

## Title: Negotiated Iconicity in Interactive Silent Gesture Communication

### Abstract:

The manual modality affords a number of iconic strategies for representing meanings. Silent gesture and pantomime studies have found that hearing non-signers tend to signal meanings, especially manipulable objects and associated actions, with action-variant gestures (Padden et al, 2015; Ortega et al, 2014; Verhoef et al, 2016). These include handshapes that resemble handling an object or the acting out of verbs. Non-manipulable objects, in contrast, are depicted by tracing salient features of the object (Ortega & Ozyurek, 2016). However, many of these studies have gesturers produce signals in isolation. What effect might interaction have on these signals in terms of maintaining, eliminating, or modifying iconic strategies? The process of alignment to form-meaning matches is an achievement of interaction arising from repeated negotiation, in this case, of iconic strategies.

Participants played an iterated, gradual turn-over communication task which required disambiguating similarly gestured noun-verb pairs using only silent gesture. The target meanings included both high and low affordances (Masson-Carro et al, 2015) for manipulability. In one condition, participants were allowed more opportunities for negotiation via repair, while the other condition did not allow for extended repair turns after guessing gestured meanings. In this face-to-face paradigm, participants were able to engage in negotiation to achieve interactive alignment. In transmission chains that allowed for more negotiation, participants innovated and conventionalized noun markers that distinguished noun gestures from verb gestures. Noun markers allowed for one type of iconicity to remain in the system (versus a patterned iconicity (Padden et al, 2015)) while simultaneously disambiguating the noun-verb paired meanings.

Target meanings that have high affordances for manipulability, were most frequently gestured with “Handled” handshapes wherein the hand resembled the holding of the imagined object. This handshape often corresponded with the acting out of the object’s associated action. For example, “A Hammer” would be represented with a fist held “holding” the imagined noun and moving up and down against a real or imagined surface. In contrast, low affordance targets were gestured via acting (of associated action) and at times also included a trace of the noun’s shape. For instance, “A Photograph” was gestured by enacting the snapping of a camera, and was also accompanied by a trace of the photograph’s square-like shape. Embodied representations were infrequent, except for their consistent use for the meanings “A Phone” and “Phoning” which took on the emblematic pinky and thumb extensions held to the ear.

Recent studies have found that interaction may in fact increase the motivatedness of signals - both vocal and gestural - suggesting that interaction may promote iconic biases (Little et al, submitted; Little et al, in press; Lister et al, 2015). Here when participants negotiated forms to align to, their biases for action-based iconicity were strengthened. Thus, we do not see a move toward a patterned iconicity nor toward abstraction. Instead, action-based iconicity is maintained for both noun and verb meanings, while nouns are highlighted with a negotiated (and potentially motivated) marking strategy for effective communication.

## References

- Lister, C.J., Fay, N., Ellison, T.M., & Ohan, J. (2015). Creating a new communication system: Gesture has the upper hand. *Proceedings of the 37th Annual Meeting of the Cognitive Science Society* (CogSci 2015).
- Little, H., Perlman, M. & Eryilmaz, K. (submitted). Repeated interactions can lead to more iconic signals. *Proceedings of the 39th Annual Meeting of the Cognitive Science Society* (CogSci 2017).
- Little, H., Eryilmaz, K., & de Boer, B. (in press). Conventionalization and discrimination as competing pressures on continuous speech-like signals.
- Masson-Carro, I. , Goudbeek, M. & Kraemer, E. (2016). Can you handle this? The impact of object affordances on how co-speech gestures are produced. *Language, Cognition and Neuroscience*, 31 (3), 430-440.
- Ortega, G., & Ozyurek, A. (2016). Generalisable patterns of gesture distinguish semantic categories in communication without language. In A. Papafragou, D. Grodner, D. Mirman, & J. Trueswell (Eds.), *Proceedings of the 38th Annual Meeting of the Cognitive Science Society* (CogSci 2016) (pp. 1182-1187). Austin, TX: Cognitive Science Society.
- Ortega, G., Sumer, B., & Ozyurek, A. (2014). Type of iconicity matters: Bias for action-based signs in sign language acquisition. In P. Bello, M. Guarini, M. McShane, & B. Scassellati (Eds.), *Proceedings of the 36th Annual Meeting of the Cognitive Science Society* (CogSci 2014) (pp. 1114-1119). Austin, Tx: Cognitive Science Society.
- Padden, C., Hwang, S.-O., Lepic, R., & Seegers, S. (2015). Tools for language: patterned iconicity in sign language nouns and verbs. *Topics in Cognitive Science*, 7(1), 81–94.
- Verhoef T., Padden C., & Kirby S. (2016). Iconicity, Naturalness And Systematicity In The Emergence Of Sign Language Structure. In S.G. Roberts, C. Cuskley, L. McCrohon, L. Barceló-Coblijn, O. Fehér & T. Verhoef (eds.) *The Evolution of Language: Proceedings of the 11th International Conference* (EVOLANG11).