Bilinguals' use of gestures when they are disfluent

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Gestures have self-oriented functions. Gesturing decreases cognitive load and facilitates cognitive processes (Kita et al., 2017; Melinger & Kita, 2007; Kita & Davies, 2009). Research suggests that gesturing might also facilitate speakers' speech production process (Morsella & Krauss, 2004; Rauscher et al., 1996). Individuals vary in their gesture production (Özer & Göksun, 2020). Bilinguals gesture more frequently than their monolingual counterparts (Nicoladis et al., 2009; Pika et al., 2006), suggesting that gesturing helps them choose from the correct lexicon among the two competing language systems (Nicoladis, 2007). There are individual differences in terms of benefiting from gestures when speech is disfluent (Arslan & Göksun, 2022; Arslan et al., 2023; Avcı et al., 2022). In this study, we investigated (1) disfluency and gesture rates of bilinguals in their two languages and (2) whether and when gestures co-occur with disfluencies across their two languages.

We tested Turkish-English bilingual adults (N=27), using Zoom Video Conferencing, in a cartoon retelling task. The participants' first language was Turkish, and English was their second language. In a within-subjects design, participants watched six Tom and Jerry cartoon clips. Participants retold half of the cartoons in Turkish and the other half in English. All clips were similar in duration and content. The order of narrative language (i.e., Turkish or English), the order of the cartoon clips, and the combination of cartoon clips and narrative language were all counterbalanced. The Oxford Quick Replacement Test (OQRT) (Syndicate, 2001) was applied to assess the English proficiency of the participants.

We used ELAN software (Version 6.2) (Lausberg & Sloetjes, 2009) to code disfluencies (silent pauses, filled pauses, repetitions, and repairs) and representational gestures (iconic and metaphoric gestures). We calculated gesture frequency and disfluency rate by dividing the total number of gestures and the total number of disfluencies, respectively by the total word count. Gesture-speech disfluency co-occurrences were determined and calculated based on Arslan and Göksun (2022). We calculated the proportion of disfluencies that co-occurred with a representational gesture among all disfluencies.

The paired samples *t*-test showed that bilinguals used more representational gestures in English than in Turkish, $t(26)=3.36$, $p=.002$, $d=.05$ Similarly, participants were more disfluent in English than Turkish, $t(26)=3.36$, $p=.002$, $d=.12$. When we controlled for English proficiency, individuals were still more disfluent in English, $F(1,25)=12.53$, $p=.002$, $\eta^2=.334$, albeit proficiency was a significant covariate of the disfluency rate in English, $F(1,25)=7.68$, $p=.10$, $\eta^2=.235$. For gesture-disfluency co-occurrences, we found that bilinguals were more likely to use gestures in English than in Turkish, $t(26)=4.50$, $p<.001$, $d=0.21$.

These findings suggest that bilinguals might use representational gestures to ease their speech production process, particularly in their second language. Our results are in line with Arslan et al. (2023), which demonstrated higher representational gesture use by Turkish-English bilingual children in their second language (English). It is important to note that our study provides only indirect evidence of gestures' self-oriented functions. This situation might also be interpreted as a communication strategy to maintain their interlocutor's attention when speaking is difficult. Creating designs to differentiate between cognitive and communicative roles of gestures is key to understanding gesture-speech interaction.

Index terms: bilingualism, gesture, disfluency

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