

Differences in Brain Activation Between Chinese and English Readers: A Meta-analysis Comparing Lexical Decision Task and Word Naming Task

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INTRODUCTION

Theoretical Background

- Task dependency on **lexical decision task (LDT)** and **word naming task (NAM)**
- Differences in writing systems and phonological structures between **Chinese** and **English reading**

Research Goal

- Conducting a **meta-analysis** to directly contrast **Chinese and English word reading of LDT and NAM**
- Evaluating how the writing system (square characters vs. alphabetic words) modulate task-specific brain activation

METHOD

Literature selection

- 56 fMRI/PET studies on Chinese & English word reading (1994–2025, PubMed)
- Inclusion criteria:
 - Whole-brain analysis
 - Reported MNI/Talairach coordinates
 - Healthy adult native speakers
 - Stimuli: Chinese single-/two-character words or English multisyllabic words

Data Analysis

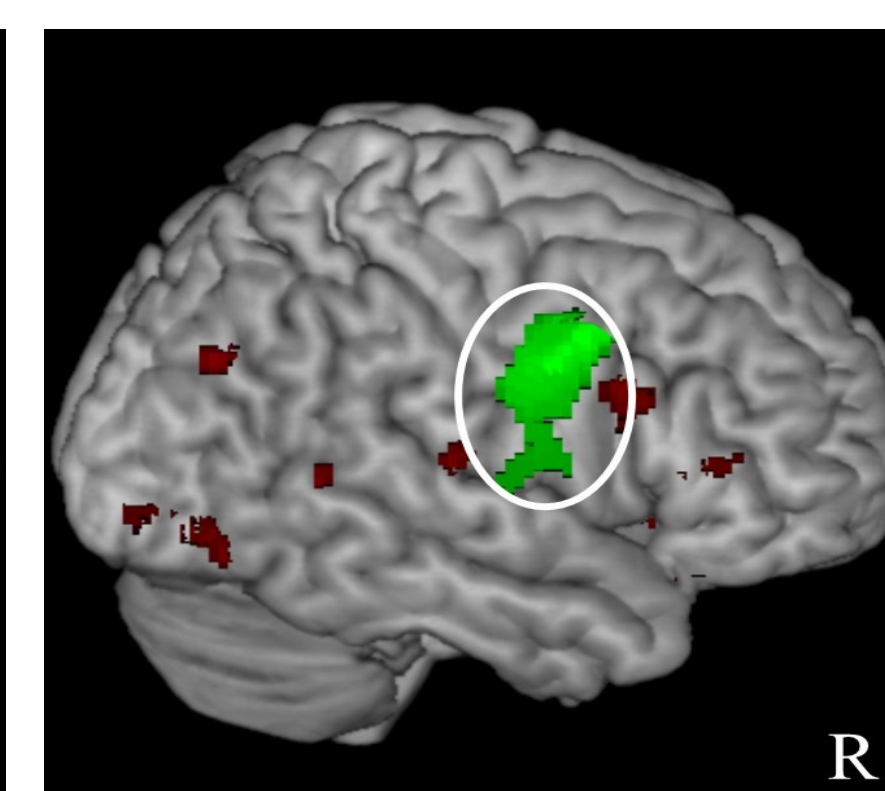
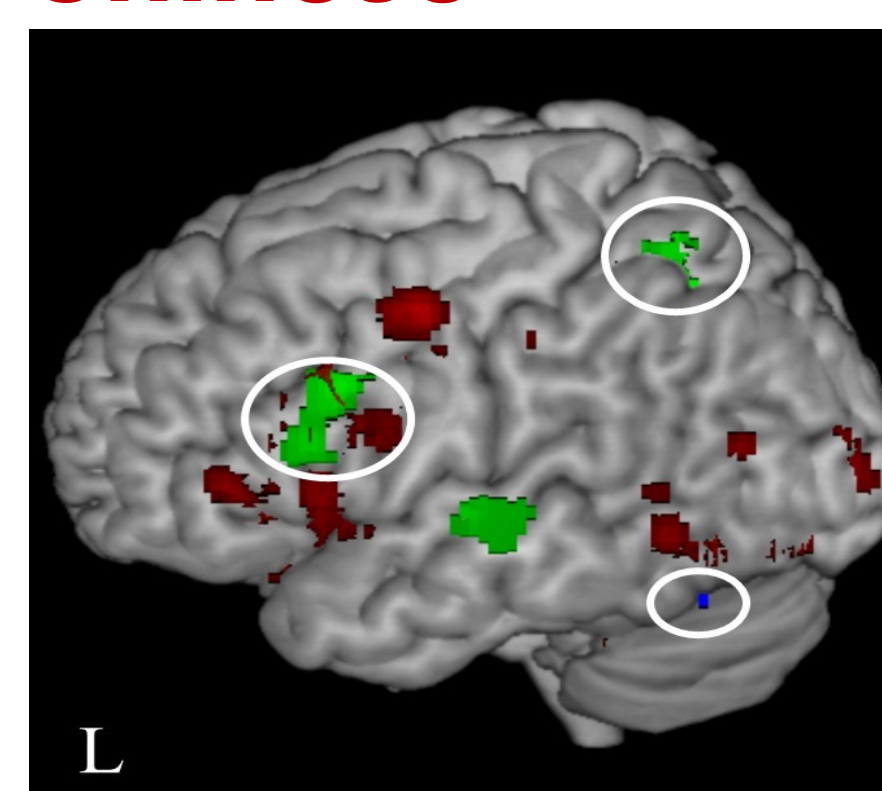
- Contrasts categorized at **LDT** and **NAM** for cross-language comparison
- GingerALE used to estimate convergence across studies
- Subtraction & conjunction analyses ($p < .01$, 10,000 permutation-corrected, minimum cluster size = 100 mm³)

RESULTS

Task Dependency

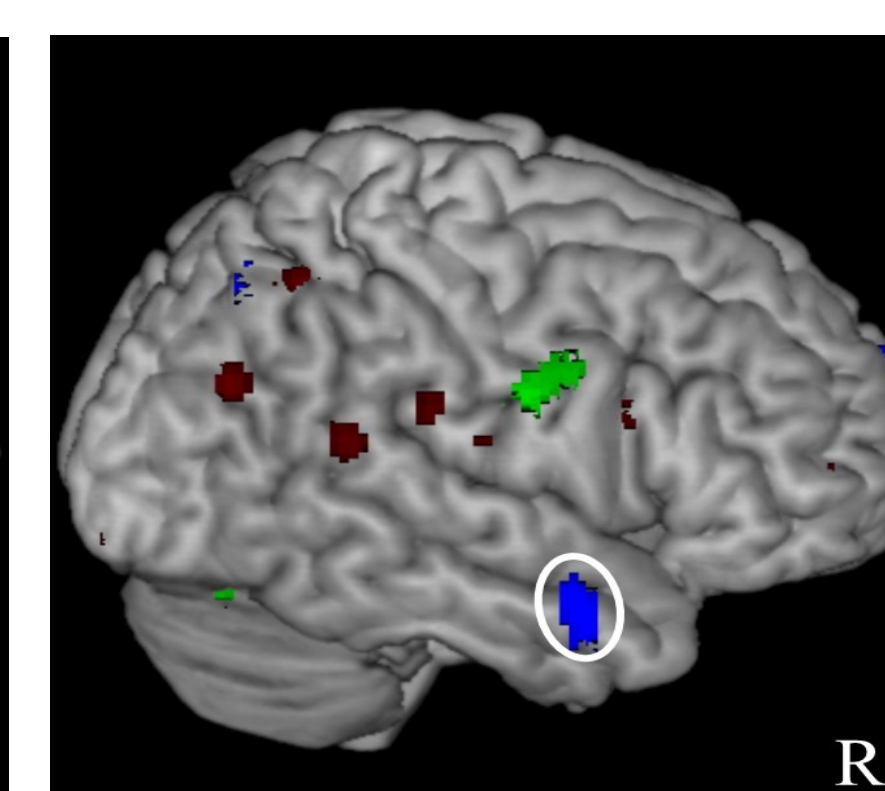
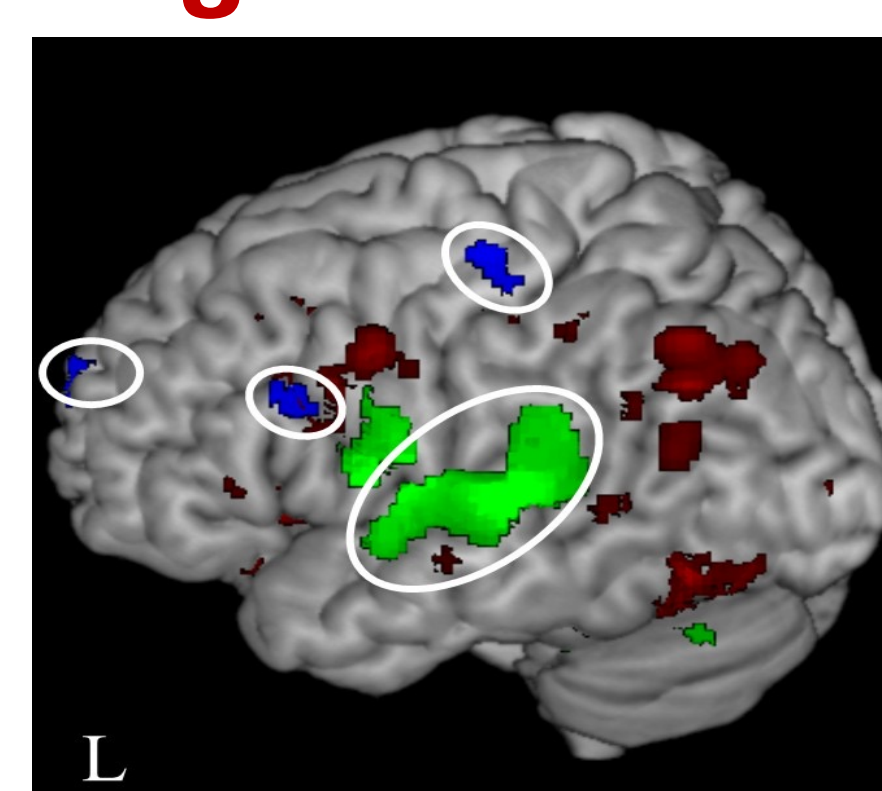
■ LDT & NAM
■ LDT > NAM
■ NAM > LDT

Chinese



- Common: left MFG, SFG, bilateral FG, lingual gyrus
- LDT: cerebellum
- NAM: left IFG, SPL, precuneus, right precentral gyrus

English

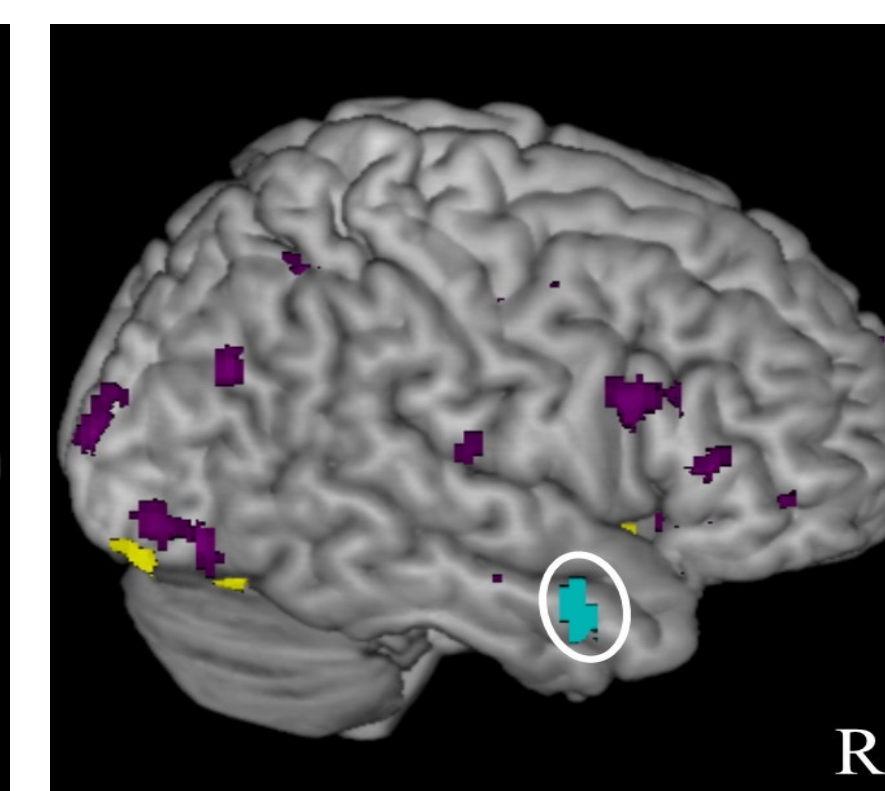
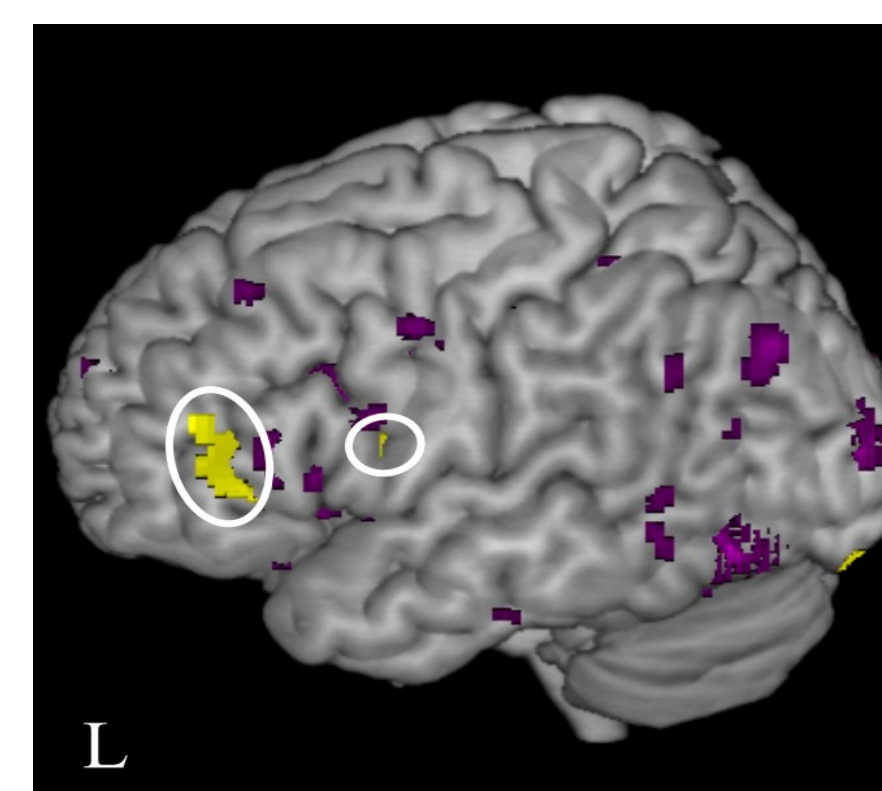


- Common: left FG, IFG, ACC
- LDT: left SFG, MFG, IPL, right MTG
- NAM: left STG, precentral gyrus

Cross-language

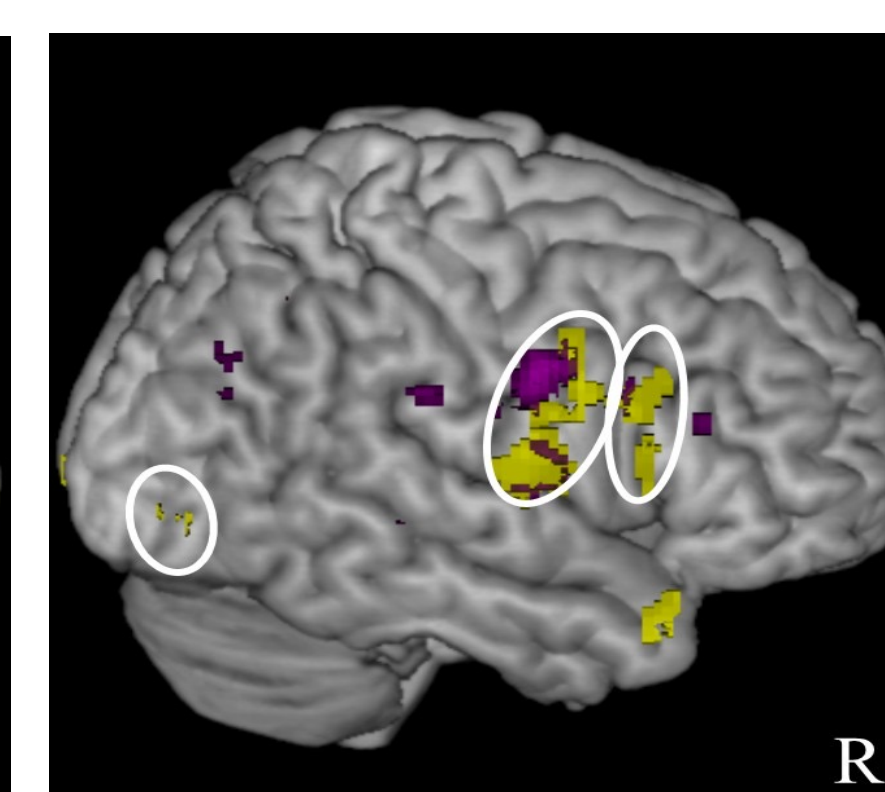
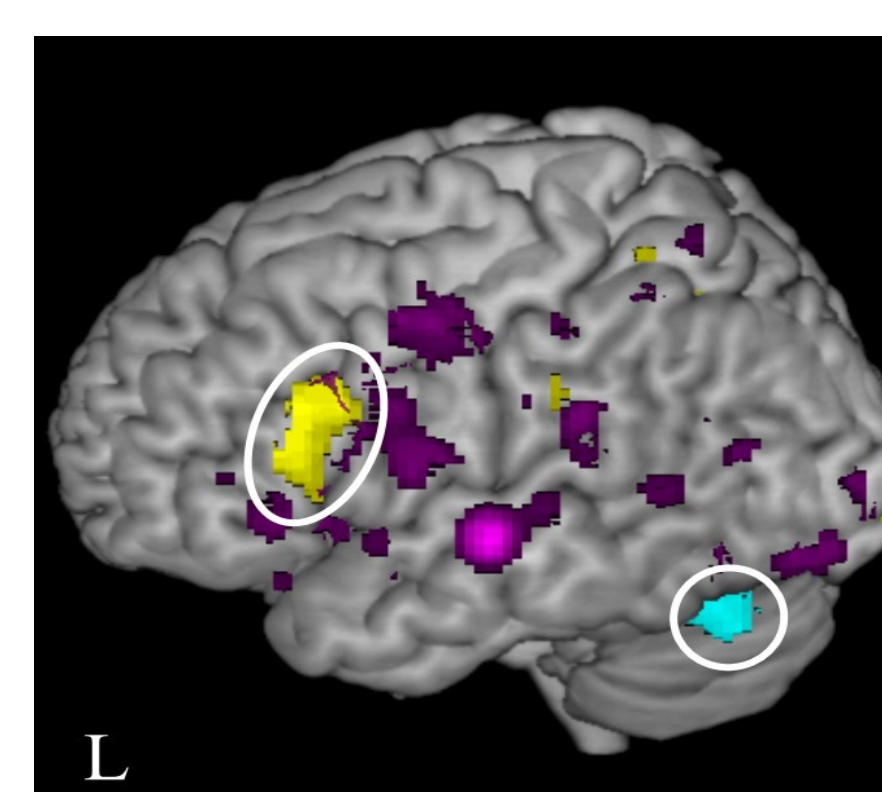
■ Chinese & English
■ Chinese > English
■ English > Chinese

LDT



- Common: left IFG, bilateral FG
- Chinese: left MFG, IFG
- English: right MTG

NAM



- Common: left STG, precentral gyrus
- Chinese: left MFG, AG, right lingual gyrus, MFG, IFG
- English: cerebellum

CONCLUSION

- We reveal distinctive neural involvement in different word reading tasks between Chinese and English.
- Chinese readers tend to recruit broader processing regions in both **LDT** and **NAM** in addition to a general **fronto-temporo-parietal reading network**.

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