The Role of Mental Imagery and Embodied Motion in Sign Language Learning

Laura M. Morett

Research has demonstrated that gesture enactment (Asher & Price, 1967; Kelly, McDevitt, & Esch, 2009; Tellier, 2008) and mental imagery (Atkinson & Raugh, 1975; Ellis & Beaton, 1993) facilitate learning of novel second language words. These results suggest that mental imagery and embodied action contribute to successful word learning in spoken second languages. To date, however, no research has investigated whether enactment or mental imagery are effective methods for learning vocabulary in signed second languages, such as American Sign Language (ASL). The objective of this study was to examine the effects of mental imagery (MI) and embodied action (EA) on the acquisition of ASL signs, thus filling this lacuna.

Twenty-six participants (average age: 19.16; 8 males) unfamiliar with ASL were recruited from the University of Pittsburgh. In learning trials, participants were presented with a silent video of a fluent ASL signer demonstrating a sign, and then were presented with the English translation of the sign as text and synthesized speech. Participants then performed the action associated with one of four conditions before proceeding to the next learning trial. In the enactment condition (MI+EA), participants enacted signs with their own hands; in the mental imagery condition (MI), participants envisioned the meanings of signs in their mind's eye; in the elicited motion condition (EA), participants moved their hands in an X-shaped pattern three times; and in the passive comprehension condition (Ø), participants were presented with signs and their English translations one additional time. A total of 20 unique ASL signs (see Table 1) were learned via these conditions in 3 learning blocks comprising 20 trials each. Sign recollection was measured 5 minutes and 1 week after learning via a recall task in which participants were presented with English translations as text and speech and were instructed to produce the corresponding ASL signs.

On the basis of extant research showing that gesture enactment facilitates word learning in spoken languages, it was predicted that signs learned via the enactment condition would be recollected best. Accordingly, in the recall task, participants correctly produced more signs learned via enactment than via imagery ($p=.04$), motion ($p=.06$), and comprehension ($p=.05$), $F_{pp}(3,57)=7.16$, $p < .001$, $\eta_p^2 = .29$; $F_{sign}(3,45)=14.07$, $p<.001$, $\eta_p^2=.48$. Participants also produced more signs correctly after 5 minutes than after 1 week, $F_{pp}(1,19)=10.99$, $p=.004$, $\eta_p^2=.38$; $F_{sign}(1,15)=18.16$, $p=.001$, $\eta_p^2=.55$. Accuracy of sign recall under each condition remained consistent at both test intervals ($F_{pp}>1$; $F_{sign}>1$; see Figure 1). Taken together, these results confirm that enactment resulted in better recall of ASL signs than mental imagery, elicited motion, or passive sign comprehension at both 5 minute and 1 week intervals. As such, they indicate that both mental imagery and embodied action contribute to effective acquisition of vocabulary in signed languages. Together with similar findings from research on spoken languages, the results of this study indicate that manual enactment facilitates second language lexical acquisition.