Iconicity in concrete and abstract concepts: A cross-linguistic comparison of silent gestures and signs

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The visual modality affords a high degree of iconic form-meaning mappings (Taub, 2001). This high affordability shapes how concepts are represented in the visuo-manual modality, both in the gestures produced by non-signers and in the lexicon of the sign languages of deaf communities. Past research finds considerable consistency in the way people across different cultures use iconic mapping strategies to refer to concrete referents in silent gestures (e.g., representing the handling of an object; Masson-Carro et al., 2015; Müller, 2009; Ortega & Özyürek, 2020; van Nispen et al., 2017). Studies have also shown overlap between the iconic strategies used in silent gesture with the strategies used in conventionalised lexical signs (Hou, 2018; Hwang et al., 2017; Padden et al., 2013, 2015). These findings suggest that gesturers and signers often converge in how they iconically represent features of a referent. However, studies thus far have focused on concrete concepts from specific semantic domains, such that it remains unclear whether and how these findings might generalise to more abstract domains. In spoken languages, iconicity may be less conducive to representing abstract concepts (Lupyan & Winter, 2018), yet in sign languages, iconic mappings readily underlie abstract concepts, e.g. through metaphor (Taub, 2001). Silent gestures can serve as an important stepping stone to understanding how iconicity is used for abstract reference, as they share a modality with sign languages yet do not show the same degree of conventionalisation. Given that abstract concepts have less evident sensori-motor features that can be depicted through iconicity, gesturers may find it difficult to provide gestural representations and converge less on iconic strategies. This higher diversity may also be visible across sign languages.

In the present study, we investigate how iconicity shapes representation of concrete and abstract concepts in the visual modality by comparing silent gesture (by speakers of British English and German, respectively), British Sign Language (BSL) and German Sign Language (DGS). For silent gesture, we want to know how non-signers use iconic resources to represent concrete and abstract referents. Comparing silent gesture to signs, we enquire whether concepts that show a higher diversity of responses in silent gestures also use different iconic strategies in BSL and DGS. We selected 234 concepts from a sign elicitation task conducted with signers of BSL ($n = 4$) and DGS ($n = 5$) and annotated each for whether the signs used in BSL and DGS shared the same iconic strategy. In a separate gesture elicitation task, hearing non-signers in the UK ($n = 15$) and Germany ($n = 15$) spontaneously produced silent gestures for the same 234 concepts without speaking. They were allowed to pass, if they could not think of a response. We also collected abstractness ratings for each concept from signers ($n = 55$) and non-signers ($n = 44$) in the UK and Germany. Silent gestures were annotated for response type (pass, manual gesture, other) and use of iconic strategy (acting, representing, personification, entity, tracing, deictic, other). We then calculated the Gini-Simpson Diversity Index (Simpson, 1949) for each concept, quantifying the degree of variation in the use of iconic strategies across participants' gestures, with higher values indicating less similar responses. We investigated the relationship between diversity scores in gesture productions, abstractness ratings and sharing of iconic strategy between signs through a Bayesian regression model (div_index ~ 1 + abstractness + strategy_overlap_signs, family = skew_normal).

Together, gesturers in the UK and Germany passed on 20.31% (1763) of trials and produced at one gesture on 55.36% (4806) of trials. Gesturers where more likely to produce manual gestures for concrete concepts, while abstract concepts showed a higher proportion of passes relative to the number of concepts. Small but consistent differences between concrete and abstract concepts also surface with respect to diversity scores in gestural responses (est. (abstractness) = 0.05, est. error = 0.01, 95% CI [0.02, 0.07]). Concrete concepts showed a range of diversity scores, with a spread from very consistent responses in terms of iconic strategies used (low diversity scores) to high variation across participants (high diversity scores). Abstract concepts predominantly showed high diversity scores, eliciting high variability in the iconic strategies used across participants (see Figure 1). BSL and DGS used the same strategy for 56.41% (132) of the 234 concepts. Comparing silent gesture to signs, we found that concepts for which gesturers showed high variability in iconic strategies were also likely to use different iconic strategies in BSL and DGS (see Figure 1, estimate (strat. Overlap) = -0.14, est. error = 0.04, 95% CI [-0.21, -0.06]).

The high number of passes and variation in gestural responses, particularly for abstract concepts, suggests that non-signers experience difficulties producing iconic representations for abstract domains. The concepts that show higher variation in gestures and across sign languages indicate that particular concepts are intrinsically more difficult to represent using iconic strategies, resulting in less similar responses, regardless of abstractness.

By comparing gestures and signs, we show that iconicity plays an important role in reference to abstract as well as concrete concepts, both for silent gesture and the conventionalised lexicon of sign languages. We find that abstract concepts show higher variation in iconic representations in the visual modality, reminiscent of the lacking suitability for abstractness suggested by Lupyan and Winter (2018). Yet, participants do produce rich iconic gestural representations for many concepts, including highly abstract concepts, highlighting the importance of taking modality into account in linguistic enquiry.

Index Terms: sign language, silent gesture, iconicity

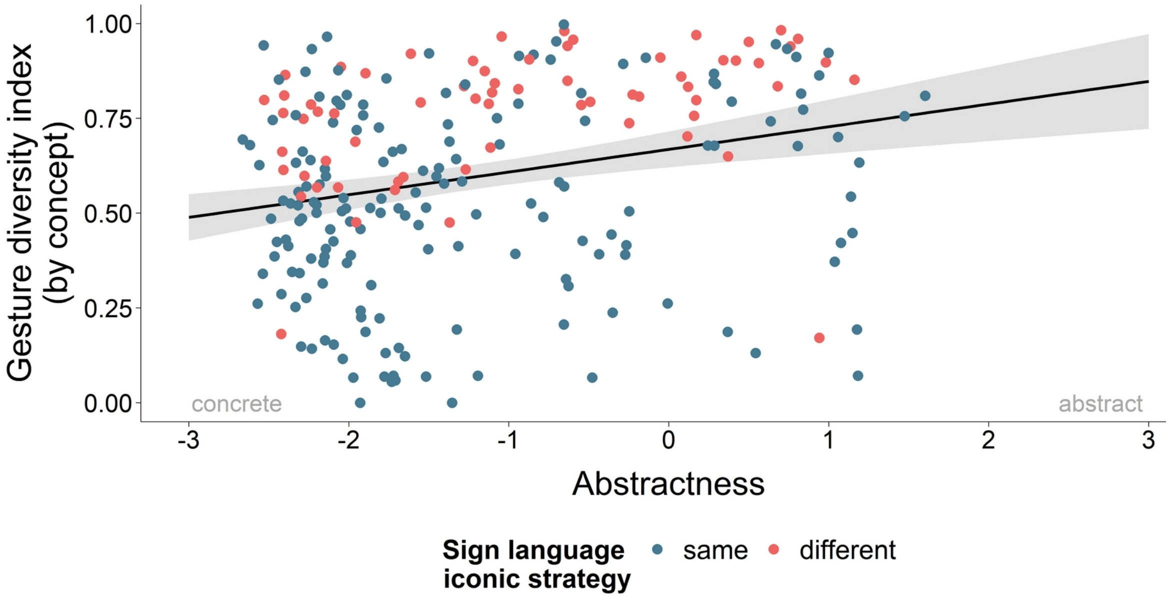

Figure 1: Gini-Simpson Diversity Index for iconic strategy use in gestures by abstractness ratings. Each dot represents a concept. Blue dots indicate concepts that use the same iconic strategy in BSL and DGS; red dots indicate concepts that use different iconic strategies in BSL and DGS.

Materials

Data and analysis scripts can be found at: https://osf.io/j6tb8/?view_only=2658b4b15ea141dd91b59570afa92ba8

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