Repetition and reduction in silent gesture: Evidence from body tracking

Gesture and sign language are "visible bodily actions" that are standardly used for human communication (Kendon 2008). We anticipate that, because they are both transmitted via the visual-gestural modality, sign and gesture should also have some formational properties in common (Kita, van Gijn, & van der Hulst 1998/2014, Gerwing & Bavelas 2004). Here we ask whether changes in form that have been shown to affect lexical signs in sign language can also be observed in elicited silent gestures in a laboratory context. We present body-tracking data from repeated tokens of gestures in a laboratory setting to show that participants' gestures reduce in systematic ways. Namely, here we develop an operational measure for DISTALIZATION, the transferrence of bodily movement to more distal joints (Napoli, Sanders, & Wright 2014), and demonstrate that it is possible to observe and measure distalization in *ad hoc* gestures as they are repeated over the course of a gesture game.

Following Namboodiripad et al. (2015), we used the Microsoft Kinect to track the movements of players in a multi-round communication game. The goal of the game was for pairs of players to successfully communicate about items from a set of 32 English nouns. Players took turns either giving clues about (the Communicator) or guessing (the Guesser) the items. In Round 1, the Communicator could use speech and co-speech gesture, but Rounds 2-4 were silent gesture-only. All items appeared in each round, and we found that over the course of the game, players converged on a set of gestural labels to refer to the target items.

From the gesture-only rounds, we measured the volume of the space that each of six joints (the right and left wrists, elbows, and shoulders) occupied during each item trial for each participant. We assumed that if the volume associated with a given joint during an item trial decreased between rounds, then the joint was moving less over the course of the communication game. Indeed, the volume occupied by each of the six joints per item trial decreased across rounds. In addition, there was a significant interaction of round and joint (p=0.013); the more distal joints decreased in volume less dramatically than the more proximal joints did. This suggests that the distribution of movement in a given gesture trial skewed towards more distal joints as the experiment progressed, our operational metric for the process of distalization.

With Kinect, we have a new tool to unobtrusively measure visible bodily actions produced in an experimental context. Here we have used this tool to assess a relatively fine-grained aspect of gesture form which has been previously described as a component of ontogenetic development and synchronic reduction, both in gesture and in sign.

References

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