

AI and Aphasia in the Digital Age: A Critical Review

Brendan Stuart Weekes

*Faculty of Education, The University of Hong Kong
Melbourne School of Psychological Sciences, University of Melbourne*

Aphasiology has a long and rich tradition of contributing to understanding how culture, language, and social environment contribute to brain development and function. Recent breakthroughs in AI can transform the role of aphasiology in the digital age by leveraging speech data in all languages to model how damage to specific brain regions impacts linguistic universals such as grammar. These tools, including generative AI (ChatGPT) and natural language processing (NLP) models, could also inform practitioners working with clinical populations in the assessment and treatment of aphasia using AI-based interventions such as personalized therapy and adaptive platforms. Although these possibilities have generated enthusiasm in aphasiology, a rigorous interrogation of their limitations is necessary before AI is integrated into practice. We explain the history and first principles of reciprocity between AI and aphasiology, highlighting how lesioning neural networks opened the black box of cognitive neurolinguistic processing. We then argue that when more data from aphasia across languages become digitized and available online, deep learning will reveal hitherto unreported patterns of language processing of theoretical interest for aphasiologists. We also anticipate some problems using AI, including language biases, cultural, ethical, and scientific limitations, a misrepresentation of marginalized languages, and a lack of rigorous validation of tools. However, as these challenges are met with better governance, AI could have an equitable impact.