Difference between signed and spoken languages is rooted in duality of patterning, not in amount of iconicity

Signed languages (SLs) are generally believed to exhibit greater iconicity compared to spoken languages. In this talk we will argue that at the lexical level iconicity emerges and functions similarly in languages of both modalities.

We define iconicity as a psycholinguistic variable that measures language users' subjective feeling for how well a signifier fits a concept associated with it. Following Gasser, et al. (2011), we distinguish *absolute iconicity*, based on the direct relationship between form and meaning (e.g. onomatopoeia), and *relative iconicity*, which corresponds to systematic associations of some phonemes with some meanings. While absolute iconicity is only marginally present in spoken languages, relative iconicity is widespread cross-linguistically, as systematic associations of particular phonological contrasts with particular oppositions in semantics are attested in many languages of the world (Blasi et al. 2016, Dingemanse 2018). Notably, in SLs contrasts between phonological parameters also correspond to semantic contrasts (cf. *ion-morphs* by Fernald & Napoli 2000).

To explore how iconicity in SLs is grounded in systematic contrasts at the sub-lexical level, we selected 300 American sign language (ASL) signs from the ASL-LEX database (Sehyr et al. 2021) and 300 Spanish sign language (LSE) signs from the LSE-sign database (Gutierrez-Sigut et al. 2016) and annotated each phonological parameter of each sign (i.e. handshape, location and movement) for its iconic motivation (cf. Pietrandrea 2002 for a similar approach). The key principle of our annotation system was to determine whether the phonological component represents itself (absolute iconicity) or something else (Figure 1). Of the signs, 184 were translational equivalents. Within the set of translational equivalents, the distribution of iconic mechanisms did not differ significantly between ASL and LSE: both languages had the same most frequent combinations and nearly all logically possible combinations showed up in the annotations.

Additionally, we had iconicity ratings for the signs from native signers of the corresponding language and from sign-naive speakers of English (ASL signs) or Spanish (LSE signs). Comparing these iconicity ratings according to the signs' iconic mechanisms confirmed that both ASL and LSE signers were equally sensitive to the same combinations of iconic parameters (Figure 2). In contrast, non-signers and signers differed in their perception of iconic patterns in both languages.

The absence of a significant difference in perception of the same iconic patterns by LSE and ASL signers is driven by the similar overall distribution of these patterns in both languages. Signers are sensitive to associations between particular phonological components with particular semantics through statistical learning, just as speakers of spoken languages are, as evidenced by the mil/mal or kiki/bouba effects (Sidhu & Pexman 2018). At the same time, sign-naive individuals do not have access to the peculiarities of SLs phonology and thus differ from signers in their perception of iconicity. Thus, the difference between spoken and signed languages with respect to iconicity lies in the proportion of absolute iconicity: while in spoken languages only onomatopoeia lacks duality of patterning (sound stands for itself), in SLs handshapes, movements and locations can stand for themselves.

References:

Blasi, D. E., Wichmann, S., Hammarström, H., Stadler, P. F., & Christiansen, M. H. (2016). Sound–meaning association biases evidenced across thousands of languages. *Proceedings of the National Academy of Sciences*, *113*(39), 10818-10823.

Dingemanse, M. (2018). Redrawing the margins of language: Lessons from research on ideophones. *Glossa*, 3(1), 4.

Fernald, T. B., & Napoli, D. J. (2000). Exploitation of morphological possibilities in signed languages: Comparison of American Sign Language with English. *Sign Language & Linguistics*, *3*(1), 3-58.

Gasser, M., Sethuraman, N., & Hockema, S. (2011). Iconicity in expressives: An empirical investigation. In J. Newman & S. Rice (Eds.), *Empirical and experimental methods in cognitive/functional research* (pp. 163–180). Stanford, CA: Center for the Study of Language and Information.

Gutierrez-Sigut, E., Costello, B., Baus, C., & Carreiras, M. (2016). LSE-sign: A lexical database for spanish sign language. *Behavior research methods*, *48*(1), 123-137.

Pietrandrea, P. (2002). Iconicity and arbitrariness in Italian sign language. *Sign Language Studies*, *2*(3), 296-321.

Sehyr, Z. S., Caselli, N., Cohen-Goldberg, A. M., & Emmorey, K. (2021). The ASL-LEX 2.0 Project: A database of lexical and phonological properties for 2,723 signs in American Sign Language. *The Journal of Deaf Studies and Deaf Education*, *26*(2), 263-277.

Sidhu, D. M., & Pexman, P. M. (2018). Five mechanisms of sound symbolic association. *Psychonomic bulletin & review*, *25*(5), 1619-1643.

| THINK. Location on the body stands for itself (SelfBody) | CLOUD. Location in the marked part of the signing space stands for itself (SelfSpace) | MAILBOX. Location on the body stands for some other object (SubstituteBody) | YELLOW. Location is not iconic (X) |

Figure 1. Types of iconic motivation for sign location illustrated with different LSE signs. The annotation system also includes categories for handshape and movement.
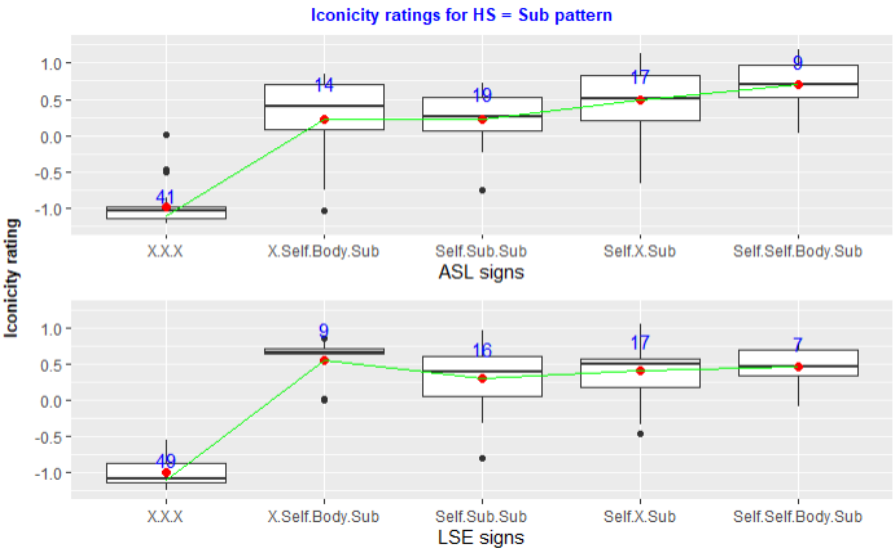

Figure 2. Boxplots showing iconicity ratings for different groups of signs grouped according to their sublexical iconic mechanisms. These plots include signs that contain handshape representing some other object. X means not iconic; Self means that a parameter represents itself; Sub means that a parameter represents something else. Order of parameters: Movement-Location-Hanshape Independent factorial ANOVA with White's adjustment shows no significant difference between two language groups (p = 0.1792)

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