Language and Cognition (2025), 17, e7, 1–15
doi:10.1017/langcog.2024.60

ARTICLE

Ideophones are more reliable than metaphors in Japanese pain descriptions

Kimi Akita

Department of English Linguistics, School of Humanities, Nagoya University, Nagoya, Aichi, Japan
Email: akita.kimi.s4@f.mail.nagoya-u.ac.jp

(Received 03 April 2024; Revised 11 September 2024; Accepted 18 September 2024)

Abstract

Japanese patients often describe their pain with ideophones (sound-symbolic, imitative words), such as *biribiri* 'having a continuous electric shock'. However, some manuals for healthcare workers recommend avoiding using these words in their interactions with patients, assuming that they are too subjective. We examined how reliable pain ideophones are in comparison with pain metaphors, such as *denki-ga hashiru-yoona itami* 'pain like an electric current running through one's body'. In Experiment 1, Japanese speakers rated visually presented pain ideophones and metaphors on 15 semantic-differential scales (e.g., strong–weak, momentary–continuous). It was found that the ratings of ideophones and metaphors equally varied between participants. In Experiment 2, Japanese speakers did the same rating task for a selected set of pain ideophones and metaphors presented auditorily in sentence frames. The results show that ideophones were rated more consistently than metaphors across participants, and this was true for various prosodic/morphological variants of ideophones (e.g., *biriiit-to* 'having a sudden, great electric shock', *biribirit-to* 'having a momentary repetitive electric shock'). These findings indicate that ideophones can be more reliable than metaphors in health communication, especially when placed in proper context.

Keywords: iconicity; ideophone; individual difference; Japanese; metaphor; pain; sound symbolism

1. Introduction

Pain is notoriously difficult to verbalize (Lascaratou, 2007; Scarry, 1985; Semino, 2010). The Japanese language has two major solutions to this problem: metaphors and ideophones.[1] As in many other languages, conventional pain metaphors and similes in Japanese represent different types of pain primarily using verbs and adjectives, as in *sasu-yoona itami* 'stabbing pain', *denki-ga hashiru-yoona itami* 'pain

[1]Borrowed medical terms, such as *attsū* 'tenderness (pain felt when a certain area is pressed)' (< Chinese) and *tendanesu* 'tenderness' (< English), would be the third solution, but many of them are not in common use.

like an electric current running through one's body' and *surudoi itami* 'sharp pain' (Kövecses, 2008). Ideophones (also known as 'mimetics' or 'expressives'), including onomatopoeia (e.g., *clip-clop*, *woof*), are conventional (and controversially, spontaneously created) words that vividly represent various types of sensory experience using speech sound imitatively (Akita & Dingemanse, 2019; Dingemanse, 2019). Japanese patients often describe their bodily feelings with ideophones, such as *kirikiri* 'having a splitting ache' and *shikushiku* 'having a dull pain in one's stomach' (Pfizer Japan Inc., 2016; Ueda, 2015), but some manuals for healthcare workers (e.g., Yamauchi, 2005) explicit say that these words should be avoided in medical communication because they are too subjective to represent the patient's pain perception accurately. However, linguists may expect the direct, highly specific semantic representation of ideophones (Akita, 2012; Diffloth, 1972; Dingemanse, 2011; Kita, 1997) to rather facilitate health communication when used properly.

This study is the first to investigate how reliable ideophones may be as pain descriptions, as compared with nonideophonic metaphors. Section 2 summarizes previous psycholinguistic studies on Japanese pain descriptions. Sections 3 and 4 report on two experiments in which Japanese speakers rated pain expressions on 15 semantic-differential scales. Based on the findings, in Section 5, we argue that ideophonic pain expressions can be more stable but more flexible than metaphorical ones and are worth serious attention in health communication.

2. Pain ideophones in Japanese

Numerous languages of the world, from Niger–Congo to Austroasiatic, Austronesian, Dravidian, and Quechuan languages, have large inventories of ideophones (Akita & Pardeshi, 2019; Dingemanse, 2018; Voeltz & Kilian-Hatz, 2001). They represent not only sound but also motion (e.g., *txingin-txingin* 'hopping' in Basque; Ibarretxe-Antuñano, 2006), texture (e.g., *jobo-jobo* 'sticky, oily on the skin' in Mundari; Badenoch, 2021), taste (e.g., *hóyíhóyíhóyí* 'bitter sharp taste' in Ewe; Ameka, 2001), smell (e.g., *kpiini-kpiini* 'strongly offensive to sense of smell, often used with reference to flatulence' in Kisi; Childs, 1988), emotion (e.g., *kɛ́lá kɛ́lá* 'happy' in Gbeya; Samarin, 1970), and interoception, including nociception (e.g., *ttakkumttakkum* 'piercingly painful' in Korean; Sohn, 1994) (see also McLean, 2021 for a recent discussion on the semantic typology of ideophones). Ideophones are 'sound-symbolic' in the sense that they consist of sounds that native speakers interpret as 'matching' their meanings and, as such, are discussed as a word-level instance of iconicity (i.e., perceived resemblance between form and meaning) in language (Akita & Dingemanse, 2019). For example, to native speakers of Japanese, voiced obstruents (e.g., /b, d, g, z, ʑ/) systematically sound larger, stronger, dirtier, and less pleasant than their voiceless counterparts (e.g., /p, t, k, s, ɕ/), as illustrated by ideophone pairs such as *bokoboko* 'hitting hard' versus *pokopoko* 'hitting lightly' and *zarazara* 'rough' versus *sarasara* 'dry and smooth' (Hamano, 1998).[2,3]

[2]Some ideophones are unique to particular dialects. After the Great East Japan Earthquake in 2011, many medical workers from outside the disaster area had trouble with dialectal ideophones local patients used. Later in the same year, the National Institute for Japanese Language and Linguistics compiled and distributed a booklet of dialectal somatic ideophones (Takeda, 2011).

[3]Due to the largely language-specific nature of the sound-symbolic system, nonnative learners of Japanese have difficulty in health communication in which some doctors and nurses describe pain and other bodily

https://doi.org/10.1017/langcog.2024.60 Published online by Cambridge University Press

Japanese speakers think that ideophones allow them to express their subjective internal sensations directly (Ishidate, 2016; Moriyama, 1994; Tanaka et al., 2015; Ueda, 2015; see Osaka et al., 2004 for a neural correlate of pain ideophones; see also Dingemanse, 2011, Ch. 11 for an observation that ideophones index epistemic authority, an individual who has privileged access to the conversational topic (Hayano, 2011)). According to Pfizer Japan, Inc.'s (2016) nationwide survey, 80% of patients with chronic throbbing pain reported that they often or sometimes use ideophones to describe their pain. Many of them also reported that when they successfully communicate their pain to medical workers with ideophones, they get a sense of being understood.

Another potential advantage of ideophonic pain expressions is their formal flexibility. Due to their iconic nature, they allow us to adjust our pain descriptions on various dimensions using prosodic and morphological features (Dingemanse, 2015; Dingemanse & Akita, 2017). For example, the ideophone *biriQ* 'having a momentary electric shock' can be prolonged (*biriiiQ*, *biriiiiiQ*, etc.) to express the duration or intensity of the shock, often accompanied by marked voice quality, such as harsh, strained, or creaky voice and falsetto (see Akita, 2021).[4] Partial reduplication (*biribiriQ*, *biribiribiriQ*, etc.) and other types of expressive morphology may also contribute to the aspectual or emphatic dimension of ideophone semantics. This formal flexibility may help patients to express their nuanced feelings that are otherwise difficult to share with others.

Despite these expected benefits, little has been investigated about how effective ideophones may be in the healthcare context (but see Sakamoto et al., 2014 for an attempt to quantify Japanese speakers' sound–meaning associations in pain ideophones). The purpose of this study is threefold: 1) to clarify how stable (i.e., shared between patients) people's understanding of pain ideophones is as compared with that of pain metaphors, 2) to identify which aspects of their meanings tend to be (un) stable, and 3) to examine whether people share the minute semantic differences between prosodic/morphological variants of pain ideophones. Investigating these issues will facilitate our understanding as to whether and how to use ideophones in health communication.

3. Experiment 1

3.1. Method

3.1.1. Participants

We recruited 151 native speakers of Japanese who are self-reportedly not proficient in another language (female: 95, male: 53, other/prefer not to answer: 3; age: 19–75, $M = 39.19$, $SD = 10.68$) via CrowdWorks, a Japanese equivalent of Amazon

feelings with ideophones. To avoid potential miscommunication and ensure the equal accessibility of information to all residents in Japan, the Agency for Cultural Affairs (2022) released guidelines on *Yasashii Nihongo* 'plain/kind Japanese', which recommend not using ideophones, as well as several other expressions, to foreigners. They suggest that pain ideophones should be paraphrased with easy words, as in *Atama-ga zukizuki-suru* '[My] head throbs' → *Atama-ga itai* '[My] head aches' (p. 9).

[4]*Q* represents the first half of a geminate cluster (medially, as in *biriQ-to* (= *birit-to* /biɾitːo/, where *to* is a quotative marker) or glottal stop (finally).

https://doi.org/10.1017/langcog.2024.60 Published online by Cambridge University Press

Mechanical Turk. They gave online informed consent and were paid 350 JPY for their participation.

3.1.2. Stimuli

A total of 50 conventional pain expressions in Japanese were used (Table 1). We collected 34 pain ideophones from Iwasaki et al. (2007a), Akita (2010), Hattori and Higashiyama (2010), and Ono (2007) and 16 nonideophonic metaphorical expressions of pain from Kusumi et al. (2010), Maruo et al. (2013), and Sakamoto (2019). This stimulus set covers all conventional pain ideophones and representative pain metaphors. Both pain ideophones and metaphors can be newly created, but the latter form a particularly fluid category, as the simile construction potentially gives rise to an unlimited number of expressions.

Table 1. Stimulus pain expressions used in Experiment 1

Ideophones	Metaphors
ビリッ *biriQ* 'having a momentary electric shock'	圧迫されるような痛み *appaku-sareru-yoona itami* 'pressing pain'
ビリリ *biriri* 'having a momentary electric shock'	ちぎれるような痛み *chigireru-yoona itami* 'pain that tears one into pieces'
ビリビリ *biribiri* 'having a continuous electric shock'	電気が走るような痛み *denki-ga hashiru-yoona itami* 'pain like an electric current running through one's body'
ピリッ *piriQ* 'irritated momentarily on the skin'	えぐられるような痛み *egurareru-yoona itami* 'gouging pain'
ピリリ *piriri* 'irritated momentarily on the skin'	引き裂かれるような痛み *hikisakareru-yoona itami* 'tearing pain'
ピリピリ *piripiri* 'irritated continuously on the skin'	引きつるような痛み *hikitsuru-yoona itami* 'cramping pain'
ヒリッ *hiriQ* 'irritated lightly and momentarily on the skin'	引っ張られるような痛み *hippararu-yoona itami* 'pulling pain'
ヒリリ *hiriri* 'irritated lightly and momentarily on the skin'	切り付けられるような痛み *kiritsukerareru-yoona itami* 'slashing pain'
ヒリヒリ *hirihiri* 'irritated lightly and continuously on the skin'	鈍い痛み *nibui itami* 'dull pain'
チクッ *chikuQ* 'prickled once'	刺すような痛み *sasu-yoona itami* 'stabbing pain'
チクン *chikun* 'prickled once'	絞られるような痛み *shiborareru-yoona itami* 'squeezing pain'
チクリ *chikuri* 'prickled once'	締め付けられるような痛み *shimetsukerareru-yoona itami* 'tightening pain'
チクチク *chikuchiku* 'prickled repeatedly or in a large area'	鋭い痛み *surudoi itami* 'sharp pain'
ガンガン *gangan* 'one's head splitting'	うずくような痛み *uzuku-yoona itami* 'throbbing pain'
ゴロゴロ *gorogoro* 'one's stomach rumbling'	割れるような痛み *wareru-yoona itami* 'cracking pain'
イガイガ *igaiga* 'scratchy on the throat'	焼けるような痛み *yakeru-yoona itami* 'burning pain'
ジン *jin* 'having a heavy, numb feeling'	
ジーン *jiin* 'having a heavy, numb feeling'	
ジンジン *jinjin* 'tingling a lot'	
キン *kin* 'having a brain freeze'	
キーン *kiin* 'having a brain freeze'	
キリキリ *kirikiri* 'having a splitting ache'	
キューッ *kyuuQ* 'one's heart wrenched'	
シクシク *shikushiku* 'having a dull pain in one's stomach'	
ショボショボ *shoboshobo* 'one's eyes bleary'	
ツン *tsun* 'one's nose stung by a strong smell'	
ツーン *tsuun* 'one's nose stung a lot by a strong smell'	
ツンツン *tsuntsun* 'one's nose stung continuously by a strong smell'	
ズキッ *zukiQ* 'throbbing once'	
ズキン *zukin* 'throbbing once'	
ズキリ *zukiri* 'throbbing once'	
ズキズキ *zukizuki* 'throbbing continuously'	
ズキンズキン *zukinzukin* 'throbbing repeatedly'	
ズーン *zuun* 'having a dull, heavy pain deep inside the body'	

https://doi.org/10.1017/langcog.2024.60 Published online by Cambridge University Press

3.1.3. Procedure

The experiment was conducted online using Google Forms. The participants were asked to rate in a quiet place each of the pain expressions on 15 six-point semantic-differential scales (from 1 to 6), all of which except 'unpleasantness' (unpleasant–not unpleasant) were taken from Iwasaki et al.'s (2007a) similar experiment with English speakers: 'stimulation' (stimulating–not stimulating), 'intensity' (strong–weak), 'sharpness' (sharp–dull), 'locality' (local–widespread), 'momentariness' (momentary–continuous), 'achingness' (aching–not aching), 'annoyance' (annoying–not annoying), 'stabbingness' (stabbing–not stabbing), 'surfaceness' (surface–internal), 'numbness' (numb–not numb), 'burningness' (burning–not burning), 'pressure' (pressing–not pressing), 'tearingness' (tearing–not tearing) and 'pulsation' (pulsating–not pulsating). According to the McGill Pain Questionnaire (Melzack, 1975), these scales can be classified into 'sensory' (sharpness, numbness, achingness, stimulation, burningness, stabbingness, pressure, tearingness), 'temporal' (momentariness, pulsation) and 'evaluative' (intensity, annoyance, unpleasantness), with the two scales (locality, surfaceness) that we call 'locational' left unclassified. The 750 questions (50 expressions x 15 scales) were randomized and divided into 15 sets of 50 questions, one of which each participant answered. The questions were presented in a random order. Each set was answered by 10 or 11 participants, each of whom answered only one set.

The current experiment essentially took an exploratory approach, as little has been known about the semantic stability of ideophones and metaphors as pain descriptors. However, the idea that pain ideophones are highly subjective would predict that they receive more varied ratings than nonideophonic metaphors.

All statistical analysis was conducted in R version 4.3.1 (R Core Team, 2023). Cumulative link mixed models were constructed using the ordinal package (Christensen, 2019).

3.2. Results

3.2.1. Semantic stability of ideophones versus metaphors

The experiment revealed that the ratings of pain ideophones are overall as stable as those of pain metaphors. Figure 1 shows the standard deviations of the ratings for all expressions.

The ratings were most stable for the ideophone *piripiri* 'irritated continuously on the skin' (M = 1.07, SD = 0.37), followed by the metaphors *denki-ga hashiru-yoona itami* 'pain like an electric current running through one's body' (M = 1.08, SD = 0.57) and *sasu-yoona itami* 'stabbing pain' (M = 1.09, SD = 0.67). A linear model predicting SD from expression type (ideophones versus metaphors) yielded no statistically reliable effect of the predictor (b = 0.02, SE = 0.03, t = 0.63, p = .53), indicating that ideophones are as objective and stable as nonideophonic metaphors. However, it should be noted that some of both ideophones and metaphors, especially less conventional ones, such as *igaiga* 'scratchy on the throat' (M = 1.53, SD = 0.25), *zuun* 'having a dull, heavy pain deep inside the body' (M = 1.41, SD = 0.29), *wareru-yoona itami* 'cracking pain' (M = 1.39, SD = 0.55) and *shiborareru-yoona itami* 'squeezing pain' (M = 1.39, SD = 0.49), did receive relatively varied ratings.[5]

[5]Various linguistic properties of pain ideophones, such as root type, vowel lengthening, frequency of use in corpora, and association with particular body parts, were also considered but not found to contribute to rating

https://doi.org/10.1017/langcog.2024.60 Published online by Cambridge University Press

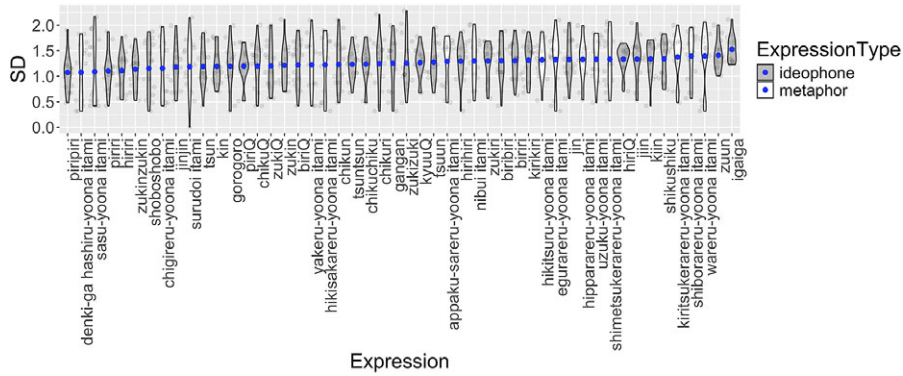

Figure 1. Standard deviations of the ratings of the 50 pain expressions, from the lowest to the highest (the blue dots represent the means). Ideophones were generally rated as stable as metaphors.

Another parallelism between ideophones and metaphors was found for the stability of scales. Figure 2 shows the standard deviations of the ratings as a function of the 15 scales. In both ideophones and metaphors, intensity and unpleasantness tended to be rated more consistently across participants, whereas pulsation and tearingness ratings tended to vary more widely.

When the scales were grouped into four according to the McGill Pain Questionnaire (Figure 3), a reliable difference between ideophones and metaphors was obtained for the evaluative scales (i.e., intensity, annoyance, unpleasantness). A linear model predicting standard deviation from expression type, scale type and the interaction of the two variables, with the sensory scales as a reference level, revealed a reliable interaction ($b = -0.39$, $SE = 0.08$, $t = -4.57$, $p < .001$). Specifically, although both pain ideophones and metaphors were rated most stably on the evaluative scales, this difference in stability was larger for metaphors than for ideophones.[6,7]

3.2.2. *Interim conclusion*

The current results suggest that, overall, ideophones are as stable as metaphors in Japanese pain descriptions. This finding might be surprising to those who assume ideophones to be too vague and subjective. They are words with specific meanings and systematic sound symbolism, and Japanese speakers share them at least to a comparable degree with metaphors. Both pain ideophones and pain metaphors are 'figurative' in that they represent pain in terms of a concrete concept (i.e., speech sound and physical action). Japanese speakers have a rather clear

stability. No meaningful differences were also found between participants' age ranges or genders. See the project's OSF page for additional results.

[6]This tendency may be partly attributed to the semantic relevance of the evaluative dimension (i.e., positivity and negativity) to metaphors (Kusumi, 1992; see also Strik Lievers, 2017).

[7]The obtained high stability of Japanese speakers' evaluative interpretation of pain expressions is contrastive with Iwasaki et al.'s (2007b) finding that the evaluative dimension of Japanese ideophones is one of the hardest for English speakers without knowledge of Japanese to access (e.g., gracefulness of *ufufu* 'a lady chuckling', unpleasantness of *ehehe* 'he-he').

https://doi.org/10.1017/langcog.2024.60 Published online by Cambridge University Press

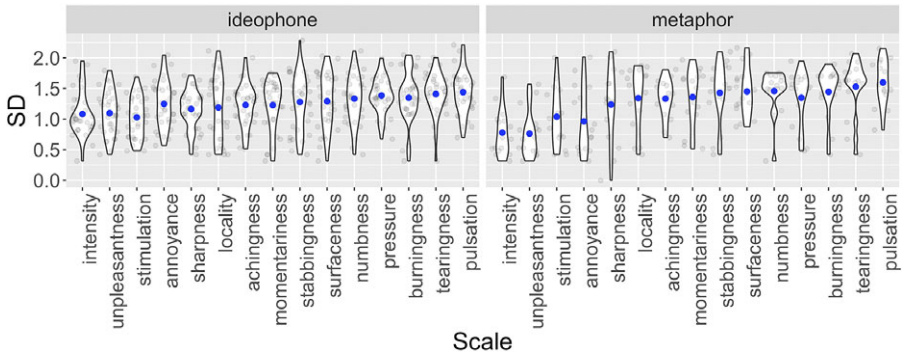

Figure 2. Standard deviations of the ratings of pain ideophones and metaphors on the 15 scales, from the lowest to the highest in ideophones (the blue dots represent the means). The two types of expressions were found to be similar to the stability of the scales.

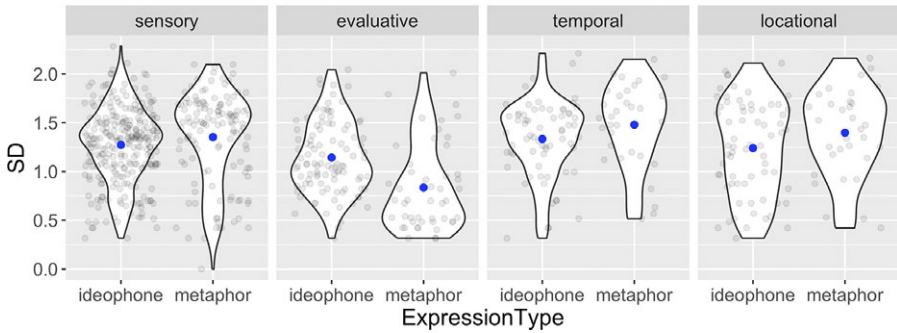

Figure 3. Standard deviations of the ratings of pain ideophones and metaphors on the four types of scales (the blue dots represent the means). Both types of expressions are most stable on the evaluative scales, but the stability of metaphors is particularly high on these scales.

understanding of these linguistic conventions and use them in describing their personal experience.

However, it should be noted that the current results might instead mean that pain ideophones are as *un*stable as pain metaphors, as there is no previously established baseline and we just compared these two types of expressions. Moreover, what is crucially missing in the current experiment is the context. The 50 pain expressions were presented in isolation, without any syntactic or semantic specification. This can be especially problematic for polysemous ideophones. Unlike the pain metaphors, which are headed by the noun *itami* 'pain', some of the pain ideophones have non-nociceptive, often psychological meanings, too (e.g., *jiin* 'having a heavy, numb feeling; deeply touched', *piripiri* 'irritated continuously on the skin; uptight', *shikushiku* 'having a dull pain in one's stomach; weeping'). Furthermore, we did not provide prosodic information, which would make a considerable contribution to the meaning of ideophones (Akita, 2021; Dingemanse & Akita, 2017). To overcome these limitations, we conducted Experiment 2, using more natural stimuli.

https://doi.org/10.1017/langcog.2024.60 Published online by Cambridge University Press

4. Experiment 2

4.1. Method

4.1.1. Participants

One hundred eighty Japanese monolinguals (female: 113, male: 66, other/prefer not to answer: 1; age: 19–77, $M = 39.89$, $SD = 10.93$) were recruited via CrowdWorks, gave online informed consent and were paid 350 JPY for their participation. Forty-one of them (22.78%) also participated in Experiment 1 half a year before. All the results presented below were replicated with the subset of the data that does not include these overlapping participants (for details, see the R script provided on the project's OSF page).

4.1.2. Stimuli

Six *Q*-ending pain ideophones, which are most flexible in prosody and morphology (Akita, 2020), and six pain metaphors were selected from the stimulus set in Experiment 1. These expressions were presented auditorily in simple sentence frames that consist of a body-part noun and a past-tense verb (the light verb *shi-ta* 'did' for ideophones and the verb *itan-da* 'hurt' for metaphors), as in Table 2. The metaphors in Experiment 1 took the form of [adnominal + N] (e.g., *uzuku-yoona itami* 'throbbing pain'), which was converted into [adverbial + V] (e.g., *uzuku-yooni itan-da* 'had a throbbing pain') in Experiment 2, fitted into the sentence frame.

These pain expressions were presented with or without formal modifications. Modifications were either lexical (addition of the degree adverb *sukoshi* 'a little bit' or *kanari* 'fairly'), morphological (partial reduplication; e.g., *biriQ* 'having a momentary electric shock' > *biribiriQ*), or prosodic (vowel lengthening with strained voice, distinguishing plain (e.g., *biriQ*), strong (e.g., *biriiiQ*) and extra-strong prosody (e.g., *biriiiiiQ*)). We did not modify the morphology and prosody of metaphors, as partial reduplication is not possible with them (e.g., *uzuku-yooni* 'throbbing' > **uzuuzuku-yooni*) and prosodic modification also often makes them sound unnatural (e.g.,*??uzuuuku-yooni*). The semantic relevance of expressive morphology and prosody in ideophones discussed in the literature (Akita, 2021; Dingemanse & Akita, 2017) motivates us to pay special attention to whether

Table 2. Stimulus pain expressions used in Experiment 2

Ideophones	Metaphors
背中がビリッとした *Senaka-ga biriQ-to shi-ta* '[I] felt a momentary electric shock in [my] back'	背中がうずくように痛んだ *Senaka-ga uzuku-yooni itan-da* '[I] had a throbbing pain in [my] back'
舌がピリッとした *Shita-ga piriQ-to shi-ta* '[I] felt [my] tongue irritated momentarily'	舌が刺すように痛んだ *Shita-ga sasu-yooni itan-da* '[I] had a stabbing pain in [my] tongue'
腕がヒリッとした *Ude-ga hiriQ-to shi-ta* '[I] felt [my] arm irritated lightly and momentarily'	腕が焼けるように痛んだ *Ude-ga yakeru-yooni itan-da* '[I] had a burning pain in [my] arm'
お腹がチクッとした *Onaka-ga chikuQ-to shi-ta* '[I] felt [my] stomach prickled once'	お腹が絞られるように痛んだ *Onaka-ga shiborareru-yooni itan-da* '[I] had a squeezing pain in [my] stomach'
胸がキューッとした *Mune-ga kyuuQ-to shi-ta* '[I] felt [my] heart wrenched'	胸が締め付けられるように痛んだ *Mune-ga shimetsukerareru-yooni itan-da* '[I] had a tightening pain in [my] heart'
頭がズキッとした *Atama-ga zukiQ-to shi-ta* '[I] felt [my] head throb once'	頭が割れるように痛んだ *Atama-ga wareru-yooni itan-da* '[I] had a cracking pain in [my] head'

https://doi.org/10.1017/langcog.2024.60 Published online by Cambridge University Press

Japanese speakers share the minute semantic differences the morphological and prosodic modifications of ideophones may make.

4.1.3. Procedure

The procedure of the rating task was the same as Experiment 1, except that the stimuli were presented auditorily. Participants were instructed to listen to them as many times as they liked wearing headphones or earphones in a quiet place. A total of 18 sets of 45 randomized stimuli and their counterbalanced version were made, and half of the participants answered the former and the other half the latter. Each participant answered only one of them.

This experiment is again exploratory in nature. However, if the sentence frames get rid of the polysemy issue raised in Experiment 1, it is expected that pain ideophones can exhibit greater interrater stability than pain metaphors.

4.2. Results

The results revealed that, when presented in sentence frames, ideophones are generally understood more consistently than metaphors. Figure 4 shows the standard deviations of the ratings of 12 pain expressions without formal modifications. A linear model that predicts standard deviation from expression type (ideophones versus metaphors) revealed that ideophone ratings are generally more stable than metaphor ratings ($b = -0.16$, $SE = 0.06$, $t = -2.90$, $p < .01$). This difference was not obtained when we reanalyzed the results of Experiment 1 by limiting ourselves to the 12 pain expressions used in the current experiment ($b = 0.06$, $SE = 0.07$, $t = 0.84$, $p = .41$), indicating the importance of sentential context in ideophone semantics.

Similar tendencies were obtained across the four scale types. As shown in Figure 5, both pain ideophones and metaphors again exhibited highest stability on the evaluative scales. A linear model predicting standard deviation from expression type, scale type and their interaction, with the sensory scales as the reference level, revealed that unlike in Experiment 1, the stability of metaphor ratings on the evaluative scales was not particularly striking compared with that of ideophone ratings ($b = -0.13$, $SE = 0.14$, $t = -0.94$, $p = .35$).

Moreover, as shown in Figure 6, the 15-scale ratings of ideophones were equally stable across different morphological/prosodic forms. A linear model predicting standard deviation from formal modification revealed no reliable difference between plain (i.e., without modification; e.g., *biriQ*) and strong (e.g., *biriiiQ*; $b = -0.03$, $SE = 0.06$, $t = -0.50$, $p = .62$), extra strong (e.g., *biriiiiiQ*; $b = 0.03$, $SE = 0.06$, $t = 0.58$, $p = .56$) or reduplicated forms (e.g., *biribiriQ*; $b = -0.05$, $SE = 0.06$, $t = -0.83$, $p = .41$).[8]

To give an example, as shown in Figure 7, the participants shared the sound-symbolic intuition that ideophones with plain, strong and extra strong forms increasingly represent more intense pain. They rated plain forms weaker than strong forms ($b = -3.21$, $SE = 0.57$, $z = -5.66$, $p < .001$), which were in turn rated weaker than extra strong forms ($b = -2.27$, $SE = 0.56$, $z = -4.08$, $p < .001$). The rated intensity of plain and partially reduplicated forms was not reliably different ($b = -0.83$, $SE = 0.46$, $z = -1.83$, $p = .07$).

[8]No interpretable results were obtained for the addition of degree modifiers to the ideophonic and metaphorical stimuli.

https://doi.org/10.1017/langcog.2024.60 Published online by Cambridge University Press

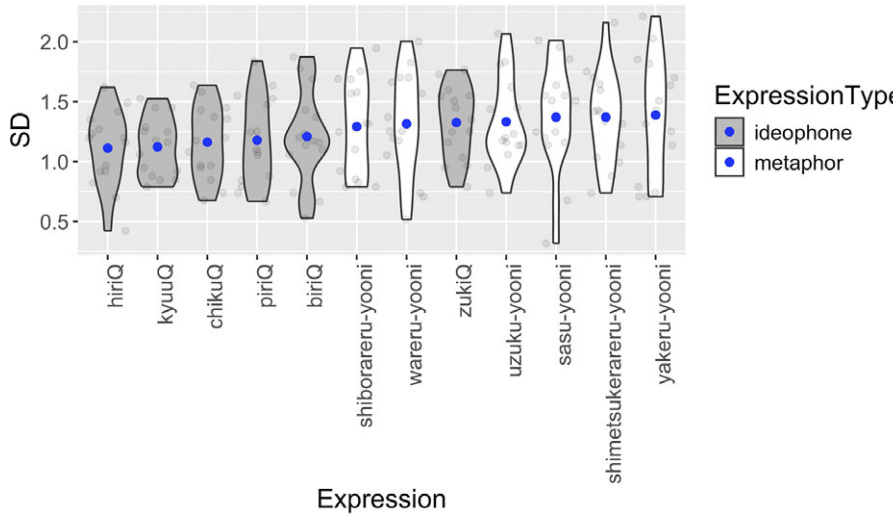

Figure 4. Standard deviations of the ratings of the 12 pain expressions without formal modifications, from the lowest to the highest (the blue dots represent the means). Ideophones were generally rated more consistently across participants.

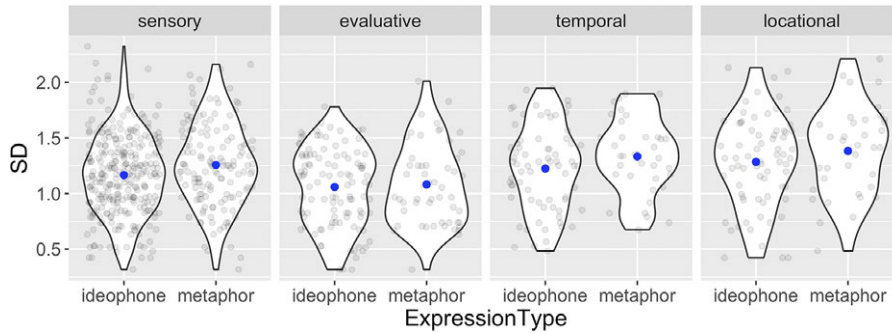

Figure 5. Standard deviations of the ratings of pain ideophones and metaphors in sentence frames on the four types of scales (the blue dots represent the means). Both ideophones and metaphors were rated most stably on the evaluative scales. Metaphors' stability was not particularly high compared to ideophones' unlike in Experiment 1.

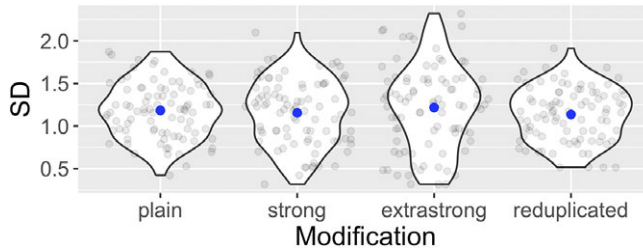

Figure 6. Standard deviations of the ratings of the six pain ideophones with and without formal modifications (the blue dots represent the means). All prosodic/morphological variants of the ideophones were rated stably.

https://doi.org/10.1017/langcog.2024.60 Published online by Cambridge University Press

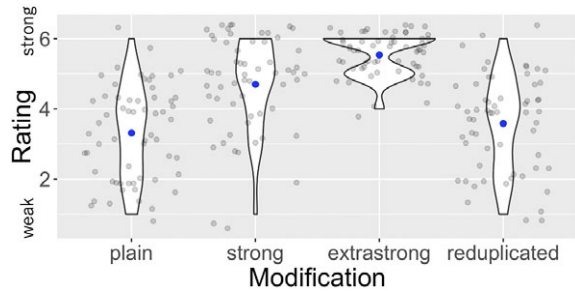

Figure 7. Intensity ratings of pain ideophones with and without formal modifications, from weak (1) to strong (6) (the blue dots represent the means). Ideophones with extra strong prosody were rated stronger than those with strong prosody, which were in turn rated stronger than plain and reduplicated ideophones.

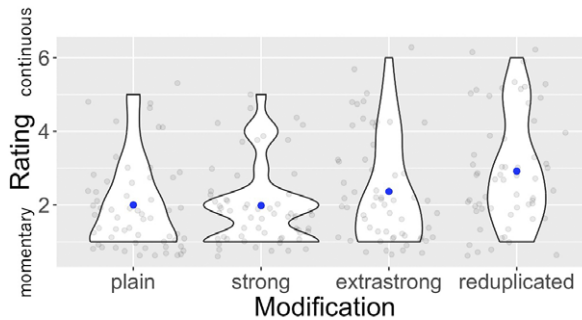

Figure 8. Momentariness ratings of pain ideophones with and without formal modifications, from momentary (1) to continuous (6) (the blue dots represent the means). Reduplicated ideophones were rated more continuous than plain, strong and extra strong ideophones.

Another example is given in Figure 8, where partially reduplicated forms were rated more continuous than plain ($b = -1.72$, $SE = 0.46$, $z = -3.75$, $p < .001$), strong ($b = -1.55$, $SE = 0.41$, $z = -3.76$, $p < .001$) and extra strong forms ($b = -1.03$, $SE = 0.41$, $z = -2.54$, $p < .05$).

5. Discussion and conclusion

Ideophones pack detailed sensory information in a limited number of speech sounds and allow us to communicate our subjective perceptions. The purpose of the current study was to examine how reliable ideophones are in comparison with metaphors in Japanese pain descriptions. Contrary to what some medical workers assume, our experiments on demonstrated that, when presented in proper context, conventional pain ideophones are generally understood more stably (or less unstably) than conventional pain metaphors. It was also shown that even fine-tuned sound-symbolic intuitions, such as the intensity of emphatic prosody and the continuousness of reduplication, are widely shared across individuals. It is also worth noting that both ideophones and metaphors are most stable in the evaluative dimension of pain perception.

The current study points to the practical applicability of ideophones or, more broadly, linguistic iconicity. Iconicity is now attracting renewed attention in cognitive

https://doi.org/10.1017/langcog.2024.60 Published online by Cambridge University Press

science (Imai & Kita, 2014; Perniss et al., 2010). However, this trend centers on language per se, especially on its acquisition and evolution, and little has been explored as to how useful they can be in our daily lives (for a related review, see Nielsen & Dingemanse, 2021). Our findings suggest that ideophones may facilitate not only children's language acquisition and the evolution of human language but also our everyday communication. This project's OSF page provides the semantic-differential profile of each pain expression obtained in the two experiments, which we hope will help medical workers to understand patients' pain descriptions in actual clinical interactions. The data might also be useful for L2 learners of Japanese who do not have clear intuitions about what those ideophones mean.

The current study has some important limitations. First, our experiments, which showed that pain ideophones are in general more stable than pain metaphors, do not guarantee that pain ideophones *are* stable and should be used extensively in medical communication. It might be that our results are attributed to the highly unstable meaning of pain metaphors, many of which are hyperboles that refer to unreal events, such as one's body being split or squeezed. Since people normally have never been split or squeezed—although they probably have some experience of parts of their body (e.g., a finger) being split or squeezed—they would not be sure what a splitting/squeezing pain is like. Therefore, a separate benchmark would be necessary to evaluate the real applicability of the current findings. Second, this study fails to pinpoint exactly what factor made ideophone ratings more stable than metaphors in Experiment 2. The two experiments differed as to whether pain expressions were placed in sentence frames, whether they were presented visually or auditorily, and whether they varied in prosody and morphology. All these conditions converge in contributing to the natural context of ideophone use, but future research needs to disentangle the effects of these factors.[9] Third, we did not collect the participants' detailed personal information, such as their medical history and profession. These pieces of information may help us to see what doctors, nurses, and patients know about ideophones and metaphors and how they use them.

Despite these limitations, it is hoped that future research will extensively connect these experimental findings with clinical observations. Do ideophones help doctors to identify particular symptoms or even diagnose particular diseases? Should doctors and nurses use ideophones themselves, or should they just repeat or paraphrase patients' ideophones to express understanding and sympathy (Ueda, 2015)? Are dialectal ideophones and newly coined ideophones also understood stably across patients? How do ideophones interact with gestures, which often contribute to ideophones' iconic representation (Dingemanse, 2011; Dingemanse & Akita, 2017; Kita, 1997), in pain descriptions (Rowbotham et al., 2014)? It is also hoped that interactional linguists and conversation analysts will analyze actual doctor–patient interactions and make practical suggestions about the usage of pain ideophones and metaphors. Furthermore, in light of the semantic typology of ideophones, it will be essential to extend the current project to other semantic domains, such as haptic and bodily feelings other than pain, and to other languages (McLean, 2021; Nielsen & Dingemanse, 2021).

[9]In a follow-up experiment, the same set of pain ideophones and metaphors did not exhibit different degrees of stability when placed in sentence frames but presented visually, regardless of the formal modification of ideophones (Akita, in preparation). This result suggests that ideophones are more effective in speech than in written text.

https://doi.org/10.1017/langcog.2024.60 Published online by Cambridge University Press

Data availability. The experimental instructions, data, additional figures and R code are all available on the project's OSF page: https://osf.io/hc8b4/.

Acknowledgments. I would like to thank Mark Dingemanse and another reviewer of *Language and Cognition* for their insightful comments. I also got useful feedback from Hinano Iida and Ryota Kido.

Funding. This work was supported by JSPS KAKENHI Grant Number 23H00627.

Competing interest. The author has no competing interests to declare.

References

Agency for Cultural Affairs, Government of Japan. (2022). *Zairyū shien no tame no yasashī nihongo gaidorain: Hanashi kotoba no pointo* [Guidelines on plain Japanese for supporting foreign residents: Important points in spoken language]. https://www.bunka.go.jp/seisaku/kokugo_nihongo/kyoiku/pdf/93832501_01.pdf (last accessed 4 August 2024)

Akita, K. (2010). An embodied semantic analysis of mimetic psych-predicates in Japanese. *Linguistics*, 48(6), 1195–1220.

Akita, K. (2012). Toward a frame-semantic definition of sound-symbolic words: A collocational analysis of Japanese mimetics. *Cognitive Linguistics*, 23(1), 67–90.

Akita, K. (2020). *System integration of Japanese ideophones*. Unpublished manuscript, Nagoya University.

Akita, K. (2021). Phonation types matter in sound symbolism. *Cognitive Science*, 45(5), e12982.

Akita, K. (In preparation). The semantic stability of pain ideophones in spoken and written Japanese.

Akita, K., & Dingemanse, M. (2019). Ideophones (mimetics, expressives). In M. Aronoff (Ed.), *Oxford research encyclopedia of linguistics*. Oxford: Oxford University Press.

Akita, K., & Pardeshi, P. (Eds.) (2019). *Ideophones, mimetics and expressives*. Amsterdam: John Benjamins.

Ameka, F. K. (2001). Ideophones and the nature of the adjective word class in Ewe. In F. K. E. Voeltz & C. Kilian-Hatz (Eds.), *Ideophones* (pp. 25–48). Amsterdam: John Benjamins.

Childs, G. T. (1988). *The phonology and morphology of Kisi*. Doctoral dissertation, University of California, Berkeley.

Christensen, R. H. B. (2019). *ordinal: Regression models for ordinal data.* R package version 2019.12-10. https://CRAN.R-project.org/package=ordinal

Diffloth, G. (1972). Notes on expressive meaning. *Chicago Linguistic Society*, 8, 440–447.

Dingemanse, M. (2011). *The meaning and use of ideophones in Siwu*. Ph.D. dissertation, Radboud University, Nijmegen.

Dingemanse, M. (2015). Ideophones and reduplication: Depiction, description, and the interpretation of repeated talk in discourse. *Studies in Language*, 39(4), 946–970.

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

Dingemanse, M., & Akita, K. (2017). An inverse relation between expressiveness and grammatical integration: On the morphosyntactic typology of ideophones, with special reference to Japanese. *Journal of Linguistics*, 53(3), 501–532.

Dingemanse, M. (2019). 'Ideophone' as a comparative concept. In K. Akita & P. Pardeshi (Eds.), *Ideophones, mimetics and expressives* (pp. 13–33). Amsterdam: John Benjamins.

Hamano, S. (1998). *The sound-symbolic system of Japanese*. Stanford: CSLI Publications.

Hattori, K., & Higashiyama, Y. (2010). Kango ni okeru nihongo onomatope no imi [The meaning of Japanese ideophones in nursing]. *The Japanese Journal of Nursing Education*, 43(4), 315–323.

Hayano, K. (2011). Claiming epistemic primacy: *Yo*-marked assessments in Japanese. In T. Stivers, L. Mondada, & J. Steensig (Eds.), *The morality of knowledge in conversation* (pp. 58–81). Cambridge: Cambridge University Press.

Ibarretxe-Antuñano, I. (2006). *Sound symbolism and motion in Basque*. Munich: Lincom Europa.

Imai, M., & Kita, S. (2014). The sound symbolism bootstrapping hypothesis for language acquisition and language evolution. *Philosophical Transactions of the Royal Society B*, 369, 20130298.

Ishidate, M. (2016). *Iryō shochi o ukeru yōji no taisho kōdō o takameru onomatope no kōyō* [Effects of onomatopoeia that facilitates the reaction of toddlers receiving medical treatment]. Ph.D. dissertation, Kanagawa University.

Iwasaki, N., Vinson, D. P., & Vigliocco, G. (2007a). How does it hurt, *kiri-kiri* or *siku-siku*?: Japanese mimetic words of pain perceived by Japanese speakers and English speakers. In M. Minami (Ed.), *Applying theory and research to learning Japanese as a foreign language* (pp. 2–19). Cambridge: Cambridge Scholars Publishing.

Iwasaki, N., Vinson, D. P., & Vigliocco, G. (2007b). What do English speakers know about *gera-gera* and *yota-yota*?: A cross-linguistic investigation of mimetic words for laughing and walking. *Japanese-Language Education around the Globe*, 17, 53–78.

Kita, S. (1997). Two-dimensional semantic analysis of Japanese mimetics. *Linguistics*, 35(2), 379–415.

Kövecses, Z. (2008). The conceptual structure of happiness and pain. In C. Lascaratou, A. Despotopoulou, & E. Ifantidou (Eds.), *Reconstructing pain and joy: Linguistic, literary and cultural perspectives* (pp. 17–33). Cambridge: Cambridge Scholars Publishing.

Kusumi, T. (1992). Hiyu no seisei/rikai to imi kōzō [Production, understanding, and semantic structure of metaphor]. In Y. Hakoda (Ed.), Ninchi kagaku no furontia, II [Frontiers in cognitive science, II] (pp. 39–64). Tokyo: Saiensusha.

Kusumi, T., Nakamoto, K., & Koyasu, M. (2010). Itami no hiyu hyōgen no shintai kankaku to ninchi no kōzō [Perceptual and cognitive characteristics of metaphorical pain language]. *The Japanese Journal of Psychology*, 80(6), 467–475.

Lascaratou, C. (2007). *The language of pain: Expression or description?* Amsterdam: John Benjamins.

Maruo, T., Nakae, A., Maeda, L., Takahashi-Narita, K., Morris, S., Yokoe, M., Matsuzaki, T., Shibata, M., & Saitoh, Y. (2013). Translation and reliability and validity of a Japanese version of the revised Short-Form McGill Pain Questionnaire (SF-MPQ-2). *Pain Research*, 28, 43–53.

McLean, B. (2021). Revising an implicational hierarchy for the meanings of ideophones, with special reference to Japonic. *Linguistic Typology*, 25(3), 507–549.

Melzack, R. (1975). The McGill Pain Questionnaire: Major properties and scoring methods. *Pain*, 1, 277–299.

Moriyama, K. (1994). Ishi keiken ryūgakusei ni taisuru gitaigo kyōzyu goi no sentaku ni tsuite [On the selection of ideophones to teach international students who have health care experience]. *Journal of International Student Center, Nagasaki University*, 2, 71–80.

Nielsen, A. K. S., & Dingemanse, M. (2021). Iconicity in word learning and beyond: A critical review. *Language and Speech*, 64(1), 52–72.

Ono, M. (Ed.) (2007). *Giongo/gitaigo 4500: Nihongo onomatope jiten* [4500 mimetic words: A dictionary of Japanese ideophones]. Tokyo: Shogakukan.

Osaka, N., Osaka, M., Morishita, M., Kondo, H., & Fukuyama, H. (2004). A word expressing affective pain activates the anterior cingulated cortex in the human brain: An fMRI study. *Behavioural Brain Research*, 153, 123–127.

Perniss, P., Thompson, R. L., & Vigliocco, G. (2010). Iconicity as a general property of language: Evidence from spoken and signed languages. *Frontiers in Psychology*, 1, 227.

Pfizer Japan Inc. (2016). *"Itami chiryō" ni taisuru ishi to kanja no ishiki hikaku chōsa* [A comparative study of doctors' and patients' consciousness of "pain treatments"].

R Core Team. (2023). *R: A language and environment for statistical computing*. Vienna: R Foundation for Statistical Computing.

Sakamoto, M. (2019). *Gokan o saguru onomatope: "Fuwafuwa" to "mofumofu" no chigai wa sūchika dekiru* [Ideophones searching for the five senses: The difference between *fuwafuwa* and *mofumofu* can be quantified]. Tokyo: Kyoritsu.

Sakamoto, M., Ueda, Y., Doizaki, R., & Shimizu, Y. (2014). Communication support system between Japanese patients and foreign doctors using onomatopoeia to express pain symptoms. *Journal of Advanced Computational Intelligence and Intelligent Informatics*, 18(6), 1020–1025.

Samarin, W. J. (1970). Inventory and choice in expressive language. *Word*, 26(2), 153–169.

Scarry, E. (1985). *The body in pain: The making and unmaking of the world*. New York: Oxford University Press.

Semino, E. (2010). Descriptions of pain, metaphor, and embodied simulation. *Metaphor and Symbol*, 25(4), 205–226.

Sohn, H. (1994). *Korean*. London: Routledge.

https://doi.org/10.1017/langcog.2024.60 Published online by Cambridge University Press

Strik Lievers, F. (2017). Figures and the senses: Towards a definition of synaesthesia. *Review of Cognitive Linguistics*, 15(1), 83–101.

Takeda, K. (2011). *Tōhoku hōgen onomatope yōreishū* [A collection of ideophone examples in Tohoku dialects]. Tokyo: National Institute for Japanese Language and Linguistics.

Tanaka, T., Okajima, M., & Komatsu, T. (2015). Fuan shōgai ni okeru kōdo ryōhō de onomatope ga naze yūkō ka?: Naibu kankaku ekusupōja ni onomatope o mochiita jissen hōkoku [Why are ideophones effective in the behavior therapy of anxiety disorder: A case report of interoceptive exposure therapy]. *Journal of Japanese Society for Artificial Intelligence*, 30(1), 282–290.

Ueda, E. (2015). Shinryō komyunikēshon ni okeru giongo/gitaigo no shiyō keikō to kōkateki un'yō ni tsuite [Tendencies of use of ideophones in health communication and their effective application]. *Health Communication Research*, 6(1), 53–67.

Voeltz, F. K. E., & Kilian-Hatz, C. (Eds.) 2001. *Ideophones*. Amsterdam: John Benjamins.

Yamauchi, T. (2005). *Fijikaru asesumento gaidobukku: Me to te to mimi de koko made wakaru* [Physical assessment guidebook: You can understand this much with your eyes, hands, and ears]. Tokyo: Igaku Shoin.

Cite this article: Akita, K. (2025). Ideophones are more reliable than metaphors in Japanese pain descriptions, *Language and Cognition*, 17, e7, 1–15. https://doi.org/10.1017/langcog.2024.60