Comparing neural measures of prediction between native and second language listeners in continuous speech

Craig Thorburn[1], I.M Dushyanthi Karunathilake[2], London Dixon[2], Ellen Lau[2], and Jonathan Z. Simon[2]

[1]University of Texas at Austin, Austin TX [2]University of Maryland, College Park,MD

Background

- Studies of second language learners give conflicting evidence of the extent to which these listeners use prediction during online processing and little work has looked at this in continuous and ecological settings[1-5]
- We ask: **Are second language listeners able to integrate sublexical, lexical and sentence level information in the same way as native listeners when predicting speech in a continuous setting?**
- Here, we record neural responses of advanced second language learners of English using Magnetoencephalography in a continuous paradigm
- Our work mitigates differences that may arise due to task effects and compares responses from two different native language groups to those of native English speakers

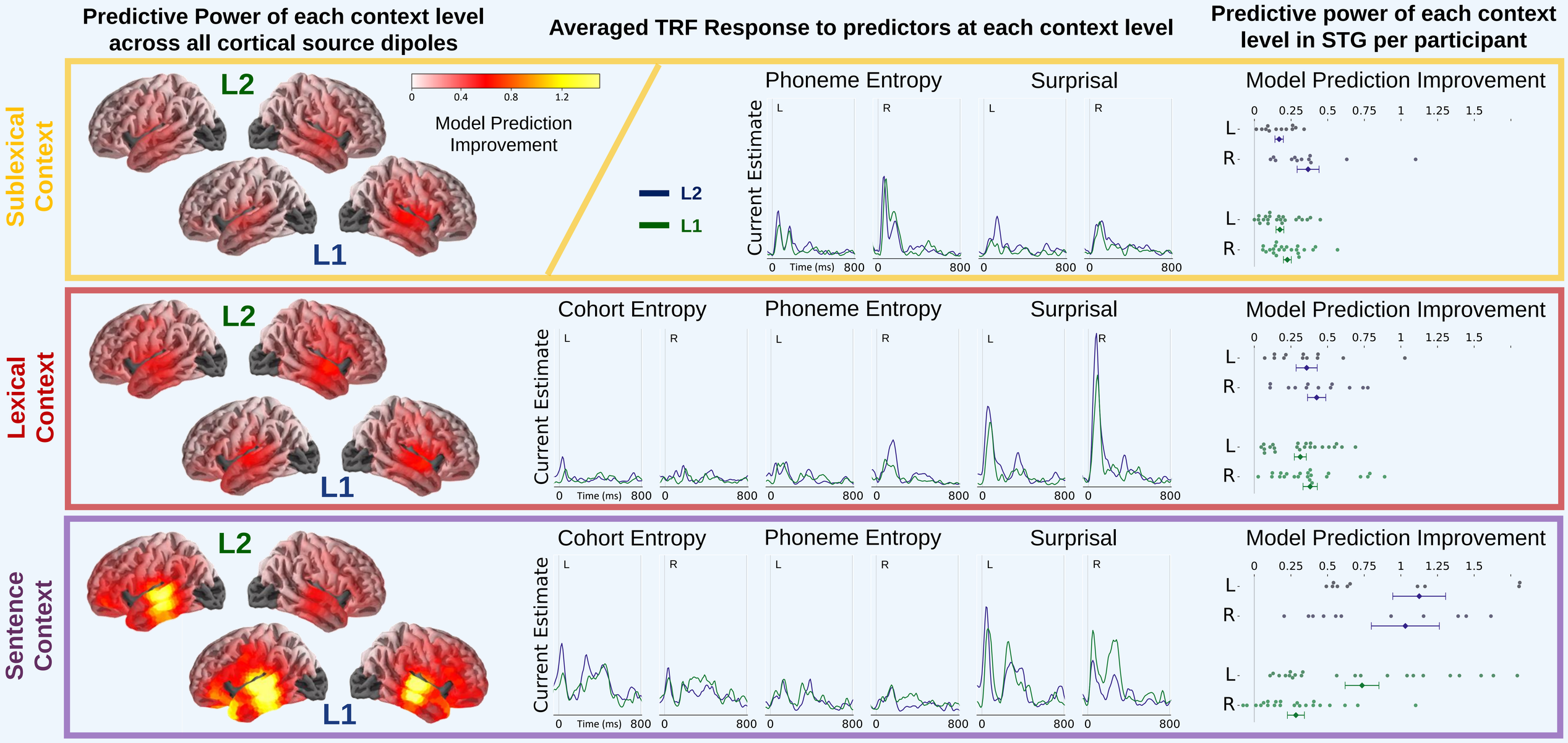
Conclusion

Second language learners exhibit reliable effects of prediction in neural data across context levels

- Decoding is robust across sublexical, lexical and sentence contexts, as in native English speakers
- Differences however are observed in lateralization and in the integration of sentence context
- We posit that learners' knowledge of a language's statistical distributions and a continuous listening task contribute to successful predictive encoding that may not be observed more constrained experimental paradigms

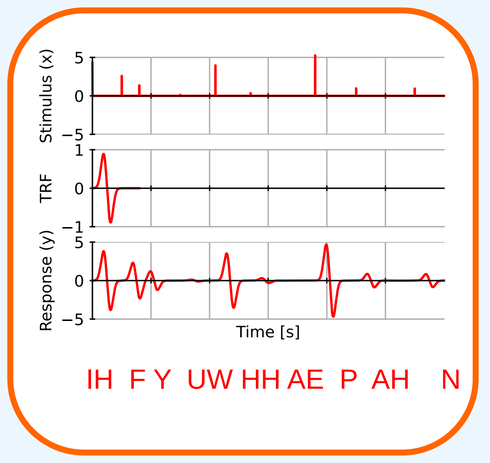
Results

Effects of prediction at the sublexical, word and sentence level were extracted from the continuous MEG data



Methods

- Magnetoencephalography (MEG) responses were recorded while **24 advanced second language learners of English** listened to 45 minutes of the audiobook 'The Botany of Desire'
  - 12 Native Mandarin Speakers
  - 12 Native Sinhalese Speakers
- Participants were compared to data previously collected from **12 native English speakers**[6]
- At each context level, surprisal, phoneme entropy and cohort entropy are regressed again the neural data[6]
- We used multivariate Temporal Response Function (mTRF) analysis[7] on the continuous speech and neural responses to investigate representation of each predictor within the MEG data
- Predictive power of a particular context level was measured by the increase in proportion of the data explained when predictors at that level are included



References

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