

## **Lexical properties in sign language: familiarity and iconicity do not go hand in hand**

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Research into the processing of sign languages is limited by the unavailability of lexical characteristics (or large corpora) for most sign languages. Lexical databases for British Sign Language (BSL) and American Sign Language (ASL) include measures such as familiarity and iconicity ratings or phonological neighbourhood density (Vinson et al., 2008; Sehyr et al., 2021). We collected familiarity and iconicity ratings from 90 deaf signers (half of whom were native signers) for a set of 300 lexical signs taken from a database of Spanish Sign Language (LSE). The signs were chosen to be representative of the full database (in terms of phonological form) and to include a broad range across the frequency and iconicity dimensions; additionally, 200 of the signs had meanings represented by an image (in the Multipic database, Duñabeitia et al., 2018). The familiarity ratings show a broadly normal distribution whereas the iconicity ratings tend toward a binomial distribution, with signs being rated as either highly iconic or not iconic. The data reveal a negative correlation between familiarity and iconicity, confirming a pattern found for other sign languages (Sehyr et al., 2021), but in contrast to findings for iconicity ratings in spoken language, which have a (weak) positive correlation with frequency (Hinojosa et al., 2020).

To examine the impact of these lexical properties on sign processing, we carried out a lexical decision task with 200 of the rated signs plus 200 pseudosigns (created by changing the handshape, location or movement of a real sign so that it no longer had a meaning). Previous work on ASL found a facilitatory effect of familiarity but iconicity lowered accuracy for native signers (Caselli, Emmorey & Cohen-Goldberg, 2021). Results from forty-two deaf signers (half of whom were native signers) showed a clear lexicality effect: responses to real signs were faster and more accurate compared to pseudosigns (see fig. 1). Analysis of the responses to real signs (see fig. 2) revealed that native signers were more accurate in their responses than non-native signers. Additionally, there was a facilitatory effect of familiarity: signs with higher familiarity ratings had more accurate and faster responses (with no difference between native and non-native signers for this effect). Similar to Caselli et al. (2021), iconicity did not affect reaction times, but in contrast to this earlier study, iconicity was associated with greater accuracy (in both native and non-native signers).

We also collected data on a picture naming task for these 200 signs from the same participants, again registering accuracy and response time as our measures of interest. Previous work showed a facilitatory effect of iconicity on response times in BSL (Vinson et al., 2015), ASL (Sehyr & Emmorey, 2022) and Catalan Sign Language (Gimeno-Martínez & Baus, 2022). As can be seen in Figure 3, familiarity had little impact on the responses (either in terms of accuracy or response times). In contrast, iconicity did play a clear role in this production task: more iconic signs were associated with more accurate and faster responses. There was also an interaction between familiarity and iconicity for accuracy: for more iconic signs, familiarity had no effect on accuracy but for less iconic signs familiarity had a facilitatory effect (see fig. 4), suggesting that iconicity boosts sign retrieval. For this task there were no significant differences between native and non-native signers.

These results reveal that lexical access in a signed language bears similarities to spoken language access – we see typical lexicality and familiarity effects – but there are also modality-specific effects: iconicity is distributed across the lexicon differently in signed and spoken languages. This may be due to how iconicity is exploited by each type of language and also how the language users perceive (and therefore rate) iconicity. Additionally, the impact of iconicity on lexical access is task dependent. While iconicity (weakly) facilitates sign

recognition, as has been reported for spoken language (Hinojosa et al., 2020), a strong link between form and meaning has a notable impact on producing a sign from a picture prompt. Measuring these lexical indices provides insight into the structure of the sign lexicon and its cognitive representation.

**Keywords:** lexical indices, familiarity, iconicity, subjective ratings, lexical decision, picture naming

**References**

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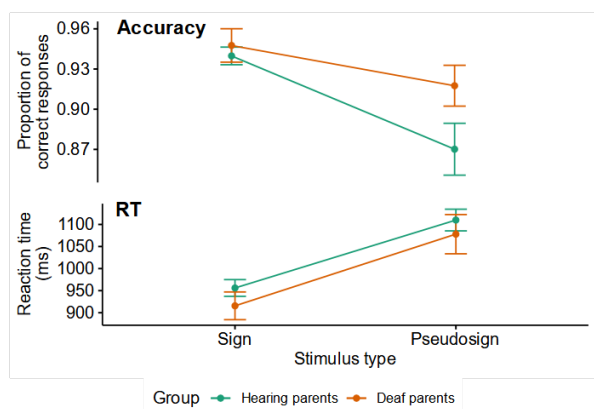


Figure 1. Accuracy and reaction times for the lexical decision task showing the different responses for real signs and pseudosigns. Error bars show standard error.

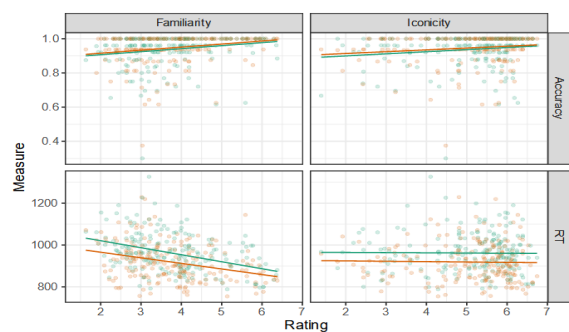


Figure 2. Relation between measures of interest – Accuracy (top row) and reaction time (RT, bottom row) – and lexical indices – Familiarity (left) and Iconicity (right) – for the lexical decision task. See fig.1 for colour key.

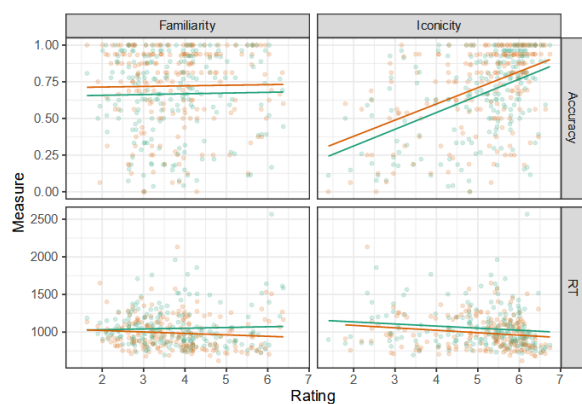


Figure 3. Relation between measures of interest – Accuracy and reaction time (RT) – and lexical indices – Familiarity (left) and Iconicity (right) – for the picture naming task. See fig.1 for colour key.

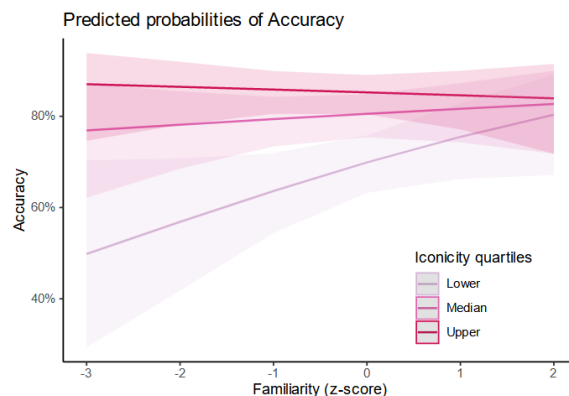


Figure 4. Accuracy scores in the picture naming task as a function of familiarity and iconicity.