From Words to Stories: Engagement of language-specific and domain-general neural mechanisms in native and second language comprehension

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INTRODUCTION

There are well-documented differences in how a native (L1) and a second language (L2) are processed in the brain [1]. These differences are associated with:

- increased cognitive control demands in L2 compared to L1 (e.g., [2])
- o differences in L1 and L2 representations in the brain [3,4]

These differences have been attributed to language-specific or domain-general mechanisms, however, limited number of studies used precision fMRI to disentangle domain-general and language specific contributions

- ? How is the native and non-native language processing reflected in language and domain-general networks?
- ? Are there regions outside of language and domain-general networks that respond differently to L1 and L2?

Previously, L2 > L1 differences were mostly studies using single-word stimuli

? Are differences between languages similar in single words and more complex utterances?

METHODS: design

31 Polish-English bilinguals

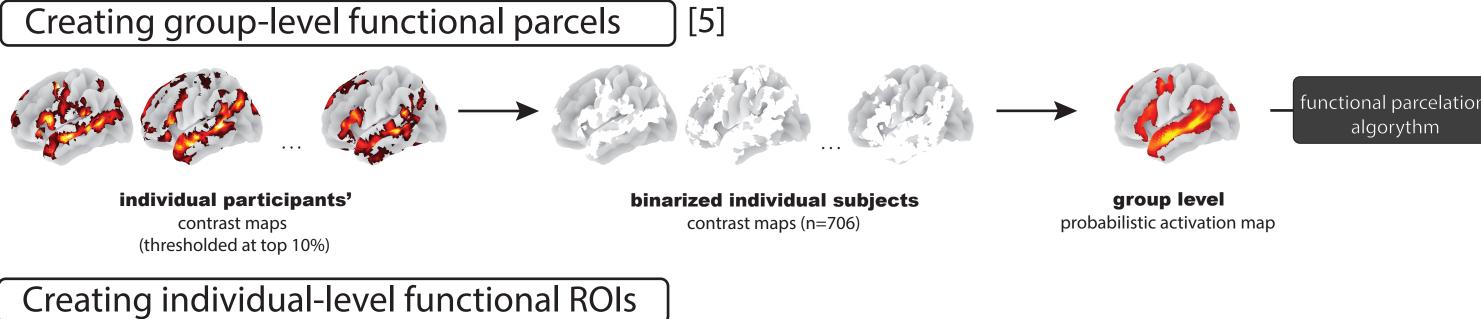
Reading task:

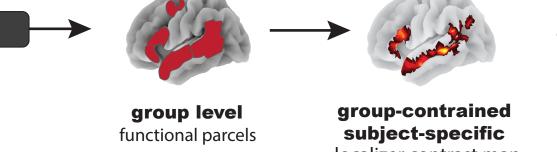
- L1 and L2 passive reading
- word lists, sentences, stories

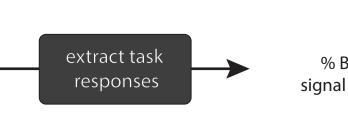
Task desing:

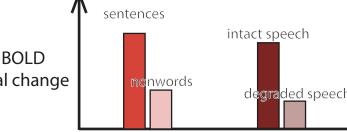
- 30s-long blocks
- 2 repetitions per condition per run
- 4 runs 8 repetitions per condition in total

METHODS: analysis

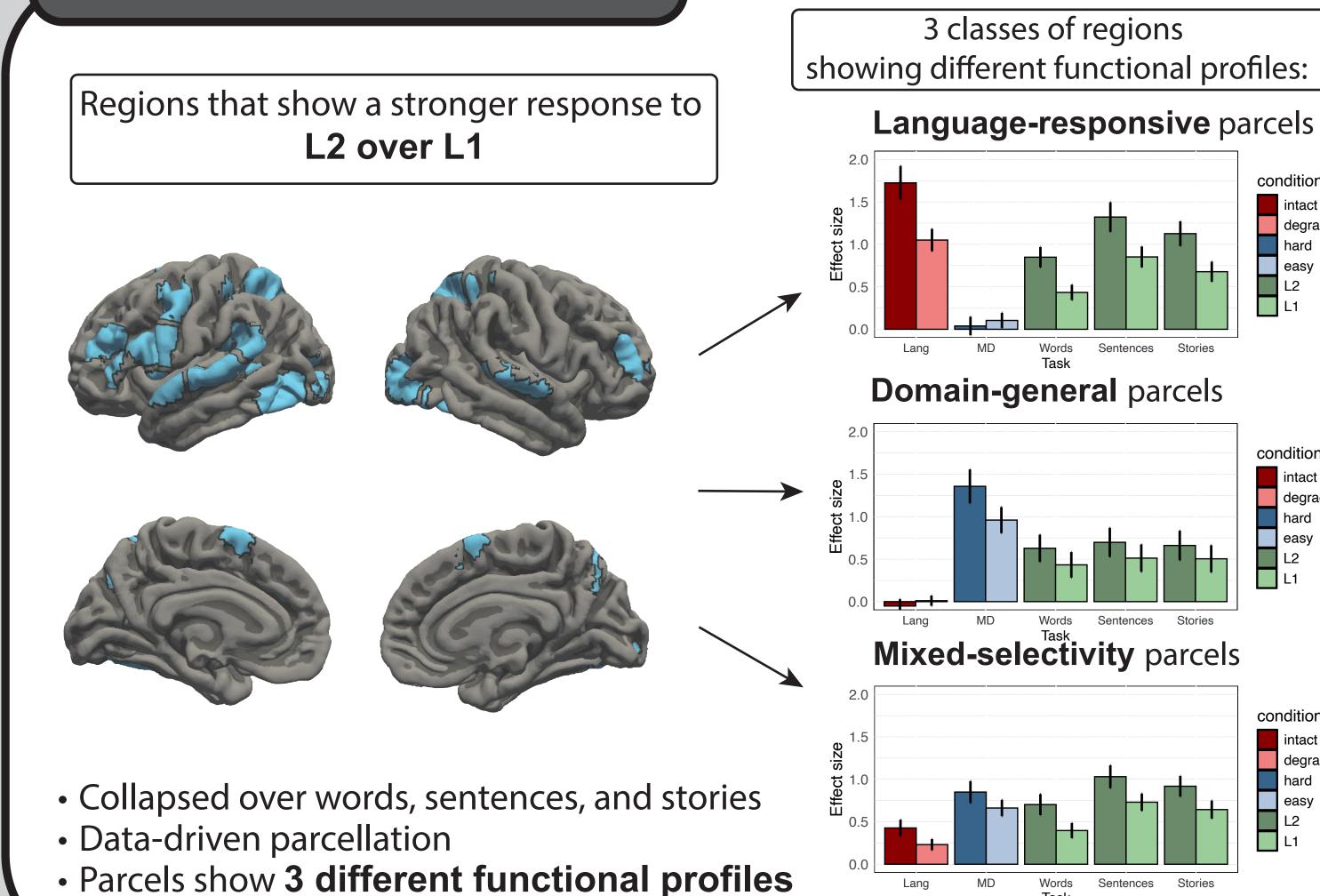


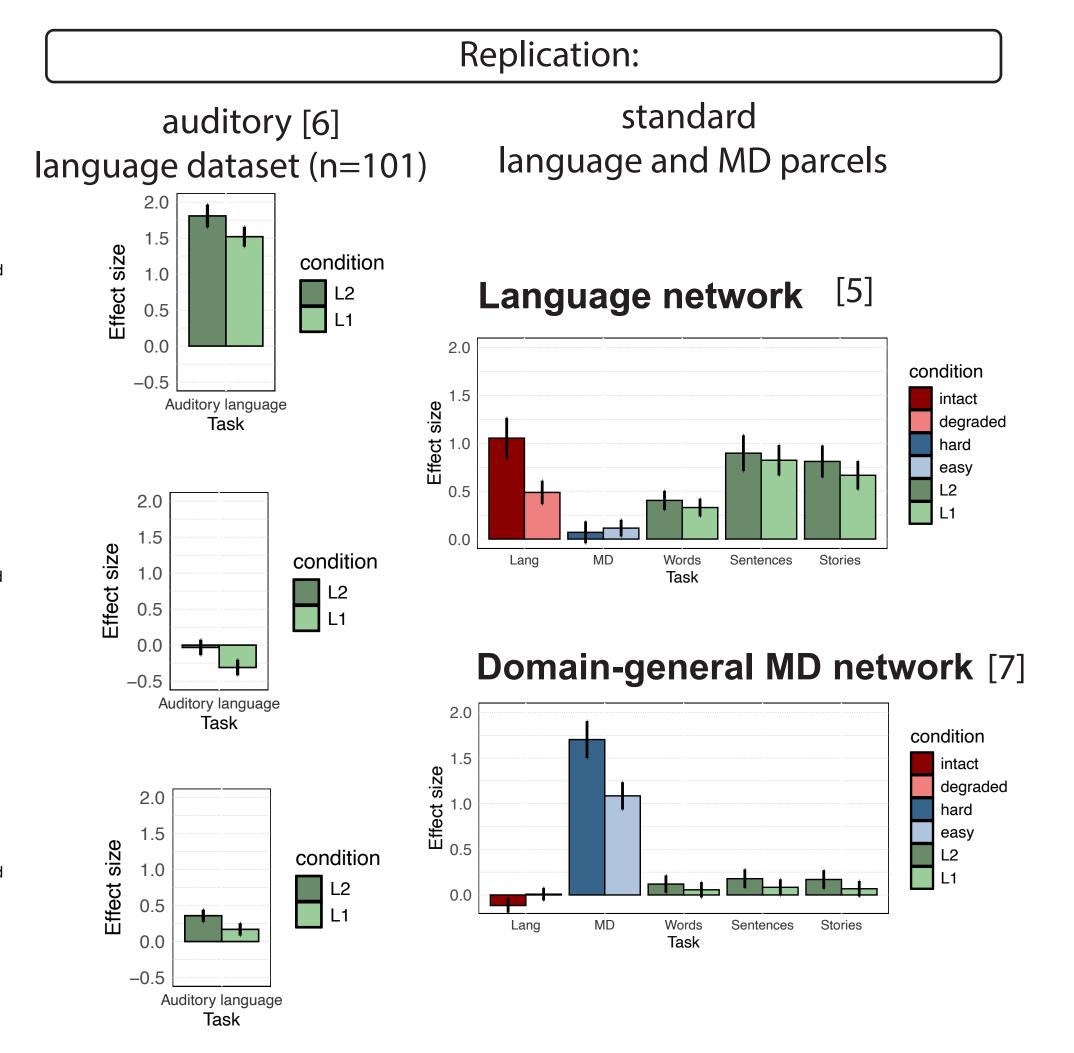


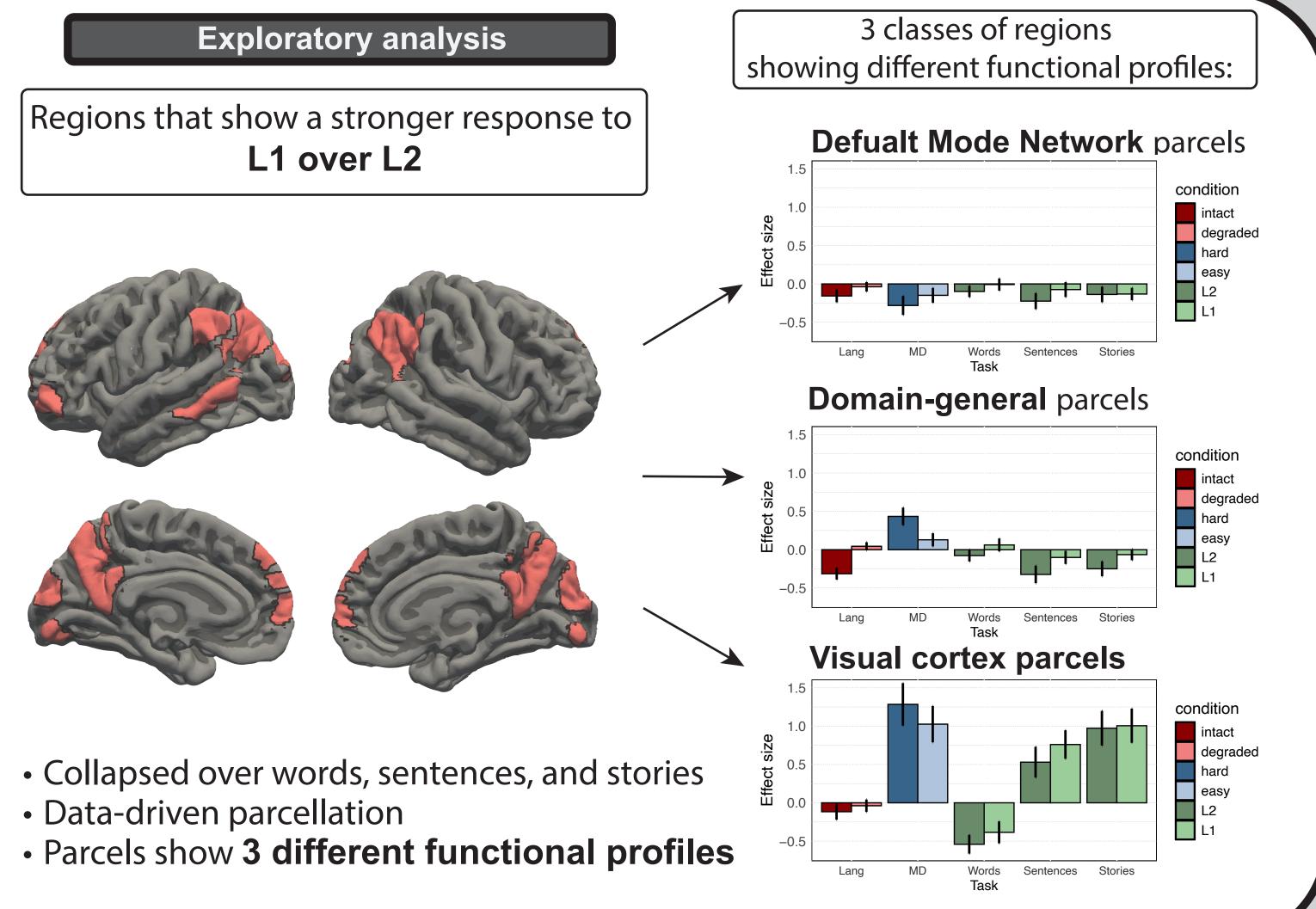




RESULTS







localizer contrast map

CONCLUSIONS

Both L1 and L2 processing engage languagespecific and domain-general resources.

Within the language system, sentences and stories are linked to stronger responses than wordlists, but stories do not engage language system more than sentences.

L2 > L1

Processing of L2 engages additional resources in both systems in both reading and auditory comprehension

This effect is **not modulated** by utterance complexity

L2 > L1

L1 seems to engage **DMN regions** more than L2:

- ? deeper processing of native language
- ? smaller demands on control mechanisms

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