

Synchrony of Gestures Important for Directing Infant Attention During Early Word Learning

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Introduction

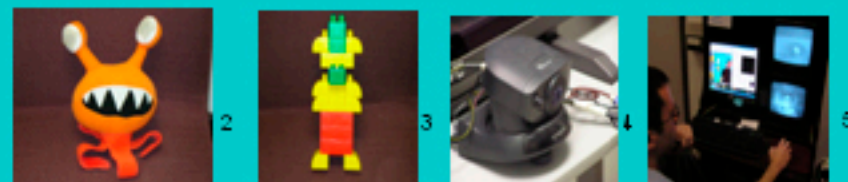
Caregivers use gestures concurrently with their speech when teaching a new word to an infant. These gestures may assist the infant in establishing a connection between the object and its referent. We hypothesized that the use of synchronous gestures would enhance infants' attention better than the use of an asynchronous gesture and lead to better word learning.

Research Question

Is the use of synchronous gestures better than asynchronous gestures in aiding early language learning?



Method



Fifteen primarily Caucasian infants aged 9.6-14.7 months sat in a car seat and viewed the stimulus presentation on a 42" plasma screen (Figure 1). We created two identical scenarios through digital editing whose only difference was the type of gesture. The speaker introduced a novel object (Figures 2 & 3) paired with a nonce word with either a synchronous or asynchronous gesture. In the synchronous condition the object was presented so that the rhythm of the gesture matched the rhythm of the word. In the asynchronous condition the object was presented so that the rhythm of the gesture and the rhythm of the word were divergent. With the use of an eye tracking system (Figure 4 and 5), eye and head movements were measured. Gazetracker software was used to determine fixation locations and their durations. After two learning trials per word-object pair, comprehension trials tested the infants' understanding. This was done by asking the infants to look at specific objects. Comprehension was measured using a ratio of correct looks to total looks.

Results

Learning Trials:

To analyze our data, we determined the infants' total object fixation during the utterances of the novel word (OFDAW). The OFDAW for the synchronous condition ($M=1.76$, $SD=1.16$) was significantly greater than that for the asynchronous condition ($M=1.11$, $SD=1.01$, $t(14)=1.91$, $p=.038$ (one-tailed). Figures 6 and 7 are examples of the time-based graphs showing a typical subject's looking patterns.

To examine whether infants paid as much attention in each condition overall, we carried out an analysis of total fixation during learning trials. We found no significant differences between the synchronous ($M=19.01$, $SD=5.08$) and asynchronous ($M=19.95$, $SD=5.95$) conditions.

Comprehension Trials:

Paired samples t-test between the synchronous and asynchronous comprehension trials showed significantly greater comprehension for the synchronous condition ($M=.68$, $SD=.21$) over the asynchronous condition ($M=.44$, $SD=.27$), $t(14)=2.71$, $p=.01$.

Conclusion

Infants looked more at the object as it was being named in the synchronous condition and showed better comprehension for words learned in this condition. These findings suggest that by using synchronous gestures, caregivers can direct infant attention in a way that encourages joint processing of the object and word. We found that this joint processing contributes to early word learning.

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