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Introduction

Linguistic productivity relies on the ability to compute morphologically complex hierarchical structures. This ability is mostly determined by accessing knowledge of selectional restrictions of roots and affixes. For instance, in a word such as *unsinkable* the prefix *un-* attaches to the complex adjective *sinkable,* not to the verb *sink* (thus, ruling out **unsink*). Conversely, in the case of *unlockable*, both morphological structures can be computed: [*un*[*lockable*]] "not able to be locked" or [[*unlock*]*able*] "able to be unlocked". As such, the correct parsing of these trimorphemic structures directly determines the derived meaning. Few experimental studies have investigated the parsing and interpretation of these types of words in isolation and in context (de Almeida & Libben, 2005; Libben, 2003; Libben, 2006; Pollatsek et al., 2010), with results pointing to either right- or left-branching preference, with factors such as context and frequency affecting later, not initial stages of analysis. We investigated morphological parsing in individuals with aphasia aiming to understand (a) whether there is a default parsing strategy, (b) how sentential-semantic context influences parsing preferences, and (c) the breakdown of morpho-semantic processing across different clinical groups of aphasia.

Methods

Participants were 12 individuals with aphasia (3 fluent [FL], 2 mixed [MX], 2 mixed but predominantly non-fluent [MN], 5 non-fluent [NF]). Controls were 30 healthy individuals matched in age, sex, and education to the clinical groups. All participants were native speakers of English. Stimuli consisted of 48 sentences containing ambiguous trimorphemic words (e.g., *unlockable*), with 24 biasing towards the left-branching, 24 towards the right-branching analysis of the trimorphemic word (e.g., '*When the zookeeper went to **unlock/lock** the cage, he found it was unlockable*'). In addition, materials included 24 sentences containing left-branching words ([[*refill*]*able*]) and 24 sentences containing right-branching words ([*un*[*sinkable*]]). These sentences were divided into two booklets, with each participant completing one booklet. Participants rated how good each sentence was on a 5-point scale (*Rating task*), and then were asked to indicate, by drawing a vertical line, where a separation could be made on a target word (*Parsing task*), which was always a word from the sentence presented below the rating scale.

Results

Correct parsing was analyzed by items considering word type (right-branching ambiguous, left-branching ambiguous, right-branching unambiguous, left-branching unambiguous) and group (controls, FL, MX, MN, NF), with repeated measures on the

second factor. A cut before the suffix was considered correct in the case of left-branching trimorphemic words (e.g., [[*unlock*]*able*] and [[*refill*]*able*]) and a cut after the prefix for right-branching words (e.g., [*un*[*lockable*]] and [*un*[*sinkable*]]). Results showed no significant main effect of group (F (4, 55) = 1.62, p = .18, η_p^2 = .11). However, both the MX and the NF groups differed significantly from the control group across most word types (see Figure 1).

Conclusions

Results are consistent with previous online experiments (de Almeida & Libben, 2005; Pollatsek et al., 2010) suggesting that the right-branching parse is preferred early in morphological analysis. Notably, the NF group shows the inverse effect, indicating that the morphological parser can be affected in non-fluent aphasia.

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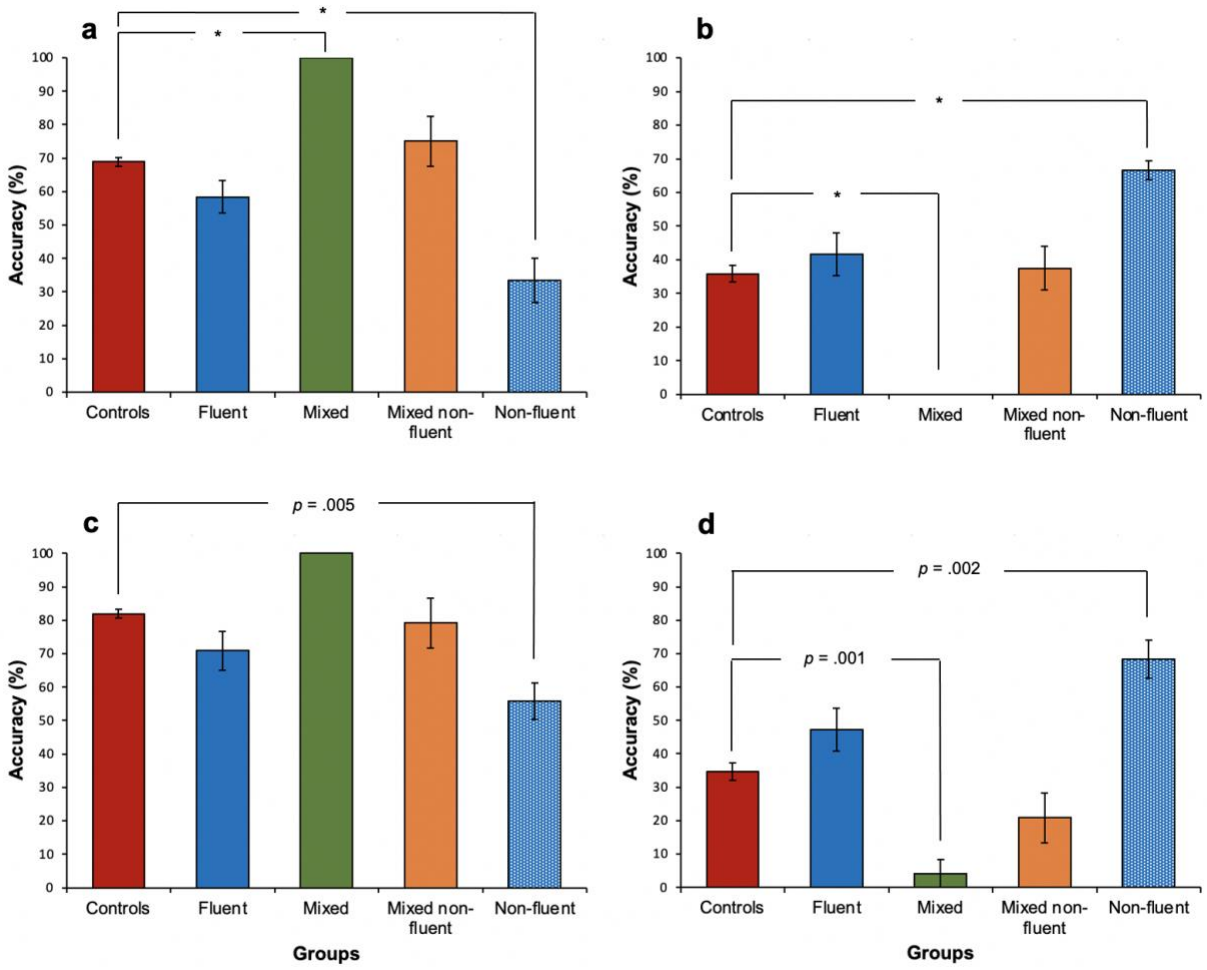

Figure 1. (a) Mean correct parsing (%) of ambiguous trimorphemic words in right-branching contexts as a function of group. (b) Mean correct parsing (%) of ambiguous trimorphemic words in left-branching contexts as a function of group. (c) Mean correct parsing (%) of right-branching unambiguous trimorphemic words as a function of group. (d) Mean correct parsing (%) of left-branching unambiguous trimorphemic words as a function of group.

* Denotes a significant difference ($p < 0.001$) between a group's mean accuracy compared to the control group.