

Linguistic Conflict Resolution: A Bilingual Perspective on Domain-General vs Domain-Specific Processes

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Domain-general cognitive control mechanisms support conflict resolution by regulating attention and inhibiting irrelevant information [1], and it has been claimed that these mechanisms are enhanced in bilinguals [2], [3]. Also, prior research has shown that conflict adaptation facilitates subsequent conflict resolution [4] and this effect has also been observed across domains, in syntactic ambiguity resolution during auditory sentence comprehension [5]. Previous research suggests that bilingual experience may influence conflict adaptation [6]. However, these effects might vary across bilinguals with typologically different L1 and L2. There are two different views: syntactic differences between the L1 and L2 affect sentence processing, leading to interference [7], [8], [9], [10]; alternatively cross-language similarity induces interference [11], [12].

This study examines how domain-general cognitive control interacts with language-specific processes during sentence processing, focusing on whether L1-L2 word order similarity in bilinguals influence conflict adaptation during ambiguous sentence processing. The present study recruits adult participants in two bilingual groups along with monolingual controls (target N per group 45). It compares bilinguals having similar (Spanish-English, SVO) and different (Turkish-English, SOV-SVO) word order systems. By comparing two bilingual groups, the study tests whether shared processing strategies in L1 and L2 facilitate conflict adaptation in ambiguous sentence processing. Temporarily ambiguous sentence structures are used to examine PP-attachment ambiguity. For example, in the sentence “*Put the frog on the napkin into the box*,” the PP “on the napkin” is initially parsed as an argument of “put”; this interpretation must then be revised to a modifier upon hearing “into the box.” Spanish, which has the same word order, requires the same revision. In contrast, Turkish does not require this revision; due to case marking and the head-final structure, “on the napkin” is not parsed as a goal argument of the verb, but directly as a modifier of the noun from the beginning. Experiment 1 includes an interleaved Stroop-Visual World paradigm [5] (Figure1), employing WebGazer for web-based eye-tracking. Experiment 2 introduces an interleaved Stroop to Word Maze design (Figure 2). In both experiments, incongruent Stroop trials are predicted to facilitate revision of the “on the napkin” PP relative to congruent trials.

Pilot phases of Experiment 1 (n = 8) and Experiment 2 (n = 6) have been completed. Ongoing data collection on monolingual and bilingual groups (target N = 45 per group) will include gaze, mouse, accuracy and reaction time data. Analysis will focus on reaction times from ambiguity onset (second preposition) in the Word Maze task, and on accuracy, gaze counts and mouse deviations on the Visual World task. Findings will show how participants respond at the point where ambiguity begins following incongruent Stroop trials. Results will show whether similar processing strategies driven by L1-L2 structural similarity modulates bilinguals’ conflict adaptation, and whether task-specific differences in cognitive control demands reflect varying sensitivity in sentence processing, indicating a need for future research on domain-general cognitive control in bilingual language processing.

References

- [1] T. Egner and J. Hirsch, 'Cognitive control mechanisms resolve conflict through cortical amplification of task-relevant information', *Nat. Neurosci.*, vol. 8, no. 12, pp. 1784–1790, Dec. 2005, doi: 10.1038/nn1594.
- [2] J. G. Grundy, A. Chung-Fat-Yim, D. C. Friesen, L. Mak, and E. Bialystok, 'Sequential congruency effects reveal differences in disengagement of attention for monolingual and bilingual young adults', *Cognition*, vol. 163, pp. 42–55, Jun. 2017, doi: 10.1016/j.cognition.2017.02.010.
- [3] E. Bialystok, 'Bilingualism and the Development of Executive Function: The Role of Attention', *Child Dev. Perspect.*, vol. 9, no. 2, pp. 117–121, Jun. 2015, doi: 10.1111/cdep.12116.
- [4] G. Gratton, M. G. Coles, and E. Donchin, 'Optimizing the use of information: strategic control of activation of responses', *J. Exp. Psychol. Gen.*, vol. 121, no. 4, pp. 480–506, 1992, doi: 10.1037//0096-3445.121.4.480.
- [5] N. S. Hsu and J. M. Novick, 'Dynamic Engagement of Cognitive Control Modulates Recovery From Misinterpretation During Real-Time Language Processing', *Psychol. Sci.*, vol. 27, no. 4, pp. 572–582, 2016, doi: 10.1177/0956797615625223.
- [6] C. A. Navarro-Torres, D. L. Garcia, V. Chidambaram, and J. F. Kroll, 'Cognitive Control Facilitates Attentional Disengagement during Second Language Comprehension', *Brain Sci.*, vol. 9, no. 5, p. 95, Apr. 2019, doi: 10.3390/brainsci9050095.
- [7] A. Zawiszewski and I. Laka, 'Bilinguals processing noun morphology: Evidence for the Language Distance Hypothesis from event-related potentials', *J. Neurolinguistics*, vol. 55, p. 100908, Aug. 2020, doi: 10.1016/j.jneuroling.2020.100908.
- [8] A. Zawiszewski, E. Gutiérrez, B. Fernández, and I. Laka, 'Language distance and non-native syntactic processing: Evidence from event-related potentials', *Biling. Lang. Cogn.*, vol. 14, no. 3, pp. 400–411, Jul. 2011, doi: 10.1017/S1366728910000350.
- [9] H. Clahsen and C. Felser, 'Grammatical processing in language learners', *Appl. Psycholinguist.*, vol. 27, no. 1, pp. 3–42, Jan. 2006, doi: 10.1017/S0142716406060024.
- [10] N. Tokowicz and B. MacWhinney, 'IMPLICIT AND EXPLICIT MEASURES OF SENSITIVITY TO VIOLATIONS IN SECOND LANGUAGE GRAMMAR: An Event-Related Potential Investigation', *Stud. Second Lang. Acquis.*, vol. 27, no. 2, pp. 173–204, Jun. 2005, doi: 10.1017/S0272263105050102.
- [11] W. J. B. Van Heuven, K. Conklin, E. L. Coderre, T. Guo, and T. Dijkstra, 'The Influence of Cross-Language Similarity on within- and between-Language Stroop Effects in Trilinguals', *Front. Psychol.*, vol. 2, Dec. 2011, doi: 10.3389/fpsyg.2011.00374.
- [12] T. Degani, A. Prior, and W. Hajajra, 'Cross-language semantic influences in different script bilinguals', *Biling. Lang. Cogn.*, vol. 21, no. 4, pp. 782–804, Aug. 2018, doi: 10.1017/S1366728917000311.

Appendix 1

Figure 1 – Experiment 1

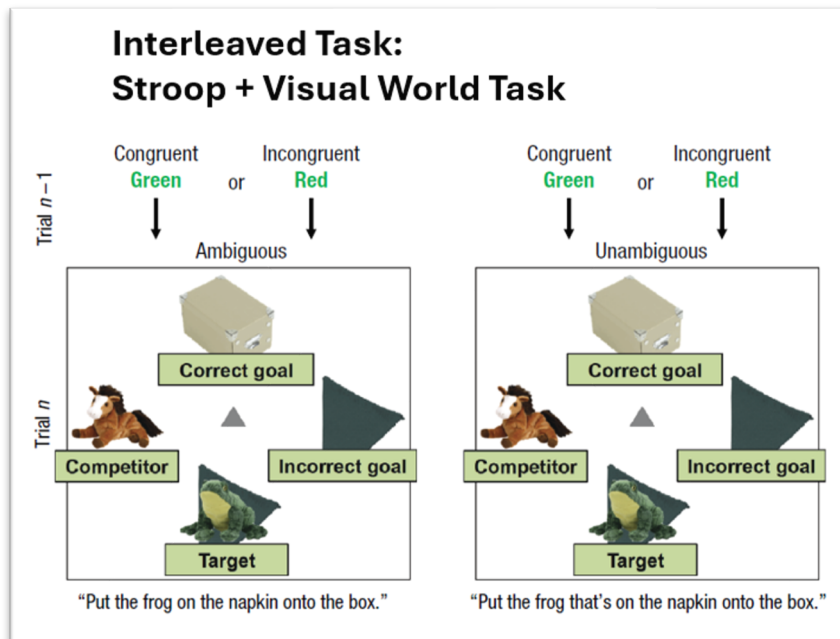


Figure 2 – Experiment 2

