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THE MAIN ISSUES OF NEUROLINGUISTICS IN THE LANGUAGE TEACHING PROCESS

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Abstract.

Neurolinguistics provides important evidence about how the brain processes language, yet applying those findings in classrooms faces scientific, methodological, and practical limits. This review identifies four core obstacles to integrating neurolinguistic knowledge into language pedagogy: inter-learner neural variability, the distributed and dynamic nature of language networks, persistent neuromyths and misinterpretations, and the difficulty of translating laboratory results into classroom-relevant strategies. Addressing these challenges—through teacher training, interdisciplinary research, and ecologically valid studies—can improve instructional design and better support learners with diverse cognitive profiles.

Keywords: neurolinguistics, language teaching, neural variability, neuromyths, educational neuroscience, pedagogy

Introduction

Neurolinguistics examines the neural bases of language comprehension, production, and acquisition. Advances in neuroimaging (fMRI, EEG/MEG) and computational methods have deepened our knowledge of phonological, syntactic, semantic, and bilingual processing. Consequently, educators and policy makers have shown interest in "brain-based" approaches to teaching. However, moving from neural description to pedagogical prescription is not straightforward. This paper reviews the principal impediments to applying neurolinguistic findings in language classrooms and outlines directions for closing the research–practice gap.

Methods

The paper is a thematic literature review drawing on research from neurolinguistics, cognitive neuroscience, second-language acquisition, educational neuroscience, and applied linguistics. Sources include foundational empirical studies, theoretical reviews, and critical perspectives on the application of neuroscience to education. Findings were synthesized into themes representing the major barriers to effective classroom translation.

Results — Key Issues

1. **Neural variability among learners.**
   Neuroanatomy and functional organization for language vary widely across individuals. Factors such as age of acquisition, proficiency, bilingual exposure, and neurodevelopmental differences produce diverse neural profiles (Friederici, 2011). This heterogeneity undermines one-size-fits-all "brain-based" prescriptions.

2. **Complexity of language networks.**
   Contemporary neuroscience locates language function in distributed, interacting networks rather than single, isolated modules (Hickok & Poeppel, 2007). Phonology, syntax, semantics, attention, and memory are interdependent, which complicates efforts to design interventions that target single neural "centers."

3. **Misinterpretations and neuromyths.**
   Oversimplified claims—e.g., rigid left-brain/right-brain dichotomies or fixed critical-period dogmas—persist among educators (Howard-Jones, 2014). Such neuromyths distort expectations and may lead to ineffective or even harmful instructional choices.

4. **Limited translation to pedagogy.**
   Many neurolinguistic studies are experimental, use small or highly selected samples, and lack classroom realism. Translating lab findings into scalable, classroom-tested methods requires ecological validity, longitudinal designs, and collaboration with teachers (Nation & Macalister, 2020).

Discussion

These issues highlight a fundamental asymmetry: neuroscience can show *how* language is processed but rarely prescribes *how* to teach. Practical implications include:

- **Differentiation over universal recipes.** Neural variability argues for flexible, learner-centred pedagogy rather than fixed "brain drills."

- **Multidimensional instruction.** Because language processing is networked, pedagogy should integrate phonological, lexical, syntactic, memory, and attentional supports rather than isolate skills.

- **Evidence-informed teacher education.** Teacher training must distinguish robust neuroscientific findings from myths and provide guidance on interpreting research responsibly.

- **Bridging research and classrooms.** Researchers should prioritize ecologically valid studies (e.g., classroom interventions with neural and behavioural measures, larger and more diverse samples) and co-design studies with educators.

Neurolinguistics can nonetheless inform pedagogical principles—such as the value of meaningful input, spaced repetition to leverage plasticity, multimodal encoding to support memory, and scaffolding to reduce working-memory load—even when it cannot deliver turnkey classroom programs.

Conclusion

Neurolinguistics offers valuable insights but applying them in language teaching requires caution and collaboration. Overcoming neural variability, the distributed nature of language networks, pervasive neuromyths, and the translational gap calls for interdisciplinary research, improved teacher education, and classroom-anchored studies. When combined with sound pedagogical theory, neuroscience can enrich rather than replace established instructional practice and help tailor support for learners with diverse cognitive profiles.

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