THE INFLUENCE OF NATIVE LANGUAGE ON MOTION EVENT ENCODING: AN ERP STUDY

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BACKGROUND

- Linguistic Relativity: native language influences cognition and perception (Sapir, 1941; Whorf, 1956).
  - The grammar structure of one's native language biases them to attend more to either the manner or the path of the agent in a motion event.
- English speakers tend to place manner of a motion event on the main verb (e.g., "she walked into the house") instead of path (e.g., "she entered the house walking") (Gennari et al., 2002).
- However, less is known about how manner and path influence listeners' expectations about motion information while perceiving language in real-time (Emerson, Conway & Özçalışkan, 2020).
- The N400 and P600 can inform us about semantic processing and syntactic processing, respectively.
  - Emerson et al. (2020) found that English speakers were better at perceiving manner compared to path, as measured by the semantic P600, but not the N400.
  - Their paradigm utilized animations, making it unclear whether these differences are perceived in more real-world scenarios.

RESEARCH QUESTION

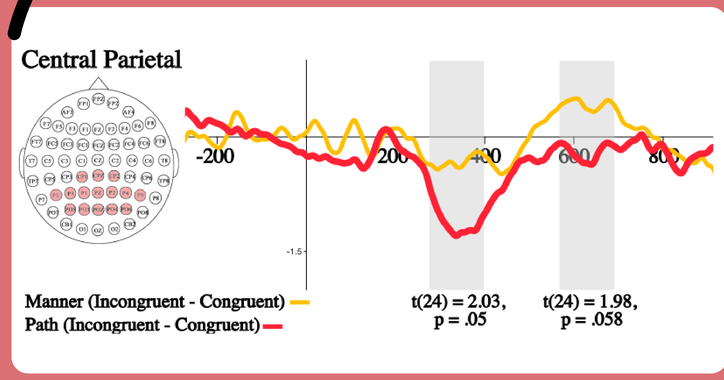
DOES LINGUISTIC RELATIVITY INFLUENCE ENGLISH SPEAKERS' N400 AND P600 RESPONSES TO SEMANTICALLY INCONGRUOUS EVENTS?

MOTION EVENTS

Participants viewed 128 videos of motion events, each followed by a visual stimulus describing what they saw one word at a time.

Congruent: She runs across the driveway.
Manner-Mismatch: She walks across the driveway.
Path-Mismatch: She runs down the driveway.
Complete-Mismatch: She walks down the driveway.

RESULTS



METHODS

Participants

- 25 native English speakers between 18-29 years (M = 19.42, SD = 2.44)

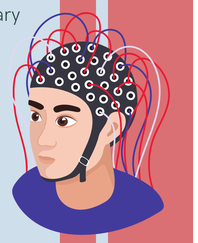
Pre-testing

- Participants completed the NIH Toolbox Picture Vocabulary Test to assess vocabulary knowledge.

Equipment

BrainVision EEG System

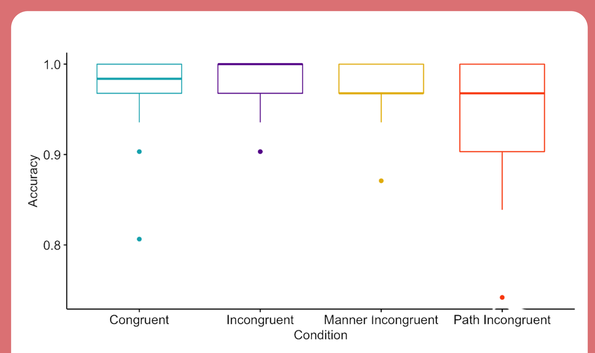
R-Net; 64 Electrodes



Data Processing

- Raw files were filtered from 0.1-30 Hz and re-referenced to the average.
- Bad channels were manually inspected and then interpolated.
- Bad components were identified using MARA, manually inspected and then removed.
- Data was epoched from -500 to 1000 ms. and baseline corrected in the pre-stimulus interval.
- Single trials were averaged together to obtain a stable waveform ERP for each condition.
- All analyses occurred in the EEGLAB Toolbox in MATLAB.

RESULTS



	df	Sum Sq.	Mean Sq.	*F*	*p*
Condition	3	.02	.007	3.61	.02*
Residuals	92	.17	.002		

Note: significant at the $p < .05$ level

CONCLUSION

Behavioral

- Monolinguals were significantly worse at identifying path-mismatch trials than any other trial type.
- This finding provides evidence for the claim of linguistic relativity that native language influences cognition and perception.
  - Specifically that English speakers are less accurate at perceiving variations in path.

ERP

- N400 for Path Trials
  - Reflects violations of a predicted word
  - Path-mismatch trials resulted in a larger N400, indicating that path was less expected for participants.
- Semantic P600 for Manner Trials
  - Reflects more general mechanisms of conflict monitoring and semantic reinterpretation
  - Errors related to manner likely require semantic reinterpretation that is not necessary for errors of path
- Findings align with Emerson et al. (2020)

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