ICONIC WORDS MAY BE COMMON IN EARLY CHILD INTERACTIONS BECAUSE THEY ARE MORE ENGAGING

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Spoken vocabularies contain a substantial number of iconic words, and a complete account of language evolution must explain how and why this is the case. Iconicity is especially prevalent in early communication, with one hypothesis being that this is because it scaffolds word learning by helping infants to establish referentiality, and another being that the phonological simplicity of iconic words makes them more pronounceable for infants. This study develops methods to examine whether another function of iconicity could be that it increases infants' engagement in interactions because there is something inherently fun about iconic communication. Iconicity ratings were assigned to transcribed words in a mother's utterances in 41 sessions with her infant between the ages of 12 and 24 months (from the Providence corpus (Demuth et al., 2006; MacWhinney 2000)). High and low iconicity bouts were identified by calculating the rolling average of iconicity per 5 words and focusing on those utterances with the highest and lowest averages. Key features from 58 high and 58 low iconicity bouts were then coded from corresponding video. Results showed that high iconicity interactions contained more behaviors considered to be indicative of engagement: eye contact, additional paralinguistic features, joint attention, smiling/laughing, gesture, child-directed utterances, and less displacement. These preliminary findings speak to the multi-functional nature of iconicity in parent-child interactions. They suggest that iconic words might be prevalent in current spoken vocabularies because people, especially young language learners and their caregivers, find these words to be intrinsically fun and engaging.

1. Background

Despite the longstanding doctrine of the 'arbitrariness of the sign', the vocabularies of spoken (as well as signed and protactile) languages are now understood to be characterized by iconicity, as well as arbitrariness (Dingemanse et al. 2015; Perniss et al. 2010; see Edwards 2017 for protactile). That is, the forms of many words are perceived to bear some amount of resemblance to what they mean, such as words like *woof* and *beep* that convey aspects of sound, and also words in other semantic domains like *wiggle* expressing manner of movement, and *teeny* expressing small size. Such words are especially prevalent in the speech

of young children and their caregivers (Laing, 2020; Perry et al. 2018). In light of accumulating evidence of iconicity in spoken vocabularies, it is clear that a complete account of language evolution must explain, not just how iconicity could have grounded the first spoken words, but also why current vocabularies continue to be iconic, and why some kinds of words are more iconic than others.

One hypothesis is that iconicity is maintained in languages because it helps young children learn their first words by "bootstrapping" the connection between the form of a word and its referent (Imai & Kita, 2014; Perniss & Vigliocco 2014). If languages evolve to be more learnable by children (Christiansen & Chater, 2008), then iconic form-meaning pairings that are more learnable may be preferred in the lexicon over time. There is considerable evidence for the bootstrapping hypothesis. Children acquire iconic forms early and both they and their caregivers use them disproportionately often (Motamedi et al., 2020; Perlman et al., 2017; Perry et al., 2018). And critically, experiments show that iconicity can help children learn new words (e.g., Miyazaki et al., 2013). For example, 3-year-old English speaking children better learned Japanese verbs when they were iconic (Kantarzis et al 2011).

Another reason that iconic words – specifically, sound-imitative words or *onomatopoeia* – might be especially prevalent in early child vocabularies is because they tend to be phonological simple and easy to produce (Laing, 2014). An analysis of diary and video data from six languages showed that infants' early lexicons were dominated by a set of easily pronounceable prosodic structures – most often consonant harmony and consonant vowel – and that onomatopoeia fit these structures more often than non-onomatopoeic forms (Laing, 2019).

Here, we explore an alternative to these two hypotheses for why early child communication is so iconic. We consider whether iconic words might occur frequently in child communication because they are especially fun and engaging (*whee!*). More than prosaic words, iconic words tend to activate the senses and emotions (Nielsen & Dingemanse, 2020). Japanese speakers exposed to mimetics perceive meanings more vividly, describing experiencing an 'at-the-scene' feeling when hearing or reading these words, as though they contain, in some sense, a degree of 'sensory input' (Kita, 1997, p. 381). Moreover, Dingemanse and Thompson (2020) found that words rated high for iconicity also tended to be rated high for 'funniness'. They suggest that iconic words are 'valued as much for their performative character as their informative content' (p. 205).

Thus, iconic words could play a role in early word learning because they are more engaging for infants and their caregivers. There may be something inherently more fun about iconic communication that could enrich language-learning and facilitate the acquisition of early words. We explored this possibility by comparing infant-caregiver interactions with iconic words to

those with arbitrary words, asking whether high iconicity interactions show more engagement by child and mother. To find out, we employed a novel method of using lexical iconicity ratings to continuously track the level of iconicity throughout an interaction, identifying bouts of high/low iconicity, and then coding these for different indicators of engagement by child and caregiver.

2. Methods

The data were taken from the Providence corpus (Demuth et al., 2006), part of the CHILDES database (MacWhinney 2000), a corpus of spontaneous video-recorded and transcribed interactions from six pairs of American English-speaking parents and children in their homes. As a proof of concept, we focused on a sub-corpus of 41 sessions between the infant 'Naima' and her mother (203201 total words). The recordings were made fortnightly while Naima was between the ages of 0;11.26 – soon after the onset of her first words – and 1;11.26.

From the mother's speech (155004 words), we identified bouts of high and low iconicity by using the mean iconicity ratings of her words used in the interactions (see Figure 1). These were taken from Winter, et al. (2022), which collected ratings for over 14,000 English words by asking adult native speakers to rate words on a scale of 1-7, with 1 being 'not iconic at all' and 7 being 'very iconic'. The average iconicity rating of each word was used to calculate a running average of iconicity per five words across the interactions. Iconicity ratings were assigned to the lemmatized forms of all words in the mother's utterances. Any words for which no iconicity rating existed were excluded (10.3% of words in the corpus). We set a threshold of a running average of 5 or above for bouts of high iconicity and 2 or below for bouts of low iconicity, which resulted in 58 bouts of each (high iconicity bouts = 2586 words; low iconicity bouts = 2676 words).

We next looked at the video of these instances to identify the features that characterized these different types of interactions. To assess the level of engagement, we coded these bouts for: eye contact (mother and child looking directly at each other during an utterance), joint attention (mother and child both directing their gaze towards the same object during an utterance), smiles and/or laughter, gestures and/or actions performed on an object by the mother and by the child, paralinguistic features (distinct moderations to tone, pitch, emphasis or extra-phonetic features such as panting like a dog), displacement (mother mentioning referents not present in the immediate context during an utterance) and child-directed speech

(directly addressed to the child, as opposed to another adult, the camera or herself).

	3.7	4.06	3.62	3.7			
	3.3	3.8	2.1	5.7			
MOT:	savoring	apples	and	blueberries			
	4.12						
	5.7	NA					
MOT:	oh	mm					
	3.944	4.1688	4.86	4.3	3.75	3.6	3.88
	4	3.4	5.5	2.9	4.3	1.9	4.8
MOT:	have	another	bite	it	is	so	good
	3.58		4.1				
	4	NA	5.5				
MOT:	have	a	bite				
	4.75	5.3	5.64	6.14			
	5.7	6.5	6.5	6.5			
MOT:	oh	**yum**	**yum**	**yum**			
	6.18	5.08					
	5.7	6.3					
MOT:	**oh**	**yummy!**					

Figure 1: An excerpt of transcribed speech from Naima's mother, showing the calculation of a rolling average of iconicity. The bottom number in red shows the average iconicity of the word below it, and the top number in blue shows the rolling average of iconicity. The high iconicity portion of the utterance is in bold.

3. Results

Table 1 summarizes the coded features observed within the high and low iconicity bouts. High iconicity bouts showed greater evidence of engagement than low iconicity bouts across all features. High iconicity interactions were characterized by more eye contact between mother and child, more joint attention on objects, more smiles and laughs by the child, and more gestures and actions on objects by the child and by the mother. In addition, the mother's speech contained more paralinguistic features, was more focused on the 'here-and-now' (less displacement), and was almost always child-directed.

Table 1. Features of utterances of high and low iconicity.

	High Iconicity	*Low Iconicity*
Eye contact	38%	12%
Joint attention on an object	45%	36%
Number of smiles/ laughs by CHI	16	6
Number of gestures/ actions on objects by CHI	29	10
Number of gestures/ actions on objects by MOT	47	35
Number of interesting paralinguistic features by MOT	49	9
MOT's utterances that contain displacement	4%	38%
MOT's utterances that are child-directed	99%	92%

4. Discussion

Iconic words are now known to be prevalent across spoken vocabularies, being especially common in interactions between young children and caregivers. One reason for this may be that iconic words are easier for children to learn, with iconicity providing an intuitive link between form and meaning. Additionally, onomatopoeic words in particular might be especially common because they are adapted to be some of the easiest words for young children to produce. However, it may also be that iconic words occur more frequently in this context because they are fun and more engaging for young children and their caregivers.

To explore this possibility, we developed a novel approach to investigate the role of iconicity in early child interactions, using iconicity ratings of words to identify high and low iconicity bouts during the natural flow of discourse. The findings showed consistently that high iconicity interactions were indeed more engaging. Compared to low iconicity

interactions, high iconicity interactions typically involved caregiver and child as more active participants, more focused on each other and their shared environment, and openly enjoying the communicative situation. These results raise questions for future research into engagement as a function of iconicity and how it figures into early vocabulary development.

One notable finding – pointing to a question for future study – was that high iconicity interactions tended to be focused on the here-and-now, rather than discussing referents and topics outside of the present context. This finding differs from Perniss et al. (2017), who found British Sign Language-signing caregivers modified iconic signs more in non-ostensive contexts than ostensive contexts. While these contrasting results could reflect a difference between the modalities of speaking and signing, they might also be explained by other differences between the studies. Perniss et al. used an experimental design where they asked caregivers to imagine talking to their child about certain toys, both with the toys present and absent. They therefore controlled the topic and ensured that caregivers' signing would be specifically directed to the (imagined) child. In comparison, in our more naturalistic data, not all the mother's utterances were directed at her child – for example, sometimes another adult was present, or the mother spoke introspectively. This suggests that iconicity's role can be nuanced depending on context. While, as in Perniss et al.'s (2017) study of BSL, iconic modification may help a child identify a referent in a non-ostensive context, iconicity can serve other functions in ostensive contexts, such as increasing a child's enjoyment of a communication that focuses on the here-and-now.

Our proof-of-concept study has only analyzed a set of interactions between a single (English-speaking) parent and child. Future studies – expanding not just to more infant-caregiver dyads, but to interactions from widely diverse languages and cultures – are needed to understand the functions of iconicity in early language learning and development. However, even in this narrow demonstration, we think there is value to the novel method tested here, using word ratings to track the running level of iconicity over the course of conversation. This opens a new approach to studying iconicity in infant and caregiver interactions, and in many other discourses, that operationalizes iconicity in a more continuous fashion. Such an approach views iconicity, not just in terms of individual words and

gestures, but as a broader quality of discourse in which the level of iconicity fluctuates over time.

5. Conclusion

We have suggested that iconic words may be especially common in early child interactions because they create an overall more engaging experience that motivates infants to communicate more. To the extent this is true, it implies that a different sort of selection pressure – not just learnability and ease of articulation – may operate on iconic words to maintain them in spoken lexicons. These words might continue to populate spoken languages because people, especially young language learners and their caregivers, find it to be intrinsically fun and engaging to use iconicity. Perhaps then the emergence of spoken language was partly rooted in an evolving sense of enjoyment that our hominin ancestors derived from the use of iconic vocalizations and what eventually became the first iconic words.

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