Speaking words in two languages with one brain: Neural overlap and dissociation

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Research design

Independent variable:
- Overt word production task in L1 and L2

Dependent variable:
- Neural overlap and dissociation
Research design: Why?

- Word production in L1 and L2:
  - common neural system?
  - specific brain regions for each lg.?

- Previous studies:
  - no neural differences
  - increased activation frontal regions in L2

- Inconsistent results:
  - AoA / proficiency?
  - CNT
Research design: *What?*

- Overt Naming Task
- Neural basis underlying WP in L1 and L2

**Aim:**
- Potential differences in neural correlates of WP in L1 and L2
- Common neural basis → localization (conjunction analysis)
Research design: *How?*

**Participants**
- 24 unbalanced Chinese-English bilinguals
- Chinese from birth; English at 12
- Self-rating scores (10-point scale)

**Stimuli**
- Language production: Overt NT (either L1 or L2)
- Baseline: passively view screen
- Instructions in Chinese

**Neuro-imaging techniques**
- fMRI (event-related to minimize movement artefacts)
Results

- **Behavioral:**
  More errors in L2 than L1

- **fMRI:**
  Increased activation LIFG in L2
  ➞ WP in L2 less automatic; more neural resources needed

  More right-lateralized activation of putamen and GP in L1
  ➞ difference phonological features between Ch. & Eng.
Conclusion

“The conjunction analysis revealed that a broad bilateral neural network is involved in both L1 and L2 word production” (Liu et al, 2009:80)
Further research

- ONT instead of CNT
- Late unbalanced bilinguals

→ Age of acquisition or proficiency more related to neural differences in WP in L2?
Relevance

Science:
- Contradicts previous findings
- ONT instead of CNT ➔ innovative
- Important basis for further research

Language teaching:
- Proficiency
- How L1 and L2 are used
- Start earlier with English as L2
Criticism

-Self rating scores: reliability?
-Instructions in Chinese only: can it influence the choice of language of the participants during the ONT?
-No data about the language choice of the participants during the ONT.