Using a foreign language does not make you think more: Null effects of using a foreign language on cognitive reflection and numeracy

Wojciech Milczarski, Anna Borkowska, Mariola Paruzel-Czachura & Michał Białek
(University of Wrocław; University of Wrocław; University of Silesia and University of Pennsylvania; & University of Wrocław)

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The Foreign Language Effect (FLe) suggests that decisions and judgments can differ when individuals use a foreign language instead of their native one. Previous research and meta-analyses (Circi et al., 2021; Del Maschio et al., 2022; Stankovic et al., 2022) have shown effects such as more utilitarian moral judgments and reduced risk aversion. However, the underlying mechanisms remain unclear. This study examines whether increased cognitive engagement might be a contributing factor.

The Dual-Process Theory (Evans & Stanovich, 2013; De Neys & Pennycook, 2019; Pennycook et al., 2015) distinguishes between autonomous Type I processes and reflective Type II processes. Type II processes, involving working memory, are crucial for cognitive reflection, which helps analyze intuitive responses arising from Type I processing. Our study explores whether the FLe is driven by increased cognitive engagement.

Using a foreign language might prompt more Type II processing. This hypothesis posits two scenarios: (i) individuals might use reflection more because they perceive the task as requiring more cognitive resources, or (ii) they might be more sensitive to conflicts between intuitions, leading to less reliance on intuitive responses. Scenario (i) would result in better performance on numeracy tasks, while scenario (ii) would show improved performance on tasks testing willingness to reflect.

To test this, we analyzed data from previous experiments (N = 1515), which collected information on cognitive reflection and numeracy. Despite the large sample size, results showed no positive effect of using a foreign language on performance in cognitive reflection (Cognitive Reflection Test - CRT) (Frederick, 2005) or numeracy (Berlin Numeracy Test - BNT) (Cokely et al., 2012). Both NHST and Bayesian analyses supported these null findings. This suggests that increased cognitive engagement is not a likely explanation for the FLe.

In conclusion, this study challenges the notion that using a foreign language enhances cognitive engagement, specifically cognitive reflection and numeracy. The null effects observed in our analyses suggest that alternative explanations or factors may underlie the observed variations in decision-making across different language contexts.

References

Circi, Riccardo, Daniele Gatti, Vincenzo Russo, and Tomaso Vecchi (2021), The Foreign Language Effect on Decision-Making: A Meta-Analysis' *Psychonomic Bulletin & Review* 28(4), 1131–1141.

Cokely, Edward T., Mirta Galesic, Eric Schulz, Saima Ghazal and Rocio Garcia-Retamero (2012),

Measuring risk literacy: The Berlin Numeracy Test, *Judgment and Decision Making* 7(1), 25–47.

De Neys Wim and Gordon Pennycook (2019), Logic, fast and slow: Advances in dual-process theorizing, *Current Directions in Psychological Science* 28(5), 503–509.

Del Maschio Nicola, Federico Crespi, Francesca Peressotti, Jubin Abutalebi and Simone Sulpizio (2022), Decision-making depends on language: A meta-analysis of the Foreign Language Effect, *Bilingualism: Language and Cognition* 25(4), 617–630.

Evans Jonathan and Keith E. Stanovich (2013), Dual-Process Theories of Higher Cognition: Advancing the Debate, *Perspectives on Psychological Science* 8(3), 223–241.

Frederick Shane (2005), Cognitive reflection and decision making, *Journal of Economic Perspectives* 19(4), 25–42.

Pennycook Gordon, Jonathan A. Fugelsang, and Derek J. Koehler (2015), What makes us think? A three-stage dual-process model of analytic engagement, *Cognitive Psychology* 80, 34–72.

Stankovic, Michelle, Britta Biedermann, and Takeshi Hamamura (2022), Not all bilinguals are the same: A meta-analysis of the moral foreign language effect, *Brain and Language* 227, 105082.