

Occurrence of Apraxia of Speech in Long-Term Aphasia Post-Stroke: A Bayesian Hierarchical Analysis

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Abstract

Apraxia of speech (AOS) is a motor speech disorder often co-occurring with aphasia following stroke, presenting challenges in communication rehabilitation. This study employs Bayesian hierarchical analysis to investigate the occurrence of AOS in individuals with long-term aphasia post-stroke. A systematic review identified relevant studies reporting on AOS prevalence in stroke survivors with persistent aphasia. Bayesian methods were applied to integrate data across heterogeneous studies, accounting for variability in sample characteristics and study designs. Findings suggest a prevalence estimate of approximately 30% for AOS among individuals with long-term aphasia. Factors influencing AOS occurrence include lesion location, severity of stroke, and individual variability in recovery trajectories. Clinical implications highlight the importance of tailored interventions targeting motor speech deficits. Bayesian hierarchical analysis provides a comprehensive approach to understanding AOS within the context of long-term aphasia, informing therapeutic strategies and enhancing outcomes for affected individuals.

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intensive therapy. Bayesian hierarchical analyses allow researchers to account for this heterogeneity, providing nuanced insights into predictors of AOS persistence or improvement.

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Understanding the prevalence and characteristics of AOS in long-term aphasia informs clinical practice and therapeutic approaches. Speech-language pathologists (SLPs) can tailor interventions to target specific deficits in motor planning, coordination, and articulation associated with AOS. Evidence-based treatments such as integral stimulation therapy or Melodic Intonation therapy (MIT) may be particularly effective for individuals with AOS within the context of aphasia. Bayesian hierarchical analyses guide the development of treatment protocols by identifying subgroups most likely to benefit from different therapeutic approaches.

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The occurrence of apraxia of speech in individuals with long-term aphasia post-stroke is a multifaceted phenomenon influenced by lesion characteristics, neuroplasticity, and individual recovery trajectories. Bayesian hierarchical analyses provide a robust framework for estimating prevalence, identifying predictive factors, and guiding therapeutic interventions. Continued research utilizing advanced statistical methods will further refine our understanding of AOS within the broader spectrum of aphasia recovery, ultimately improving outcomes and quality of life for stroke survivors affected by these complex communication disorders. The variability in AOS prevalence observed across studies underscores the complex interplay of factors influencing its manifestation, including lesion location, stroke severity, and individual differences in neuroplasticity. Bayesian hierarchical methods proved invaluable in integrating heterogeneous data sources, offering more precise estimates while accounting for study-specific variations and biases. Clinical implications of these findings highlight the importance of tailored interventions targeting motor speech deficits in individuals with AOS and long-term aphasia. Therapeutic

approaches such as integral stimulation therapy or Melodic Intonation therapy (MIT) may be particularly effective in improving speech fluency and articulatory precision. Further research is warranted to explore longitudinal trajectories of AOS recovery and the efficacy of intervention strategies in enhancing long-term communication outcomes. Advances in neuroimaging techniques and comprehensive assessment tools will continue to refine our understanding of AOS within the broader spectrum of aphasia recovery.

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