Noun-Verb Dissociations in Aphasia: Exploring Performance Patterns Across Naming and Single Word Comprehension Tasks

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Introduction

Naming deficits are the most pervasive symptoms of aphasia, with recent research suggesting that verb retrieval is particularly challenging (Crepaldi et al., 2011; Mätzig et al., 2009; Thompson et al., 2012). The extent to which this processing difficulty is specific to naming has not been ascertained, with studies showing conflicting results for noun-verb dissociations in comprehension tasks (see Soloukhina & Ivanova, 2018). However, few studies have directly compared performance across the two word classes on naming and comprehension tasks with items matched on relevant psycholinguistic properties in large groups of people with aphasia (PWA). Thus, the goal of this study was to probe further the extent and the nature of these word class dissociations in aphasia.

Methods

Individuals with different types and severity of post-stroke aphasia (*N* = 77) completed the Russian Aphasia Test (RAT) (Ivanova et al., 2021), a comprehensive standardized aphasia battery. Here we focus specifically on performance on the four lexical-semantic subtests of the RAT: object/action naming and single-word comprehension of nouns/verbs. Each of the four tasks contained 24 items ranging in difficulty. The target stimuli across all four noun and verb tasks were matched on relevant psycholinguistic parameters (lexical frequency, imageability, age of acquisition, name agreement, image agreement, object/action familiarity, visual complexity), permitting direct comparison of performance within and across domains.

Results & Conclusions

Results of linear mixed modeling showed that performance on the naming tasks was more impaired compared to the comprehension tasks. Surprisingly, there was no significant effect of word class. That is, accuracy for both production and comprehension of nouns was similar to that of verbs, although numerically PWA performed slightly worse on the verb comprehension subtest relative to noun comprehension. Further, there was a significant interaction between aphasia severity (as determined by the overall performance on the RAT) and decrement in performance: participants with moderate and severe aphasia showed a greater disparity between comprehension and naming subtests. Cumulatively, we did not observe more pronounced verb processing deficits relative to that of nouns, indicating at least partly similar mechanisms underlying observed impairments.

Additionally, we investigated the interrelations between performance on these four subtests and sentence and discourse level subtests of the RAT by performing partial correlations between subtest scores accounting for aphasia severity. Performance on the naming and single word comprehension subtests was not significantly correlated. Interestingly, it was verb (but not noun) comprehension that was related to sentence and discourse level comprehension, underscoring the role of the verb as a central sentence element. Accordingly, this finding is in line with the hypothesis that verb grammatical properties are processed during comprehension and production of isolated verbs (Thompson et al., 2010), linking impairments at the single-verb and sentence levels. A similar significant relationship was observed between action naming and discourse production, with correlation between action naming and sentence production trending towards significance. Thus, while we were not able to uncover reliable noun-verb dissociations in performance on naming and comprehension tasks, we did observe that specifically verb processing deficits affected higher-level linguistic impairments in aphasia.

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