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Integration of "secondary" information during comprehension: co-speech gestures and mouth patterns accompanying signs

We investigate how information conveyed by a primary linguistic channel is affected by secondary information conveyed visually. In studies of audio-visual speech, crucial evidence comes from studies using incongruent pairings, as in [1]; and the same is true of speech and gesture, e.g. [2]: gestures are integrated with speech in comprehension. However, avoidance of visible mouth movements in gesture studies using incongruent speech-gesture pairings has led to the majuroty of such studies using materials where only a speaker's body, but not head is visible.

Such materials may exaggerate the extent to which gesture is integrated, vs. the far more frequently occurring natural contexts in which the face is visible (and correlates to speech signals). Here, we produced digitally edited videos in which a speaker's face is fully visible and corresponds to heard speech, but combined with a naturally produced gesture from a different utterance. In addition to considering co-speech gestures we also investigate mouth movements that accompany manual production in British Sign Language (BSL). In BSL, many signs are produced with lip patterns resembling English speech. As the role of these mouth patterns is unclear, we use incongruent combinations to investigate how such "secondary" visual information is integrated in sign comprehension.

In Experiments 1 and 2 we presented a picture followed by a video clip and asked participants to indicate whether the word (spoken) or sign (produced by hands) matched it. This provides a strong test of whether the secondary information (gesture accompanying English, or mouth pattern accompanying BSL) is integrated, as it is not needed to perform the task. In both experiments incongruent information increased the error rate compared to congruent combinations. In a third experiment in English we asked participants to pay attention to both cues (speech and gesture). When they were incongruent, native speakers made more errors for incongruent speech than for incongruent gestures, while the opposite pattern was observed for non-native speakers.

These findings provide further evidence for obligatory integration of "secondary" information in both audio-visual English and BSL, replicating studies of speech using incongruent "headless" materials. The results of Experiment 3 also show how the relative weighting of speech and gesture in comprehension can be shifted by context: non-native speakers, who presumably had more difficulty comprehending the speech, paid more attention to gestures. This latter finding suggests that comprehenders are not just extracting maximal information, but are affected by the demands of the communicative situation.

References

[1] McGurk, H. & MacDonald, J. (1976). Hearing lips and seeing voices. *Nature*, 264, 746–748.

[2] Kelly, S., Özyürek, A., & Maris, E. (2010). Two sides of the same coin: Speech and gesture mutually interact to enhance comprehension. *Psychological Science*, 21, 260–267.

Preference: poster presentation
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