Interfering with embodied cognition in consecutive dialogue interpreting: Gesture inhibition and its impact on the cognitive load

Monika Chwalczuk, Robert Balas
(Polish Academy of Sciences)

Speech is a multimodal process integrating embodied resources, such as hand gestures, body positioning, and facial expressions, along with verbal and vocal cues used for communication (Kendon, 2004; McNeill, 1992; Mondada, 2016). Gesture studies demonstrate that gesture production supports lexical retrieval, recalling actions or events, and helps structure thought by packaging information (Kita & Emmorey, 2023). Moreover, research conducted on interpreters shows that gestural mimicry (Kimbara, 2006) occurs both in dialogue interpreting (Chwalczuk, 2022) and simultaneous conference interpreting (Zagar Galvão, 2019), where instances of higher cognitive load lead to an increased gestural production (Cienki & Iriskhanova, 2020). Despite the increasingly common use of the embodied cognition framework to analyse interpreter-mediated events (Martín de León & Fernández Santana, 2021), trainee mediators are continuously advised to limit their gesture production, especially during onsite dialogue assignments. In such settings, exuberant gesticulation is deemed a sign of poor proficiency, insufficient training, or even a parasitic behaviour attracting unnecessary visual attention to the interpreter instead of keeping it on the speakers. Our aim is to investigate how the advised professional strategy of limiting one's gestural production impacts the cognitive load of the interpreters working in consecutive dialogue mode.

The experiments were conducted on 57 graduate students in interpreting departments, covering English-Spanish, English-French, and English-Polish language combinations. Participants interpreted a series of video recordings presenting a mock doctor-patient interaction with visible gestures from the speakers. During half of the task, the interpreter's gesticulation was inhibited by the instruction to keep one's hands on the table, as opposed to a control condition with unrestricted hand movement. PsychoPy software was used to present video stimuli, measure reaction times, and gather self-assessment data based on the NASA Task Load Index administered after each condition. Continuous electroencephalographic (EEG) (Koshkin et al., 2018) and heart rate variability (HRV) (Spinolo et al., 2022) measurements were taken throughout the procedure, and video-recorded performances of the participants were subsequently annotated in ELAN. To address the issue of oculomotor and muscle artifacts in the EEG signal, independent component analysis (ICA) and the artifact subspace reconstruction (ASR) algorithm were applied to raw data. Drawing on recent EEG findings in cognitive interpreting studies (Boos et al., 2022), the focus of the analysis is kept on the mean of online values of theta power at a frontal (F3, Fz, and F4) and alpha power at a parietal (P3, Pz, and P4) electrode pool to assess the impact of gesture/no gesture conditions on the mental effort (Antonenko et al., 2010) recruited in consecutive dialogue interpreting.

The findings suggest that the inhibition of spontaneous gesture production leads to a longer ear-voice span and higher cognitive load indicators in trainee dialogue interpreters.

Keywords
consecutive dialogue interpreting; cognitive load; embodied cognition; gestures; multimodality

Acknowledgments
This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Maria Skłodowska-Curie grant agreement No 847639.

References

Antonenko, P., Paas, F., Grabner, R., & van Gog, T. (2010). Using Electroencephalography to Measure Cognitive Load. Educational Psychology Review, 22(4), 425–438. https://doi.org/10.1007/s10648-010-9130-y

Boos, M., Kobi, M., Elmer, S., & Jäncke, L. (2022). The influence of experience on cognitive load during simultaneous interpretation. Brain and Language, 234, 105185. https://doi.org/10.1016/j.bandl.2022.105185

Chwalczuk, M. (2022). Construction of Shared Semantic Spaces through Gestures in Interpreter-Mediated Psychotherapy Sessions. International Visual Culture Review, 9(2), 207-221. https://doi.org/10.37467/gkarevvisual.v9.2933

Cienki, A., & Iriskhanova, O. (2020). Patterns of multimodal behavior under cognitive load: An analysis of simultaneous interpretation from L2 to L1. Voprosy Kognitivnoy Lingvistiki, 1, 5-11.

Kendon, A. (2004). Gesture: Visible Action as Utterance. Cambridge University Press.

Kimbara, I. (2006). On gestural mimicry. Gesture, 6(1), 39–66. https://doi.org/10.1075/gest.6.1.03kim

Kita, S., & Emmorey, K. (2023). Gesture links language and cognition for spoken and signed languages. Nature Review Psychology, 2, 407–420. https://doi.org/10.1038/s44159-023-00186-9

Koshkin, R., Shtyrov, Y., Myachykov, A., & Ossadtchi, A. (2018). Testing the efforts model of simultaneous interpreting: An ERP study. PLoS ONE, 13(10). https://doi.org/10.1371/journal.pone.0206129

Martín de León, C., & Fernández Santana, A. (2021). Embodied cognition in the booth: Referential and pragmatic gestures in simultaneous interpreting. Cognitive Linguistic Studies, 8(2), 277-306.

McNeill, D. (1992). Hand and Mind. University of Chicago Press.

Mondada, L. (2016). Challenges of multimodality: language and the body in social interaction. Journal of Sociolinguistics, 20, 336–366. https://doi.org/10.1111/josl.12211

Spinolo, N., Olalla-Soler, C., & Muñoz Martín, R. (2022). Finding a way into an interpreter's heart: methodological considerations on heart-rate variability building on an exploratory study. Edizioni Università di Trieste. https://doi.org/10.13137/2421-714X/34392

Zagar Galvão, E. (2019). Gesture functions and gestural style in simultaneous interpreting. In H. Salaets & G. Brône (Eds.), Linking up with video: Perspectives on interpreting practice and research, 151–179. Amsterdam: John Benjamins.