Prosodic and motor impairment in Apraxia of Speech: A single-case study

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The disruption in Apraxia of Speech (AOS) may be ascribed to post-lexical planning levels (e.g., Aichert & Ziegler, 2004; Laganaro, 2012): At the interface between phonological and phonetic encoding, unimpaired speakers are hypothesized to retrieve stored, precompiled phonetic syllables that yield faster and more accurate motor programming, by bypassing a slower online segment-by-segment assembly procedure that is required for novel or rare syllables. Evidence for the storage of phonetic syllables stems from a number of experimental studies that show that healthy speakers produce high-frequency (HF) syllables faster than low-frequency (LF) syllables (e.g., Cholin, Dell, & Levelt, 2011; Croot, Lallas, Biedermann, Rastle, Jones, & Cholin, 2017). There are contradictory claims as to whether speakers with AOS can still retrieve stored syllable programs: (i) Varley, Whiteside, and Luff (1999) hypothesized that access to the syllable store is impaired in AOS and that HF syllables should have no production advantage over LF syllables. Consequently, they predict no difference in accuracy or in response time between HF and LF syllables in AOS. (ii) Contrary to this prediction, Aichert and Ziegler (2004) found significant syllable frequency effects in accuracy in German speakers with AOS and argued for a preserved access to phonetic syllables in AOS.

In a single-case study, we investigated syllable frequency effects in a female speaker of American English with pure AOS: While her phonological and neuromuscular abilities are largely intact, her deficit mainly concerns phonetic encoding and motor programming. Using well-controlled materials and a method that yielded significant syllable frequency effects in healthy speakers (Cholin et al., 2011; Croot et al., 2017), we tested DO's accuracy and naming latencies for HF and LF syllable productions in mono- and disyllabic pseudo-word strings. Overall, her accuracy data showed no difference between HF and LF syllables. Her latency data, on the other hand, showed clear syllable frequency effects in monosyllables and in disyllabic strings with the frequency manipulation on the first but not the second syllable (see Figure 1). This finding suggests that access to at least some HF syllables is intact in this speaker with AOS. Moreover, the pattern of syllable frequency effects in disyllabic pseudo-word strings mirrored that of healthy Dutch speakers who have been found to use syllable-sized prosodic planning units rather than the foot-sized units previously identified as a default planning unit in healthy English speakers using the same materials (Cholin et al., 2011; Cholin, Schiller, & Levelt, 2006). In summary, DO's production data suggest she can still retrieve HF syllables from the syllabic store, but that her integration of syllables into larger prosodic frames is impaired. DO is therefore forced to produce disyllabic words on a syllable-by-syllable basis, a frequently-seen pattern in speakers with AOS (e.g., Ziegler, 2008). The results are discussed against the background of a dual-route encoding model and prosodic planning processes. We agree with Maas and Mailend (2012) that, with some caveats, AOS latency data may inform accounts of AOS and psycholinguistic theories of unimpaired speech production.

Figure 1

![Graph showing syllable frequency and syllable structure in apraxia of speech.](https://www.frontiersin.org/10.3389%2fconf.fnhum.2017.223.00073/event_abstract)

References


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