

The role of mode of representation in iconic gestures on novel second language vocabulary acquisition

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In recent years, different studies have shown the positive role of representational (iconic) gestures on a set of cognitive processes. Iconic gestures favor word recall when learning one's own language (Tellier, 2005; So et al., 2014). Iconic gestures also favor second language (L2) word memorization both by children (e.g., Tellier., 2008) and by adults (e.g., Kelly et al., 2009). Yet, little is known about the potential effects of iconic modes of representation on L2 word learning. Recently, Ortega et al. (2014) showed that type of iconicity matters for sign language acquisition by children. Parents interacting with children tend to use signs associated with a referent (action signs). When interacting with adults they instead favor signs associated with perceptual features of the named object (perceptual signs) (Ortega et al., 2014).

When we deal with noun representation, the same referent may be depicted in two possible ways. One way is to represent a form, or perceptual features of a named object with different hand configurations, the other way is to show an action that is associated with the object or the way it is manipulated (Ortega et al., 2014). We take these two variants to correspond to observer and character viewpoint iconic gestures (McNeill, 1992). Observer viewpoint gestures exclude speaker's body from the gesture space, whereas character viewpoint gestures incorporate the speaker's body into the gesture space and the narrator's own body is used in depicting an event (McNeill, 1992). Arguably, in noun representation, observer viewpoint gestures could be said to refer to the form of the named object, and character viewpoint gestures to the action produced on the named object (approximating the function of the object).

It has been suggested that iconic gestures generated from a character viewpoint are more communicative than those generated from an observer viewpoint (McNeill, 1992; Beattie & Shovelton, 2002). The study by Beattie and Shovelton (2002) revealed that after gesture observation in the absence of speech the reporters provided a significantly higher proportion of transitive structures in their answers when they were exposed to character viewpoint gestures. The researchers suggest that communicative power of gestures is affected by the viewpoint from which a gesture is generated; character viewpoint gestures observation supply more information about the target items (Beattie & Shovelton, 2002).

However, little is known about whether observer and character viewpoint gestures affect memory and second language word learning. In the current study we investigate the impact of mode of representation (i.e., character and observer viewpoint gestures) produced by the instructor on vocabulary acquisition in a second language (L2).

Thirty-six Catalan-dominant speakers ($M=23$, 8 years, $SD=5.23$; range: 18-40, 19 female) participated in an L2 word memorization task. The stimuli consisted of 12 Russian disyllabic words for everyday objects. The Russian word forms complied with the phonotactic constraints of Catalan. For each Russian word we created 4 videos of an instructor producing the words under 4 experimental conditions: observer viewpoint gesture with speech, character viewpoint gesture with speech, no gestures condition, and co-speech beat gesture condition. We considered the no gesture condition as a

baseline in our study and the beat gesture condition served as a control for visual activity. In the observer viewpoint gesture condition the instructor said the word while tracing the shape of the target nouns with her index fingers. In the character viewpoint gesture condition the instructor said the word while producing a possible imaginary action related to the named object. The gestures used for the observer and character viewpoint conditions were controlled for the following characteristics: 1) gesture transparency (10 Catalan native speakers rated the semantic relationship between the gesture and the target word; the selection of items was based on the mean score of the rating), 2) equality in gesture exposure (all gestures were bimanual and repeated hand movements produced in a central gesture space), and 3) gesture phases (in all gestures three gesture phases were present: preparation, stroke and retraction).

Participants were trained and tested individually. In training session the target 12 Russian words were presented in random order according to four within-subject experimental conditions (3 words for each condition). The order of the words was unique for each participant. Each of the 12 trials (target words) had the following presentation format: first, the written Catalan translation of a word appeared in the screen (4 seconds); immediately after, a video with the instructor saying the target word in Russian could be watched (4 seconds). We repeated this sequence twice for each word. After the second repetition a black screen appeared (4 seconds) to indicate that a new word was coming up.

The test consisted of a word translation task. After hearing and seeing each word twice, participants had to choose between three possible Catalan translations of the Russian word. The results of a GLMM model on the accuracy scores from the test revealed a main effect of condition ($F(3,428) = 4.261, p = .006$). Follow up paired comparison showed a significant difference between the four conditions: observer viewpoint - character viewpoint gestures ($p = .036$), observer viewpoint - beat gestures ($p = .003$), observer viewpoint - no gesture conditions ($p = .001$). In general, the results show beneficial effects of the presence of iconic gestures over no-gesture or beat-gesture conditions. Moreover, observer viewpoint gestures had better mnemonic effect than character viewpoint iconic gestures, indicating that perceptual features related to the referent are highly valuable in the process of noun memorization in an L2.

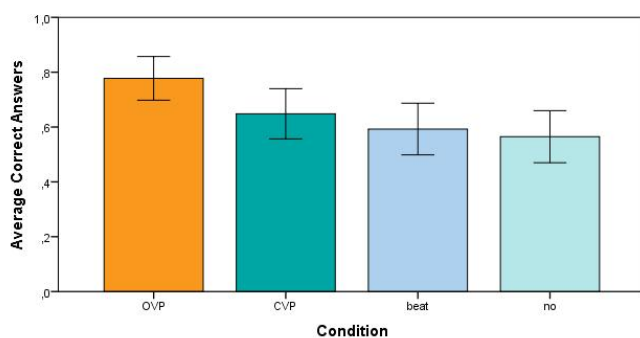


Figure 1. Mean proportion of memorized words across the four training conditions.

The findings of this study indicate that the mode of representation matters on second language words acquisition. Gestures generated from observer viewpoint have more positive effect on the acquisition of L2 nouns than gestures generated from character viewpoint. A possible explanation of the results would be that since character viewpoint gestures contain supplementary information about the action related to the referent they might cause additional cognitive load and thus negatively affect novel L2 vocabulary acquisition.

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