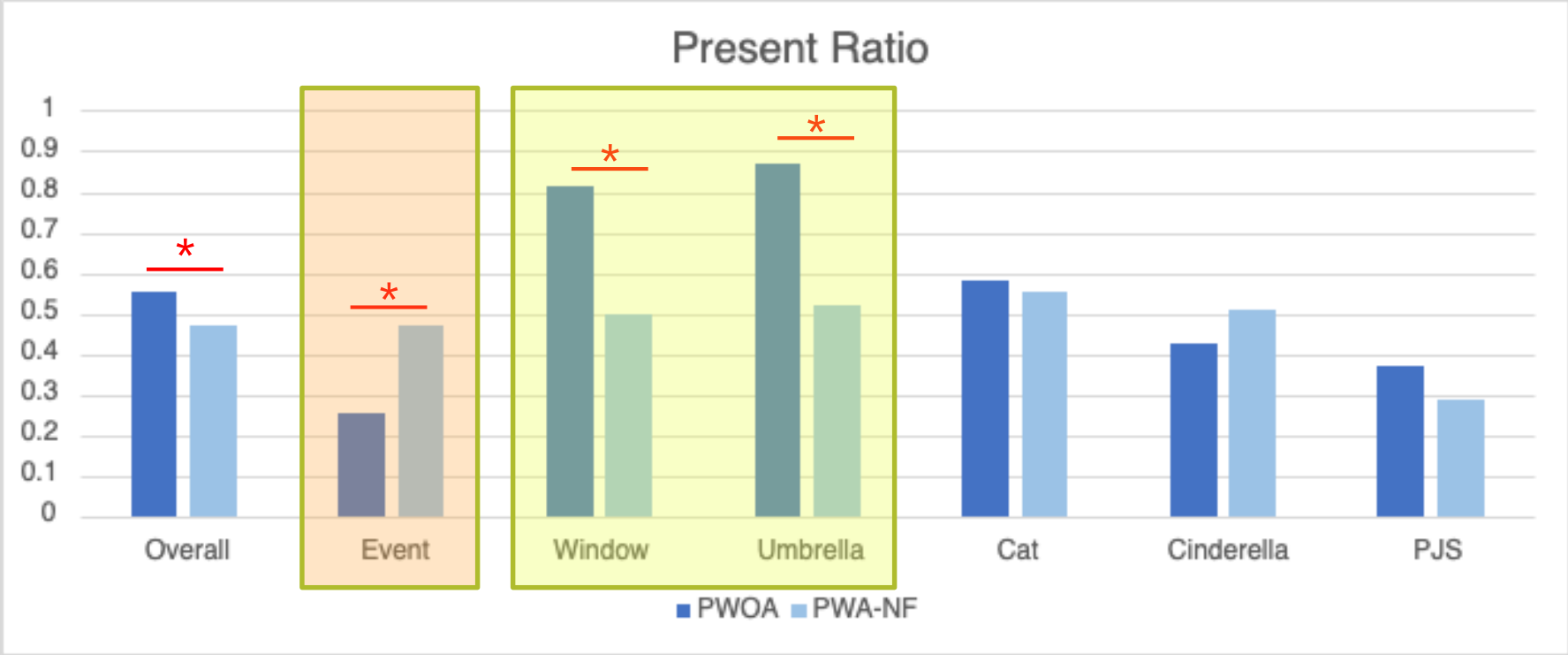
- Past ratio
  - Significant group effect, F(1, 288) = 45.748, p = .000
  - Significant task effect, F(5, 288) = 16.746, p = .000
  - Significant interaction, F (5, 288) = 4.870, p = .000
- Present ratio
  - Significant group effect, F(1, 299) = 4.104, p = .044
  - Significant task effect, F(5, 288) = 10.175, p = .000
  - Significant interaction, F (5, 288) = 5.420, p = .000
- Future ratio
  - Significant group effect, F(1, 288) = 12.523, p < .001
  - No task effect, F(5, 288) = 1.460, p = .203
  - No interaction, F (5, 288) = 1.083, p = .370
- Imperative ratio
  - Significant group effect, F(1, 288) = 34.647, p = .000
  - No task effect, F(5, 288) = .778, p = .378
  - No interaction, F (5, 288) = .384, p = .860
- Unknown ratio
  - Significant group effect, F(1, 299) = 30.015, p < .001
  - No task effect, F(5, 288) = 1.308, p = .261
  - Significant interaction, F (5, 288) = 2.317, p = .044

Group Comparisons

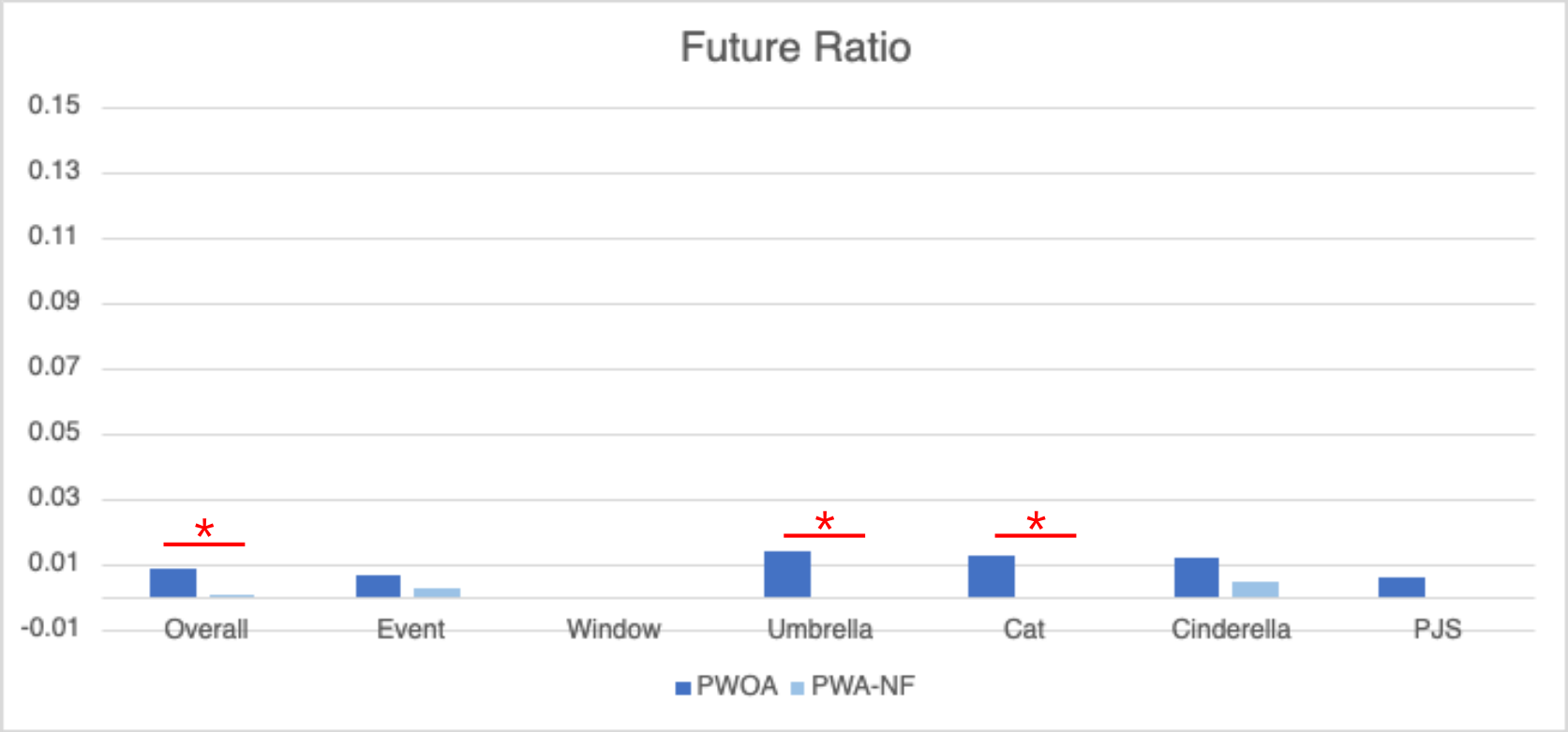
Past Tense Ratio Comparisons



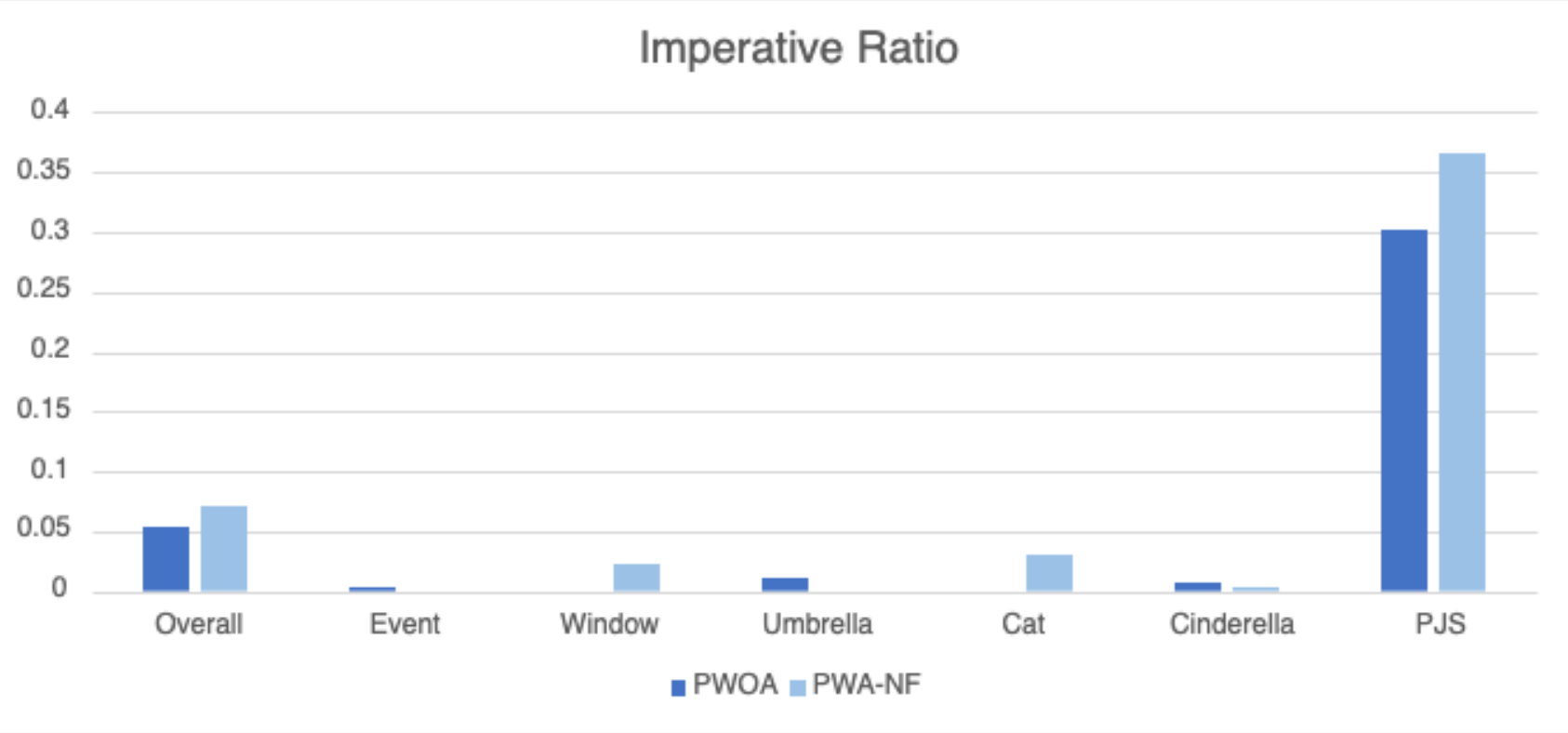
Present Tense Ratio Comparisons



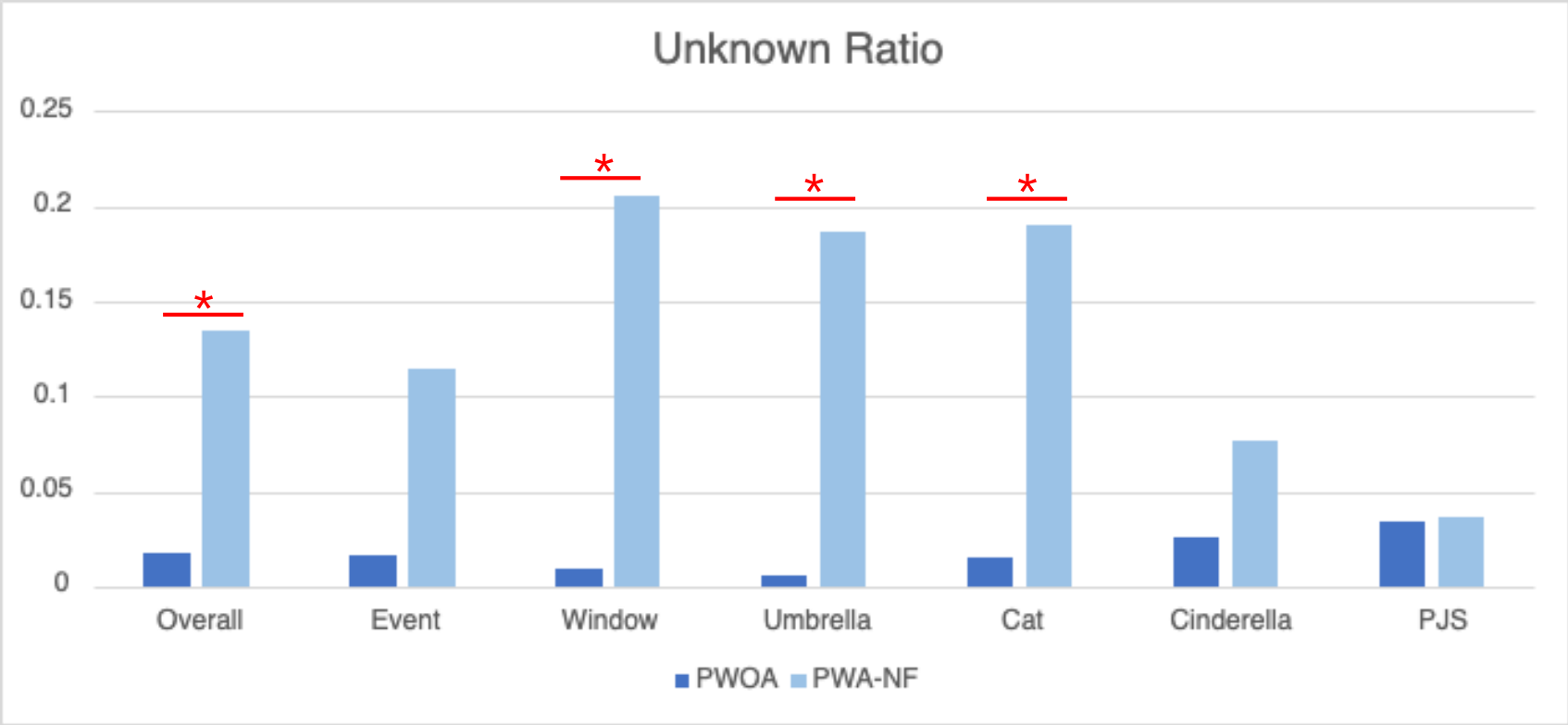
Future Tense Ratio Comparisons



Imperative Tense Ratio Comparisons

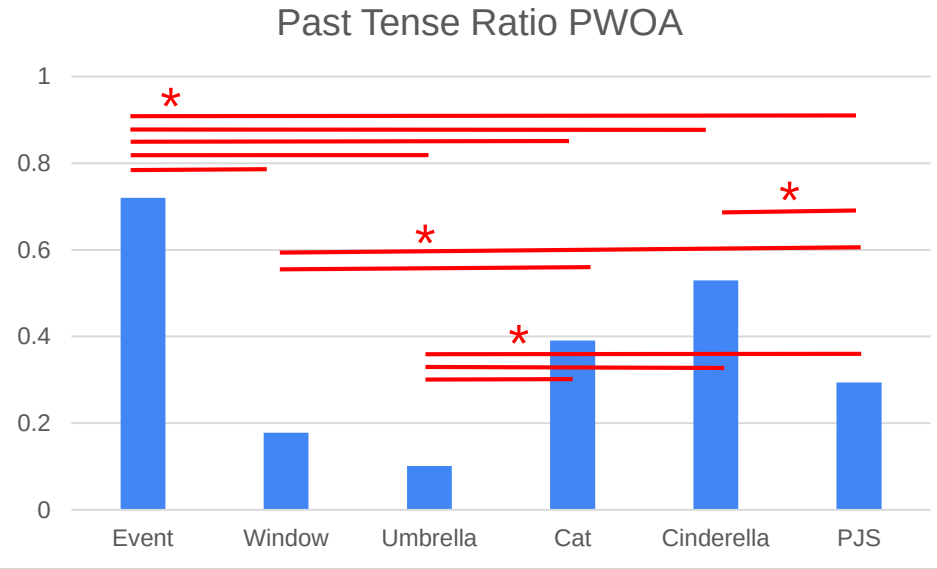


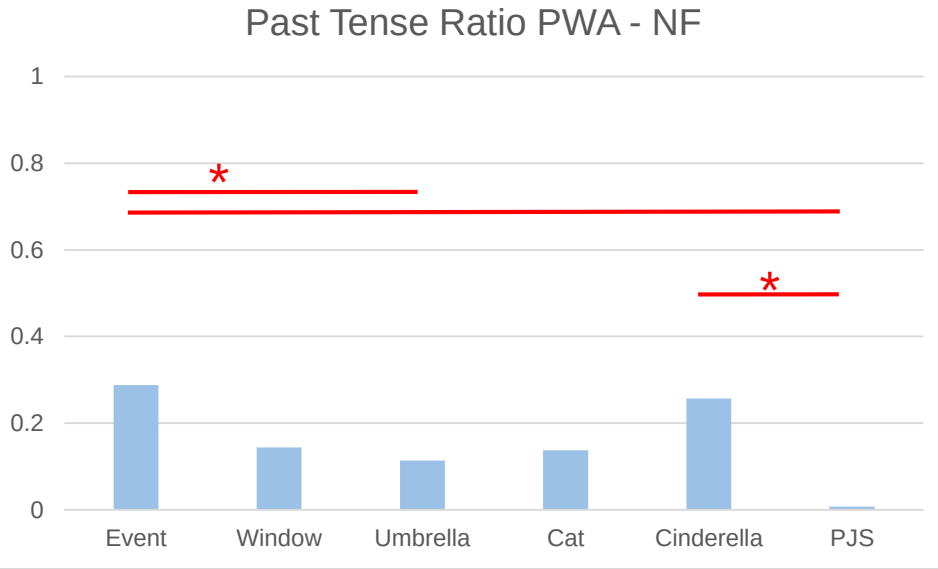
Unknown Tense Ratio Comparisons



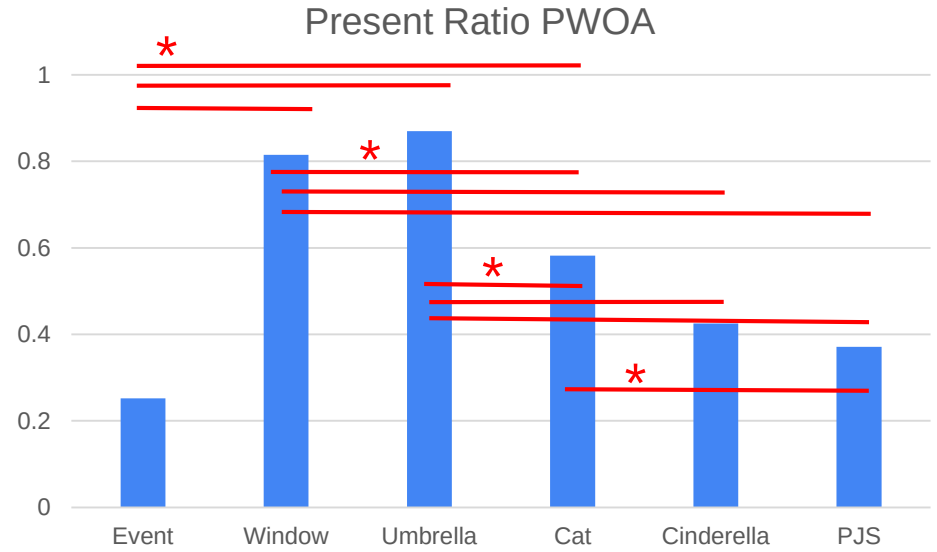
Task Comparisons

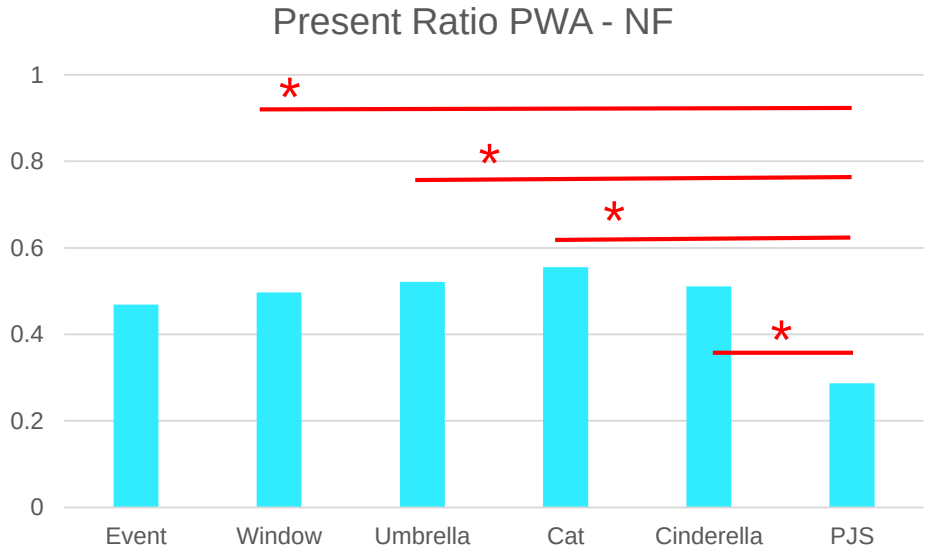
Past Tense Ratio Comparisons



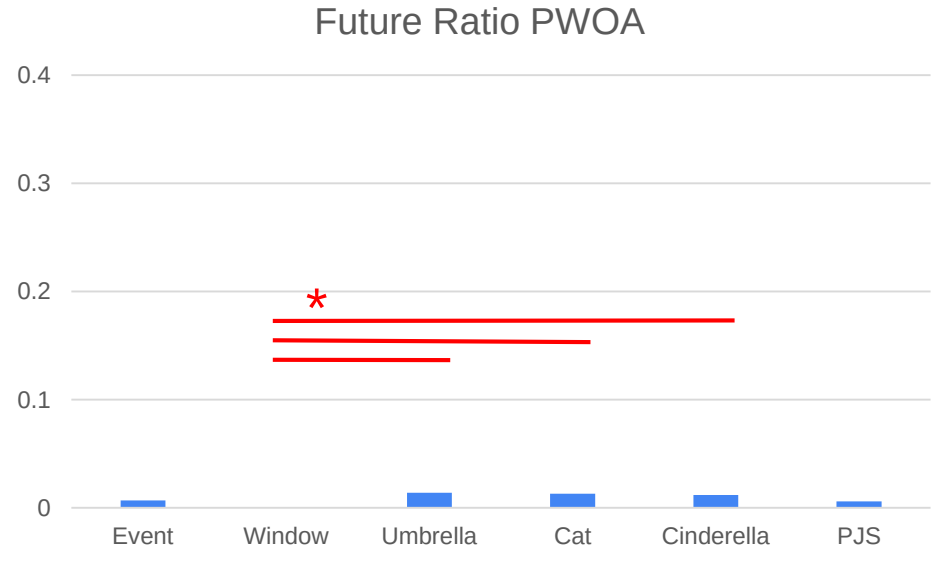


Present Tense Ratio Comparisons

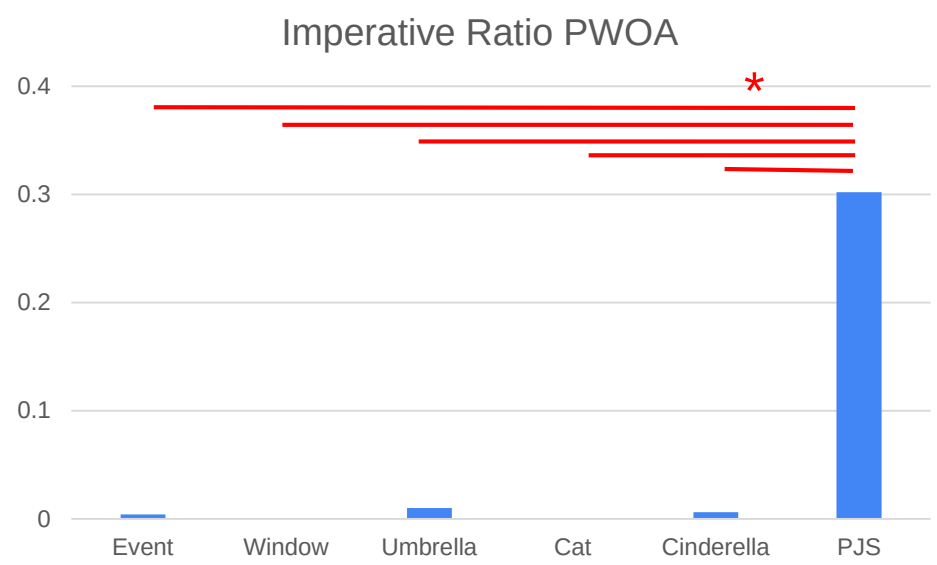


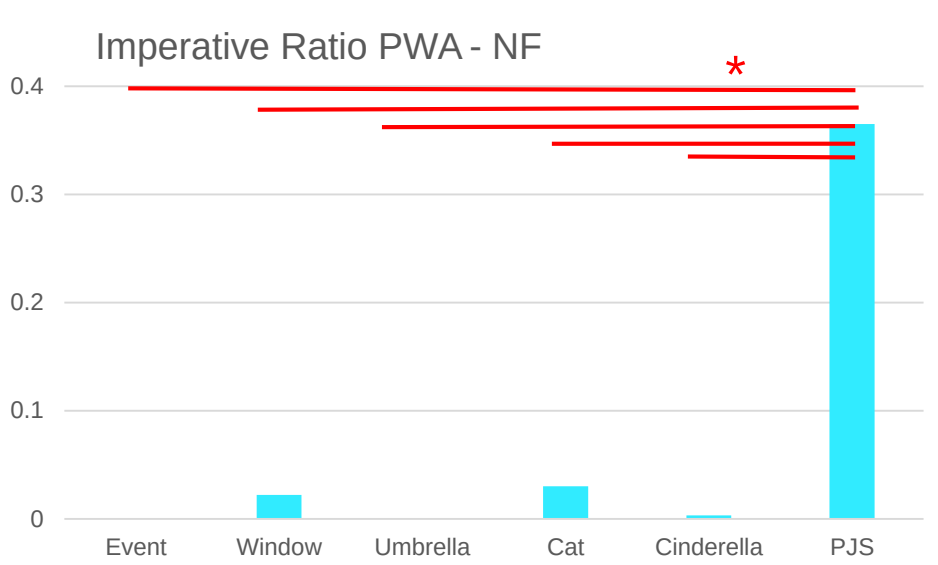


Future Tense Ratio Comparisons

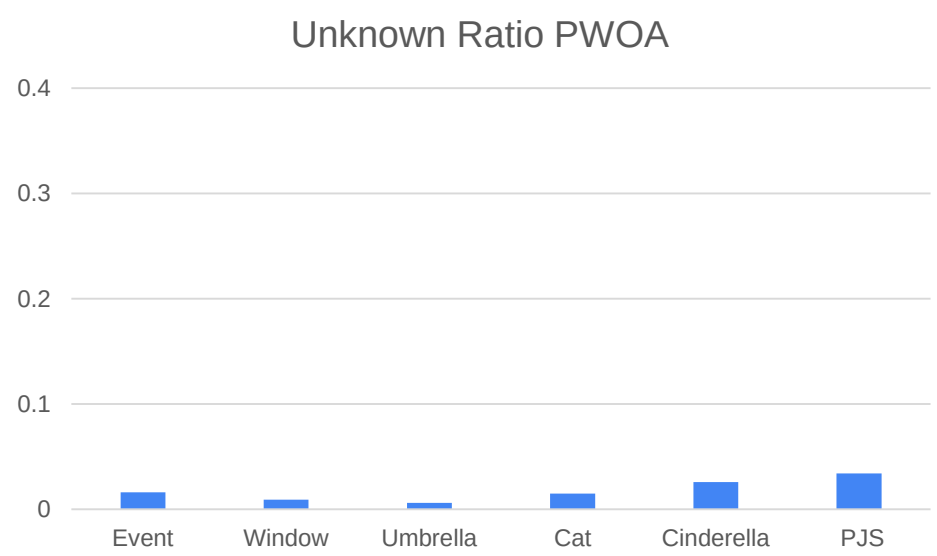


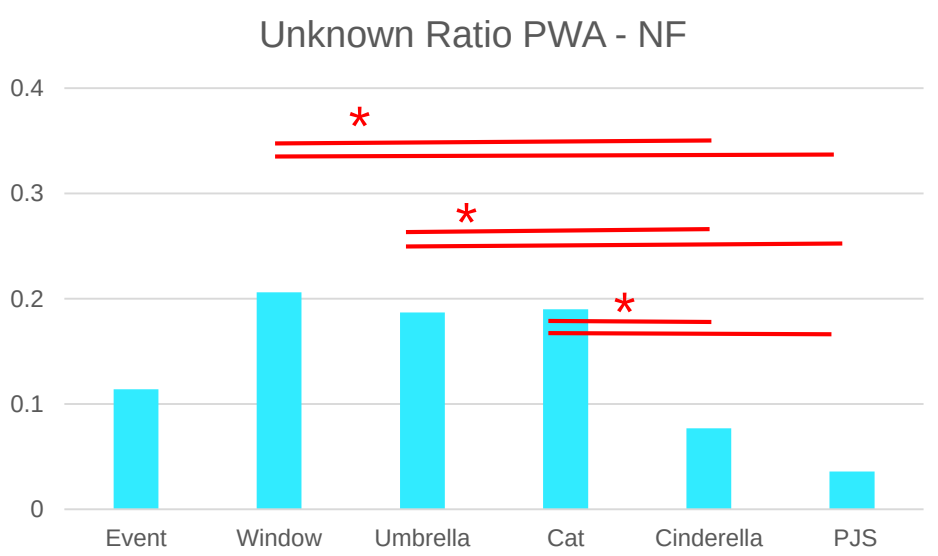
Imperative Tense Ratio Comparisons





Unknown Tense Ratio Comparisons





Discussion

Discussion

- Goals of the study: To investigate tense production across discourse tasks in people with and without nonfluent aphasia

  - Hypothesis 1. PWA-NF will produce less verb tense overall than PWOA: Supported
    - Overall past-, present-, and future-ratios were decreased in PWA-NF than PWOA

  - Hypothesis 2. Specific past tense deficit in PWA-NF: NOT supported
    - A lower past-ratio was shown in four tasks (all except Window and Umbrella) while reduced present- and future-ratios were shown in only two tasks.
    - Overall, similar impairments in past and present ratios

Discussion

- Hypothesis 3. Discourse task effect on tense production: Partially supported
  - Increased imperative ratio in PJS in both groups
  - Task effect seen in PWOA
    - More past tense in recount (Event) and storytelling (Cinderella)
    - More present tense in sequential picture descriptions
  - Limited task effects (floor effects) in PWA-NF
    - Trend of task effect: More reduction of the tense in a task where the tense is dominantly used in the task by PWOA
    - No evidence of the cognitive-linguistic demands of the task

Discussion

Significance

- Replicated overall verb tense impairments in PWA-NF in discourse
- Evaluated selective past tense impairment in PWA-NF in discourse
- Evaluated verb tense production in various discourse tasks

Clinical Implications & Future Directions

- Consider task effect when evaluating PWA
- Improved understanding of morphosyntactic difficulties in PWA-NF
- Limited in the use of discourse tasks for future tense
- Limitations - mood & aspect
- Future research could consider accuracy for tense production
- Investigate different types of verb tenses (regular vs irregular past tense)

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Thank you
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