

Word Imitation and Developmental Language Disorder

Developmental language disorder (DLD) impairs the learning, understanding, and use of spoken language, partly due to a rhythmic processing deficit. Research shows that children with DLD have higher thresholds for perceiving stress patterns that contribute to speech rhythm. Based on this, we hypothesized they would struggle to reproduce the rhythmic structure of words and phrases. This study was framed within the Temporal Sampling Framework (TSF), which proposes atypical sensory/neural processing of amplitude envelope (AE) cues at low modulation rates that carry prosodic information.

We examined word production from an AE perspective, as prior studies link AE difficulties to DLD. Specifically, we assessed how closely children's imitations matched target words in AE and pitch contour. Participants were 57 children aged 5-10: children with DLD (DLD, $n = 20$), age-matched controls (AMC, $n = 21$), and younger language controls (YLC, $n = 16$). They completed standardized language, phonology, and reading tests; an acoustic threshold task; a rhythmic tapping task; and a novel speech production imitation task with 30 familiar multisyllabic words (e.g., *alligator*). Production similarity was computed using correlation and mutual information.

Children with DLD showed reduced imitation of AE and pitch contour compared to AMCs. Word length effects were similar across groups, and repetition did not improve performance. Importantly, AE and pitch similarity correlated positively with phonological, oral language, and literacy measures. These findings support the TSF, indicating impaired processing of low-frequency amplitude and frequency modulations in DLD. The results highlight the diagnostic potential of multisyllabic word production measures. Intervention approaches targeting syllable stress and speech rhythm may enhance remediation. Aiding in the identification of the placement of strong and weak syllables, that constitute the rhythmicity of language, could also improve language outcomes. Intervention-based approaches that target language deficits early on, with emphasis on rhythm, would be a promising direction.

(300 words)

Keywords: developmental language disorder, amplitude envelope, pitch contour, prosody, acoustic processing

Figure 1

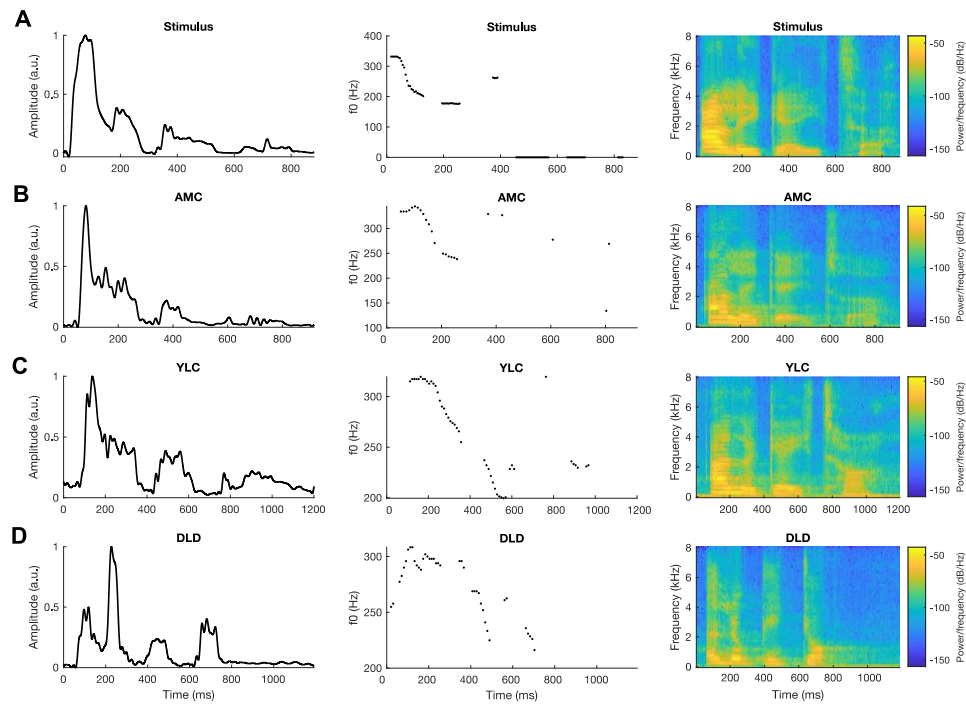


Figure 1. Depiction of the amplitude envelope and pitch contour for the word “alligator” showing the target stimulus and one representative participant respectively from the AMC, DLD, and YLC groups. The first column shows the amplitude envelope, the second column shows the pitch contour, and the third column shows the spectrogram.

References

Parvez, Lyla, Mahmoud Keshavarzi, Susan Richards, Giovanni M. Di Liberto, and Usha Goswami. “Imitation of Multisyllabic Items by Children With Developmental Language Disorder: Evidence for Word-Level Atypical Speech Envelope and Pitch Contours.” *Journal of Speech, Language, and Hearing Research* 67, no. 11 (2024): 4288–4303.