GESTURAL ORIGINS OF VERB AND NOUN ENCODING IN SIGN LANGUAGE EMERGENCE

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Human languages use verbs and nouns distinguish actions vs. objects (Langacker 1987) and predication vs. reference (Croft 2000). Prototypically, verbs predicate about actions while nouns refer to objects. The visual modality affords the ability to iconically represent actions and objects with the movement and shape of the hands; in sign languages, related verbs and nouns can be distinguished by manner of movement (Supalla & Newport 1978, Johnston 2001, and Tkachman & Sandler 2013) or handshape (Padden et al. 2015). To examine the possible gestural origins of verb/noun-encoding in representations of actions/objects in sign language emergence, here we ask whether non-signers are sensitive to representational strategies that emulate verb/noun-encoding strategies in natural sign languages.

It has been found that sign-naïve gesturers show a strong preference for representing actions with "handling" handshapes, which show a human hand in action, and a slight preference for representing objects with "instrument" handshapes, which show human manipulation of the object, an encoding strategy that also distinguishes verbs and nouns in ASL (Verhoef et al. 2016). In ASL, movement patterns also distinguish some related verbs and nouns: verbs are formed with longer/continuous movements, while nouns are formed with faster/constrained movements (Supalla & Newport 1978). Here, we test the possible interplay between these handshape and movement preferences. We expect that non-signers will interpret gestures formed with handling handshapes and continuous movements as depicting actions, and gestures with instrument handshapes and constrained movements as referring to objects. However, it is not clear what non-signers may prefer when these mappings are in conflict (Table 1).

Table 1. Expected non-signer responses in four experimental conditions

	Handling handshape	*Instrument handshape*
Continuous movement	Favors **action** interpretation	Conflicting biases
Constrained movement	Conflicting biases	Favors **object** interpretation

We recruited 1175 participants via Crowdflower, and asked them to identify each of the gestures in a pair of videos as representing either an action (e.g. "using a handsaw") or object (e.g. "a handsaw"). Figure 1 shows the proportion of gestures labeled as referring to an action (as opposed to an object) for each gesture type, in the four conditions from Table 1. When movement is constant across gesture pairs and handshape varies, participants map handling handshapes to actions and instrument handshapes to objects. When handshape is constant and movement varies, participants map continuous movements to actions and constrained movements to objects. In the interaction conditions, participants weight their preferences for mappings based on handshapes over their preferences for mappings based on movement, suggesting that handshape is a more salient cue.

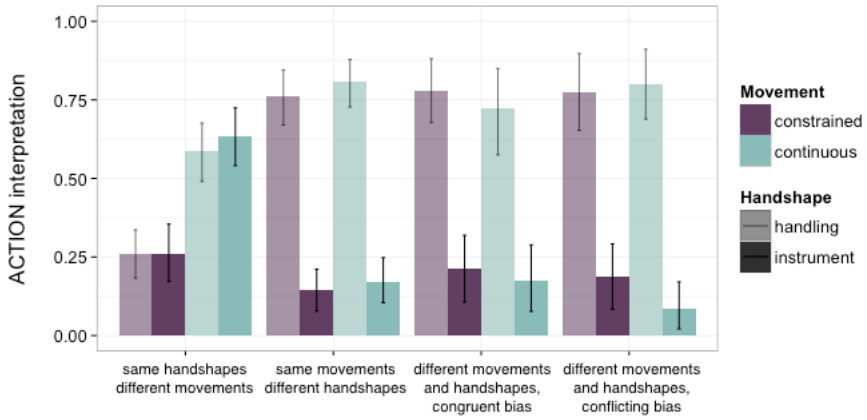

Figure 1. Proportion of gestures interpreted as describing an ACTION (as opposed to an OBJECT) for each of two gesture types, in each of the four experimental conditions

In this perception experiment, we replicate the finding that nonsigners exhibit a handshape bias when interpreting gestures as referring to objects/actions, and we identify an expected movement bias. When these biases are in conflict, nonsigners overwhelmingly map forms to meanings on the basis of their handshape bias.

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