I SEE WHAT YOU DID THERE: THE ROLE OF ICONICITY IN THE ACQUISITION OF SIGNS

ASHA SATO*[1], MICHAEL RAMSAMMY[2], MARIEKE SCHOUWSTRA[1] and SIMON KIRBY[1]

*Corresponding Author: Asha.S.Sato@ed.ac.uk
[1]Centre for Language Evolution, University of Edinburgh, Edinburgh, UK
[2]Department of Linguistics and English Language, University of Edinburgh, Edinburgh, UK

Recent theoretical syntheses offer a view of language in which iconicity – a perceived resemblance between form and meaning – is seen as a fundamental design feature alongside arbitrariness (Dingemanse et. al. 2015). Under this view, iconicity serves to bootstrap acquisition, and there is a large body of work from both spoken and gestural modalities confirming that iconic signs are easier to acquire than arbitrary signs (for an overview, see Lockwood & Dingemanse, 2015; Perniss et. al. 2010). However, two recent studies suggest a more nuanced picture of iconicity's contribution to learning: In an artificial language learning experiment using a whistled language, Verhoef et. al. (2016) found that whistles were reproduced less accurately in a condition where iconicity was possible compared to a condition where iconicity was disrupted by scrambling the correspondence between signals and meanings. Similarly, in a longitudinal study of phonological development in British Sign Language (BSL) learners, Ortega & Morgan (2015) found that learners produce iconic signs with less articulatory accuracy than arbitrary signs of equal complexity. These two results are apparently contradictory to the idea that iconicity provides a learning advantage, but we suggest this is because most iconicity learning studies have focused on the acquisition of the *mapping* between form and meaning, thus potentially obscuring subtleties relating to the acquisition of the *form*.

We present the results of an experiment focusing on iconicity's role in the acquisition of forms. In line with Ortega & Morgan (2015) and Verhoef et. al. (2016), we predict that while iconicity helps to acquire new mappings, it may also lead to less precise encoding of forms. We presented learners (n = 36, no previous experience of a signed language) with an artificial gestural language based on iconic and arbitrary signs from BSL. We measured performance on an immediate imitation task, using the 3D body-tracking capabilities of Microsoft Kinect to quantify the trajectories of learners' wrists during production. This allows comparison of gestures produced by different participants using Dynamic

DOI:10.12775/3991-1.120

Time Warping (Celebi et. al. 2013). We also measured recall of the mapping using a guessing task, and recorded iconicity ratings on a 7 point Likert scale.
Our results show that learners were indeed better at remembering mappings they perceived to be iconic (Figure 1), however, counter to our prediction, there was no difference in the accuracy with which they reproduced iconic and arbitrary items (Figure 2). A possible explanation for this is that the Kinect-based measured we used focuses on the trajectory of movement of the joints of the arms and wrists, whilst in the chosen stimuli iconicity was often based on hand-shape, rather than movement (e.g. in BSL 'TREE'). Future work will use stimuli that are more suited to the Kinect-based measure.

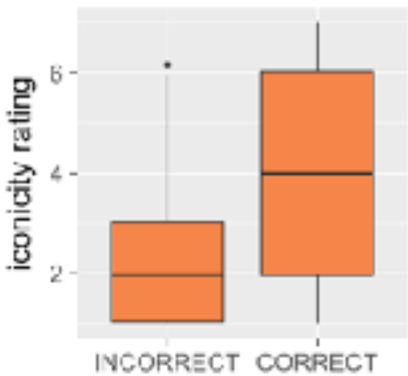

Figure 1: Correctly recalled items received higher iconicity ratings.

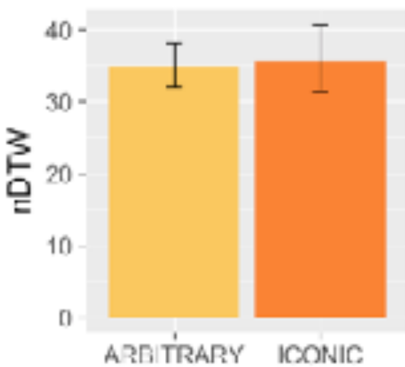

Figure 2: Participants were not more accurate at copying arbitrary gestures.

Acknowledgements

Asha Sato is funded by the Economic and Social Research Council (grant number ES/J500136/1).

References

Celebi, S., Aydin, A. S., Temiz, T. T., & Arici, T. (2013). Gesture Recognition using Skeleton Data with Weighted Dynamic Time Warping. In *VISAPP (1)* (pp. 620-625).

Dingemanse, M., Blasi, D.E., Lupyan, G., Christiansen, M.H. and Monaghan, P., (2015). Arbitrariness, iconicity, and systematicity in language. *Trends in Cognitive Sciences*, *19*(10), pp.603-615.

Lockwood, G. and Dingemanse, M., (2015). Iconicity in the lab: A review of behavioral, developmental, and neuroimaging research into sound-symbolism. *Frontiers in psychology*, *6*, p.1246.

Perniss, P., Thompson, R. and Vigliocco, G., (2010). Iconicity as a general property of language: evidence from spoken and signed languages. *Frontiers in psychology*, *1*, p.227.

Ortega, G. and Morgan, G. (2015). Phonological development in hearing learners of a sign language: The influence of phonological parameters, sign complexity, and iconicity. *Language Learning*, 65(3), pp. 660-688.

Verhoef, T., Kirby, S., & Boer, B. (2016). Iconicity and the emergence of combinatorial structure in language. *Cognitive science*, *40*(8), 1969-1994.