

The central processing bottleneck during word production: Comparing simultaneous interpreters, bilinguals and monolinguals

Longjiao Sui¹, Haidee Kruger^{2,3}, Helen Slatyer²

¹ Ghent University, Department of Experimental Psychology

² Macquarie University, Department of Linguistics

³ North-West University

Longjiao.Sui@UGent.be

Simultaneous interpreters are a special group of bilinguals who frequently perform complex linguistic tasks in real time. When performing simultaneous interpretation (SI), they not only perceive information when interpreting one language into another but also perform processes such as comprehension and memorization. To account for this performance, Gile (2009) suggests that interpreters allocate limited cognitive capacity to concurrent tasks. When the total capacity required by the tasks exceeds the limitations, the performance will be affected. In other words, the process of tasks can be parallel, consistent with the capacity-sharing assumption suggested by Tombu and Jolicoeur (2003).

However, some studies have shown that people cannot conduct another task while speaking, which is against the parallel processing hypothesis (Cook & Meyer 2008; Declerck & Kormos 2012). Ferreira and Pashler (2002) found that people cannot perform a non-linguistic task when producing a word, indicating that language production shares the central processing mechanism, which can process one task at a time, with some processes underlying non-linguistic tasks. That is, the process of tasks cannot be parallel but in serial.

When considering the fluent and clear interpretations interpreters provide while listening to the speaker, it is hard to believe that they are also subject to this structural limitation. Therefore, this study investigated whether professional simultaneous interpreters perform multiple tasks simultaneously or whether they are affected by the central processing bottleneck during language production.

The study compared the performance of professional simultaneous interpreters, bilinguals, and monolinguals. Each group has 30 participants, and each interpreter has one carefully matched counterpart in each group with age, gender, and language pairs (except monolinguals who speak only English). Interpreters in this study have at least five years of SI work experience. All participants performed a dual-task separated by stimulus onset asynchronies (SOA: 50, 150 and 900 ms). The picture naming task in sentence context that requires a verbal response presented first, followed by a tone discrimination task that requires a button-press response. This study manipulated the sentence constraint (medium vs low) and the frequency of picture names (high vs low).

The robust psychological refractory period effect was found in all three groups, showing that the reaction times to the second task were postponed at the shortest SOA compared to at the longest. These results showed that interpreters, highly proficient bilinguals, and English monolinguals are subject to the central processing bottleneck and cannot conduct another task while speaking.

Note:

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