Iconicity and Memory

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Phonological iconicity refers to instances in which the sound of a word imitates its meaning (see Perniss et al., 2010). One example of this is onomatopoeia, instances in which the sound of a word directly imitates its meaning (e.g., *splash*, *meow*). Iconicity can also emerge in less direct, more analogical instances. For example, the word *fluffy* is evocative of a soft texture, though it doesn't imitate the *sound* of fluffiness.

Previous research has demonstrated that iconic words can be easier to learn (e.g., Imai et al., 2008) and process (e.g., Sidhu et al., 2020). One possible explanation for this is that these effects arise from the special link between sound and meaning for iconic items. In this work we examine whether participants have a better *memory* for iconic items. In addition, we make use of the levels of processing paradigm (see Craik, 2002) to examine if having participants focus on the phonological form of a word will enhance memory specifically for iconic words. This would support the idea that the sounds of iconic words carry meaning.

In a pre-registered study, we presented 132 participants with 80 real English words to remember. Half of these were iconic and half were non-iconic, based on ratings from Winter (2021). Iconic and non-iconic words were also matched log subtitle frequency (Brysbaert & New, 2009), length, orthographic levenshtein distance, phonological levenshtein distance (Yarkoni et al., 2008), concreteness (Brysbaert et al., 2014), valence (Warriner et al., 2013), mean bigram frequency, number of phonemes, number of syllables, number of phonological neighbours and ease of articulation (collected as pilot data). Further, half of the participants received a deep encoding task when learning items (rate the pleasantness of this word) and half received a shallow encoding task (rate how difficult this word is to articulate). They then took part in a recognition task with 80 new words (half iconic, half non-iconic) as fillers.

We found no interaction between encoding condition and iconicity. We did find a main effect of encoding condition, such that participants in the deep encoding condition had overall better memory than participants in the shallow encoding condition. In addition, we found main effects of iconicity, such that iconic words elicited more hits *and* false alarms. Investigating this further with signal-detection analyses, we found that participants had a higher d' score (i.e., better ability to distinguish old and new items) for non-iconic words, and that they set a lower response criterion (Criterion C) for iconic words, see Figure 1. Supplementary analyses suggested that these effects were strongest for onomatopoeic iconic words (vs. non-onomatopoeic iconic words). This suggests that, instead of leading to a better memory, participants may be more likely to think that they have previously seen an iconic word, regardless of whether the word is old or new.

These results suggest a novel property of iconic items: they evoke a feeling of having been seen before in recognition memory. While further research is needed, we speculate that this might arise from the special link between sound and meaning in iconic items leading to a stronger activation of meaning for these items. This might be interpreted by participants as evidence of having previously seen the item.
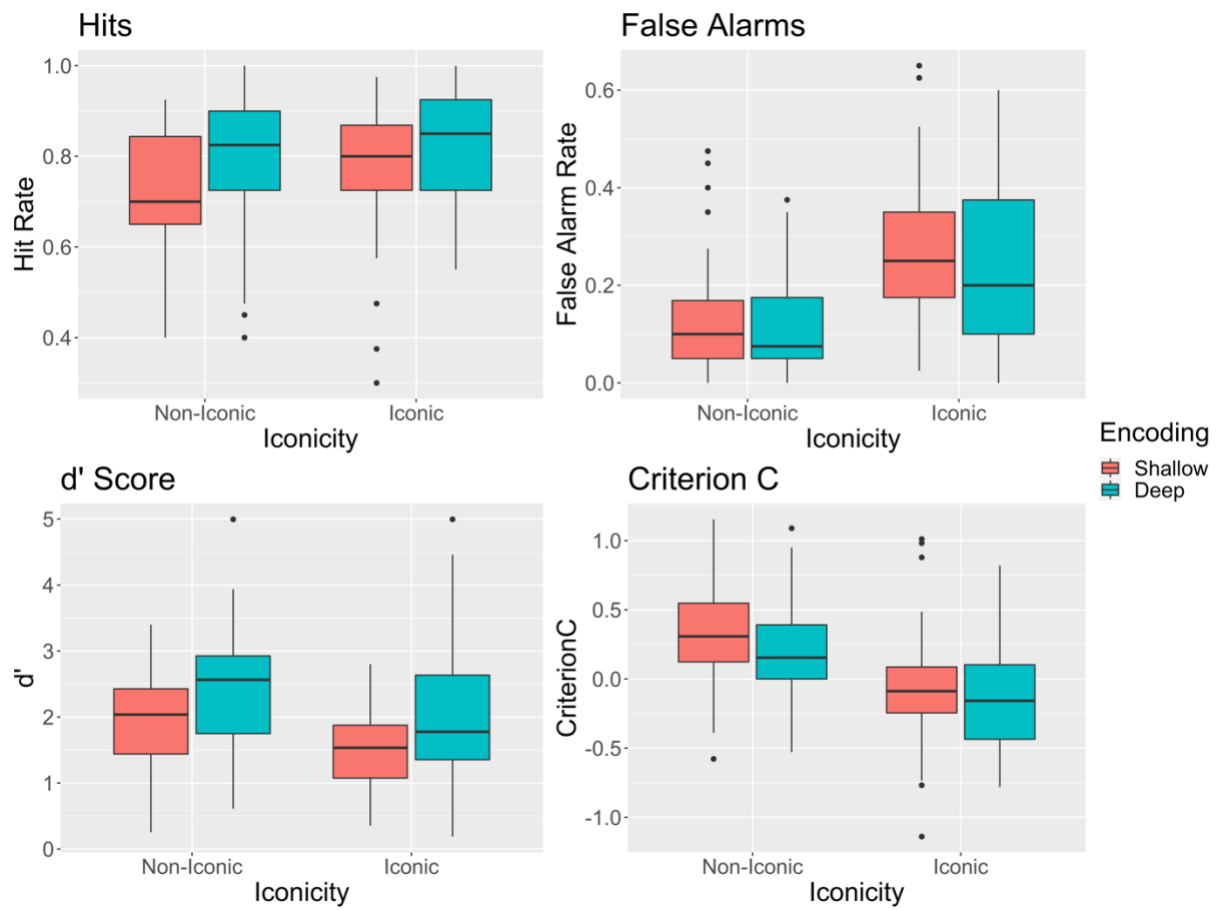
Figure 1. Average subject hit rate, false alarm rate, d' Score and Criterion C, by word iconicity and encoding condition.