

Interaction between gesture and speech during word retrieval failures

While speaking, on occasion, we experience tip-of-the-tongue (TOT) states during which we temporarily fail to retrieve the intended words. Just like during fluent speech, when experiencing a TOT, speakers gesture. Two types of gestures are especially relevant here. First, iconic gestures (i.e., co-speech gestures expressing some aspects of the meaning being produced), that have been argued to help lexical retrieval. Second, gestures that reflect the speaker's cognitive state of frustration during the retrieval failure, which we call metacognitive gestures. According to different proposals, iconic gestures have been linked to either the semantically-driven lexical retrieval step (Kita, 2000) or to the phonologically-driven lexical retrieval step (Krauss et al., 2000). By assessing the iconic gestures produced by speakers during TOTs occurring either during the semantically-driven or phonologically-driven retrieval steps, we evaluated these two proposals. In addition, we speculated that metacognitive gestures should be more common for TOTs occurring during the phonologically-driven retrieval step. This is because the closer the speaker is in retrieving the word, the greater the feelings of frustration for not being able to produce the word.

We induced TOT states in 76 native Spanish Speakers using 59 gesturable (as established in pre-testing) nouns, following Vigliocco et al.'s (1997) methodology. The experiment was carried out in Spanish in order to differentially tap into semantically-driven and phonologically-driven retrieval failures. We reasoned that in the former type of retrieval failures, speakers would know the gender of the sought-after noun, but not any phonological property. In the latter, instead, they would correctly report the gender of the noun and phonological information. As in Vigliocco et al. (1997), on the basis of speakers' guesses, we classified instances of failed retrieval as: phonologically-based TOTs (speakers reported gender and some aspect of the wordform); semantically-based TOTs (speakers only reported gender). In addition we identified a third class of retrieval failures: cases in which speakers were unsure whether they were thinking of the experimental target, but nonetheless, guessed gender correctly above chance (we called this latter type: tip-of-the-mind, TOMs). The experimental protocol included a 20sec "thinking aloud" phase during which gestures were recorded. Gestures were analysed following Kita (2000), focusing on iconic and metacognitive gestures. According to Kita (2000), iconic gestures should be more common during semantically-based TOTs and TOMs (iconic gestures of the corresponding object would enhance the activation of the corresponding semantic representation). According to Krauss (2000), iconic gestures would be more prevalent during phonologically-based TOTs as these gestures would enhance activation of wordforms (through priming). Metacognitive gestures, instead, should be more common during phonologically-based TOTs.

As shown in the Table, we found that iconic gestures were produced equally often in TOMs, semantically-based and phonologically-based TOTs. This result suggests that iconic gestures may be time-locked, and facilitate, both steps in lexical retrieval: whereas when tied to the semantically-driven retrieval they might help enhancing the activation of lexico-semantic representations via the semantic overlap between properties of the gesture and properties of the referent; when tied to phonologically-driven retrieval, they could enhance form retrieval by cross-modal priming, as argued by Krauss et al. (2000). We found that metacognitive gestures were more commonly produced for phonologically-based TOTs than other types of retrieval failures and showed an increase from TOMs to semantically-based TOTs to phonologically-based TOTs.

References

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Table I. Gesture production at different types of failure in word retrieval

RETRIEVAL FAILURES	Num. of retrieval failures	GESTURE PRODUCTION	
		Num. of Iconic gestures (average per type of failure)	Num. of Metacognitive gestures (average per type of failure)
Phonologically-based TOTs	133	207 (1.56)	103 (0.77)
Semantically-based TOTs	43	83 (1.93)	21 (0.48)
TOMs	190	312 (1.64)	21 (0.11)