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Systematic Side of Sound Symbolism: The Case of Suffixed Ideophones in Japanese

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Abstract

Sound-meaning correspondences in ideophones are both iconic and systematic (i.e., statistically regular). Despite the growing interest in ideophones in linguistics and psychology, the (non-iconic) systematic aspect of ideophones has been largely neglected, and the relationship between systematicity and iconicity in ideophones also remains unclear. This paper explores how five systematic features of "suffixed" ideophones in Japanese (C1 voicing, C1 /p/, C2 /r/, vowel assonance, and suffix type) are related to the degree of iconicity. Our classification tree analysis reveals that C1 voicing and C2 /r/ make particularly important contributions to the iconicity-based hierarchy of ideophones. This analysis suggests that C1 voicing and C2 /r/ support relatively high and low parts of the hierarchy, respectively.

1 Introduction

Ideophones—also known as mimetics or expressives and subsuming onomatopoeia—are "marked **words** that depict sensory imagery" (Dingemanse 2011: 25; emphasis added). Despite the increasing interest in ideophones in linguistics and psychology, their sound-symbolic properties still tend to be conceived of as extralinguistic. The purpose of this paper is to examine the linguistic aspect of the sound-symbolic system of ideophones, with special reference to so-called "suffixed" ideophones in Japanese. We adopt the classification tree method to examine holistically how each phonological or morphological feature contributes to the system.

Japanese ideophones can be classified morphologically into reduplicated, suffixed, and other types, as illustrated in (1). Reduplicated and suffixed ideophones together account for almost 70% of the whole inventory (based on the entries in Kakehi et al. (1996)).

(1) Japanese ideophones:

a. Reduplicated (35.25%):

koNkoN 'knocking,' *buubuu* 'oinking,' *poipoi* 'tossing,' *kotukotu* 'rapping,'

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yurayura ‘swaying,’ *ketyoNketyoN* ‘harshly criticized’[1]

b. Suffixed (33.77%):
gyuQ ‘squeezing,’ *piN* ‘tightened up,’ *gooN* ‘bonging,’ *huwaQ* ‘fluffy,’ *potyaN* ‘plopping,’ *horori* ‘dropping a tear’

c. Other (30.99%):
niNmari ‘smiling satisfactorily,’ *suQpori* ‘completely covered,’ *saQsa* ‘without delay,’ *uturautura* ‘drowsing,’ *kokekoQkoo* ‘cock-a-doodle-doo’

Arguably, all these ideophones are based on either monomoraic ((C)V) or bimoraic ($(C_1)V_1C_2V_2$) roots, with the latter being less iconic and more linguistically constrained, according to Hamano (1998). Suffixed ideophones consist of an ideophone root and /-Q/, /-N/, or /-ri/, and, unlike reduplicated ideophones, they represent bounded events (Toratani 2018).

The organization of this paper is as follows. Section 2 introduces two key semiotic notions—systematicity and iconicity—and formulates a research question to be addressed in the current study. Section 3 describes the five representative systematic features of Japanese ideophones used in our classification tree analysis. The methods and results of the statistical analysis are presented in Sections 4 and 5, respectively. Section 6 discusses general implications of our findings, and Section 7 concludes this paper.

2 Systematicity and Iconicity

2.1 Definitions

The current study reconsiders the relationship between the form and meaning of ideophones. It is becoming common in cognitive science to distinguish three types of form-meaning relationships: arbitrariness, iconicity, and systematicity. All these notions are traditional and of common use in linguistics, but their definitions have been slightly updated in the recent literature (Monaghan et al. 2014; Dingemanse et al. 2015).

Arbitrariness is the absence of motivation between form and meaning. For example, what is called *tree* in English is called by totally different names in other languages: *Baum* in German, *arbre* in French, and *ki* in Japanese. Since de Saussure (1916), the arbitrariness of linguistic signs has been taken to be a fundamental principle in linguistic theories.

Iconicity and systematicity, as defined in the present paper, are two specific subtypes of non-arbitrariness that are not exclusive to each other.[2] Not essentially different from the definition by Peirce (1932), iconicity is here defined as a perceived resemblance between form and meaning (Emmorey 2014). Reduplicated nouns in Japanese, such as *yama-yama* (mountain-mountain) ‘mountains’ and *kuni-guni* (country-country) ‘countries,’ are iconic in that repeated morphemes

[1] The abbreviations used in this paper are as follows: DAT = dative; GER = gerundive; IDPH = ideophone; N = moraic nasal; NPST = nonpast; POL = polite; Q = first half of a geminate cluster (word-medially), glottal stop (word-finally); QUOT = quotative; TOP = topic. We use “N” and “Q” only for transcribing ideophones.

[2] The specific definitions of these two notions still differ from researcher to researcher.

represent multiple referents. Ideophones are also assumed to involve iconicity at different levels. The segmental iconicity of ideophones is called sound symbolism (e.g., the association between /s/ and smoothness illustrated by the Japanese ideophone *surasura* 'fluent'), while their morphological shapes often have iconic correspondences to aspectual features (e.g., the durativity of *surasura*).

Mirroring the gradable nature of iconicity, ideophonic lexicons are often hierarchically represented. Hamano (1998), among many others, assumes that onomatopoeic (unimodal) ideophones (or "giongo/phonomimes") are more iconic than non-onomatopoeic (crossmodal) ideophones (or "gitaigo/phenomimes"). Some linguists further divide non-onomatopoeic ideophones. To illustrate, Dingemanse (2012) posits the implicational hierarchy in (2).

(2) SOUND < MOVEMENT < VISUAL PATTERNS < OTHER SENSORY PERCEPTIONS < INNER FEELINGS AND COGNITIVE STATES

(Dingemanse 2012: 663)

This fine-grained hierarchy predicts that if a language has ideophones for one semantic type (e.g., VISUAL PATTERNS), then it also has ideophones for lower-ranked meanings (e.g., SOUND, MOVEMENT), but not vice versa (for other proposals, see Akita (2009); Van Hoey (2016); McLean (2019)). Dingemanse attributes this ranking to the different types of iconicity (e.g., direct vs. relative iconicity) involved in the different semantic types of ideophones. Note that, to consider (2) a hierarchy of iconicity, the "less than" marks in it should be reversed.

Systematicity is defined as statistical regularity that may be language-specific. A well-known example is the semi-regular correspondence between the stress patterns and syntactic categories in English (e.g., ˈ*increase* (N) vs. *in*ˈ*crease* (V); ˈ*survey* (N) vs. *sur*ˈ*vey* (V); ˈ*present* (N, A) vs. *pre*ˈ*sent* (V)). Moreover, English phonesthemes, such as *gl-* for vision-related meanings (e.g., *glance*, *glisten*, *glitter*, *glow*) and *sn-* for nose-related meanings (e.g., *snarl*, *sneeze*, *sniff*, *snooze*), are now considered examples of systematic form-meaning mappings (Thompson & Do 2019; cf. Hinton et al. 1994).

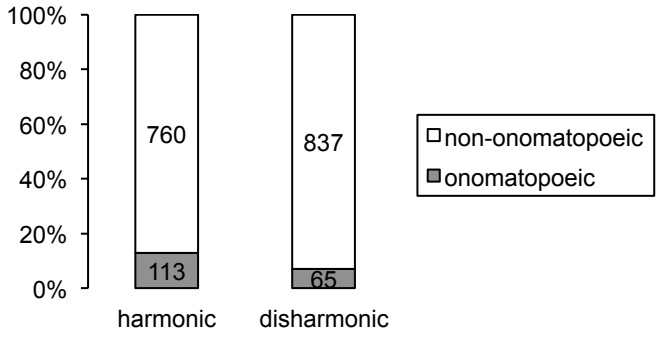
Note that some of the above instances involve both iconicity and systematicity. For example, the iconic reduplication of Japanese nouns is somewhat productive and systematic. Moreover, the phonestheme *sn-* appears to be at least partly based on an iconic sound-meaning mapping. This idea is supported by Blasi et al. (2016), who examined the basic word lists from 6,452 languages and found that the words for 'nose' contain /n/ at an above-chance level.

The coexistence of iconicity and systematicity in these linguistic signs leads us to question the iconicity of ideophones that has been taken for granted. Assuming ideophones are conventional lexical items, it might be that some of the sound-meaning associations in ideophones are not iconic but merely systematic. Put differently, the sound-symbolic system of ideophones might be a mixture of iconic and systematic mappings (see Thompson & Do (2019) for a similar critical view on ideophonic iconicity). The systematic side of ideophonic sound symbolism may differentiate it from the "pure" sound symbolism of nonce words in experimental studies, such as *mal/mil* for large/small tables (Sapir 1929) and *bouba/kiki* for round/spiky shapes (Ramachandran & Hubbard 2001).

2.2 Research Question

Both positive and negative correlations have been noted between iconicity and systematicity. Kwon (2018) reports on a positive correlation between the iconic and systematic properties of Korean ideophones. Korean ideophones have a counter-universal system of vowel harmony in which "light" vowels (/ɛ, a, o/) and "dark" vowels (/i, e, ɨ, ə, u/) do not cooccur and are associated with diminutive and augmentative meanings, respectively (Cho 1994). However, numerous ideophones violate this systematic pattern and involve disharmonic vowels. Based on a thorough investigation of reduplicated ideophones, Kwon found that harmonic ideophones are more likely than disharmonic ideophones to be onomatopoeic (i.e., sound-mimicking), as shown in Figure 1.[3] For example, *tekək-tekək* 'rattling' is a harmonic ideophone imitating sound, and *kakul-kakul* 'winding' is a disharmonic ideophone with a non-auditory meaning.

Figure 1 Onomatopoeicity and Vowel Harmony in Korean Ideophones (adapted from Kwon (2018: 14))
(Reduplicated ideophones with vowel harmony are more likely than those without to represent sounds.)



Given that Korean vowel harmony is a systematic feature and that onomatopoeic ideophones are more iconic than non-onomatopoeic ideophones (Section 2.1), Kwon's finding can be interpreted as illustrating a positive relationship between systematicity and iconicity.

In contrast, McLean (2019) presents an iconicity-systematicity tradeoff view in her crosslinguistic study of Japonic ideophones. She found that non-onomatopoeic ideophones tend to have more similar segments than onomatopoeic ideophones and non-ideophonic words between Japanese and Ryukyuan. She interprets this finding as follows. Due to their high iconicity, onomatopoeic ideophones often have deviant forms (e.g., *kokekokkoo* 'cock-a-doodle-doo'), and this formal flexibility allows them to look very different across languages. On the other hand, non-onomatopoeic ideophones are less flexible but still iconic, so they exhibit great phonological consistency across languages (cf. Childs 1994; Güldemann 2008; Thompson & Do 2019).

These previous findings suggest that iconicity and systematicity may be both positively and

[3] A chi-squared test by the present authors revealed a significant difference between the two groups ($\chi^2(1) = 16.19$, $p < .001$).

negatively correlated. In other words, it appears that some systematic features have iconic functions, but some others do not. Therefore, in the present study, we investigate when systematicity and iconicity coincide and why. We examine suffixed ideophones in Japanese to pursue this research question.

3 Japanese Ideophones

To answer the research question, we examine how five representative systematic features of suffixed ideophones in Japanese are correlated with iconicity. We chose suffixed ideophones because they are highly productive and involve not only segmental but also morphological systematicity, as described in this section.

The first feature we focus on is the voicing of initial obstruents (abbreviated as "C1_voi" for statistical purposes). This phonetic feature plays a central role in the sound-symbolic system of Japanese ideophones (Suzuki 1962; Hamano 1998). A total of 51.05% (267/523) of all bimoraic ideophone roots in Kakehi et al. (1996) form minimal pairs based on initial voicing, as illustrated in (3).

(3) a. /biku/ 'trembling' vs. /piku/ 'twitching'
b. /goro/ 'a heavy object rolling' vs. /koro/ 'a light object rolling'
c. /zara/ 'rough' vs. /sara/ 'smooth'

According to Hamano's (1998: 172) phonosemantic description, voiced and voiceless obstruents are systematically associated with "light; small; fine" and "heavy; large; coarse" meanings, respectively (see Kawahara et al. (2018) for a phonetic account of these phonosemantic mappings).

The second feature is initial /p/ ("C1_p"). A total of 15.25% (247/1620) of the ideophones in Kakehi et al. (1996) start with /p/ (e.g., *pikaQ* 'flashing,' *piyopiyo* 'tweeting,' *potari* 'dripping'). This notable frequency made Hamano (1998: 7) call /p/-initial ideophones "mimetics par excellence" (see also Nasu (1999)). According to Hamano, C1 /p/ is associated with the "taut surface" of something "light; small; fine" (p. 172).

The third feature is intervocalic /r/ ("C2_r"). A total of 20.27% (106/523) of the bimoraic ideophone roots in Kakehi et al. (1996) have /r/ in their second consonant slot (e.g., /bori/ 'scratching hard,' /hura/ 'staggering,' /koro/ 'a light object rolling,' /nuru/ 'slippery') (Thompson 2017). According to Hamano (1998: 173), C2 /r/ is associated with "rolling; fluid movement."

The fourth feature is vowel assonance ("V1_V2"), or "monovocalicity" in Dingemanse's (2011: 135) terms. Phonological harmony, including vowel assonance and tonal harmony, is common in ideophones across languages (Childs 1994: 183; see also Section 2.2). In Japanese, 31.55% (165/523) of bimoraic ideophone roots in Kakehi et al. (1996) have the same vowel in their first and second vowel slots (e.g., /kiri/ 'squealing,' /dere/ 'slovenly,' /hara/ 'fluttering,' /toro/ 'melting,' /nuru/ 'slippery'). Akita et al. (2013) propose that the vowel assonance in Japanese ideophones represents the stability of eventualities.

The fifth feature is the suffix type ("suffix"). Suffixed ideophones account for 44.15% (434/1239) of the bimoraic root-based ideophones in Kakehi et al. (1996) (CVCV-Q: 206 (16.63%); CVCV-N: 99 (7.99%); CVCV-ri: 129 (10.41%); see also Nasu (2007)). The three suffixes signify the boundedness of events, with subtle differences (Hamano 1998; Tamori & Schourup 1999; Toratani 2018; Jin 2019). /-Q/ is associated with forcefulness or vigorousness (e.g., *koroQ* 'a light object rolling quickly once'). /-N/ is associated with reverberations, a lingering sensation, or a round shape (e.g., *koroN* 'a light spherical object rolling once and stopping'). /-ri/ is associated with quietness or calmness (e.g., *korori* 'a light object rolling once quietly').

All these features cover a large portion of the sound-symbolic system of Japanese ideophones and, therefore, can safely be considered systematic features. The present study examines how each of these features is related to the iconicity cline introduced in Section 2.1.

4 Methods

We used classification tree analysis to illuminate the relationship between the systematicity and iconicity of ideophones. A classification tree is a type of decision tree that represents "a division of the data set into a series of non-overlapping subsets that jointly comprise the full data set" (Baayen 2008: 149). The algorithm checks all predictors and returns the best one (see also Eddington (2010); Gries (2019)). This multifactorial modeling matches well with our research question, as it enables us to take a holistic perspective on how different systematic features work together to constitute a sound-symbolic lexicon.

The present dataset consists of 588 suffixed ideophones based on bimoraic roots (CVCV-Q: 286; CVCV-N: 132; CVCV-ri: 170). This list is an extended version of the list by Kakehi et al. (1996).[4] We coded each ideophone in terms of the five systematic features (i.e., C1 voicing (whether to form a minimal pair based on initial voicing), C1 /p/, C2 /r/, vowel assonance, suffix type) and the fine-grained semantic types in Dingemanse (2012) (i.e., SOUND, MOVEMENT, VISUAL PATTERNS, OTHER SENSORY PERCEPTIONS, INNER FEELINGS AND COGNITIVE STATES). For polysemous ideophones, we only considered their putatively most common meanings. Table 1 presents part of the dataset.

Table 1 Part of the Dataset (588 suffixed ideophones were coded for their phonological, morphological, and semantic properties.)

Ideophone	*Systematicity*					*Iconicity*
	C1 voicing	C1 /p/	C2 /r/	Assonance	Suffix	Meaning
bataQ 'thudding'	Yes (*pataQ*)	No	No	Yes	Q	SOUND
burari 'strolling'	Yes (*purari*)	No	Yes	No	ri	MOVEMENT
kiraN 'glistening'	Yes (*giraN*)	No	Yes	No	N	VISUAL PATTERNS
zaraQ 'rough'	Yes (*saraQ*)	No	Yes	Yes	Q	OTHER SENSORY PERCEPTIONS
dokiQ 'startled'	No (**tokiQ*)	No	No	No	Q	INNER FEELINGS & COGNITIVE STATES

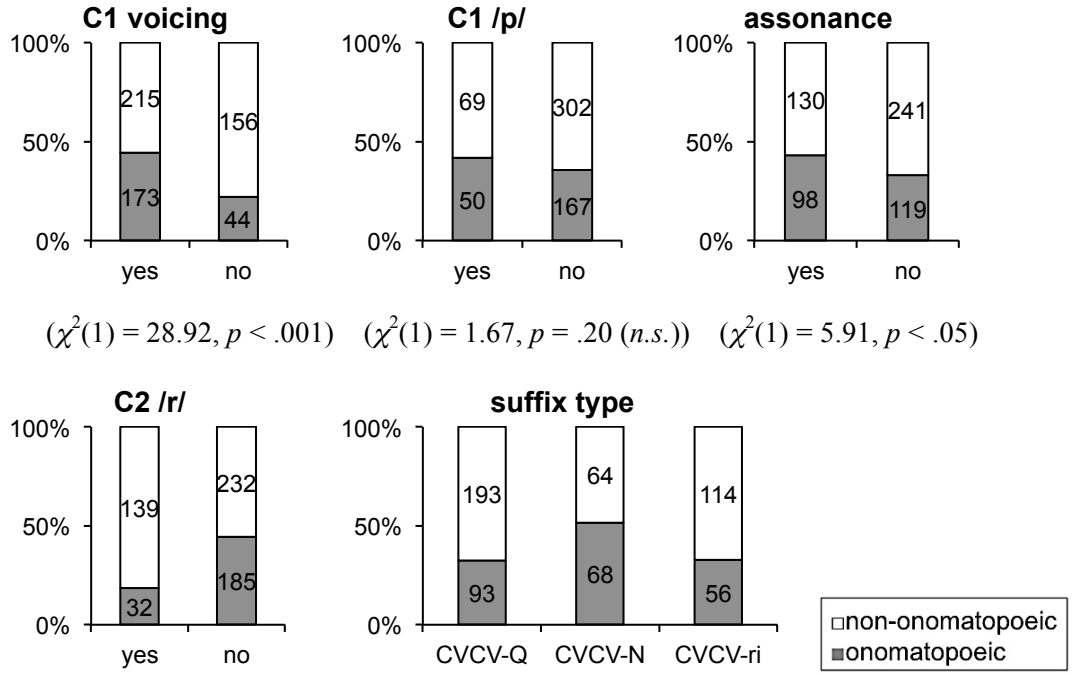
[4] The dataset is available on the first author's website.

Using the R packages `rpart` and `partykit` on R version 3.5.2 (R Core Team 2015), we created classification trees that predict the semantic types (i.e., the degree of iconicity) of ideophones from their systematic features. For the semantic types, we considered the coarse-grained (i.e., onomatopoeic or not) and fine-grained (i.e., Dingemanse's) classifications separately, as the validity of the latter is still under debate.

5 Results

The results revealed that the five systematic features of Japanese suffixed ideophones are either positively or negatively correlated with iconicity and that C1 voicing and C2 /r/ play particularly important roles in the sound-symbolic system. Figure 2 summarizes the correlations between the systematic features and onomatopoeicity.

Figure 2 Correlations between Systematic Features and Onomatopoeicity (C1 voicing, vowel assonance, and CVCV-N exhibit a relative preference for onomatopoeic meanings, whereas C2 /r/ prefers non-onomatopoeic meanings.)



($\chi^2(1) = 28.92, p < .001$) ($\chi^2(1) = 1.67, p = .20$ (*n.s.*)) ($\chi^2(1) = 5.91, p < .05$)

($\chi^2(1) = 34.27, p < .001$) ($\chi^2(2) = 15.61$, adjusted residual for /CVCV-N/ = 3.95, $p < .001$)

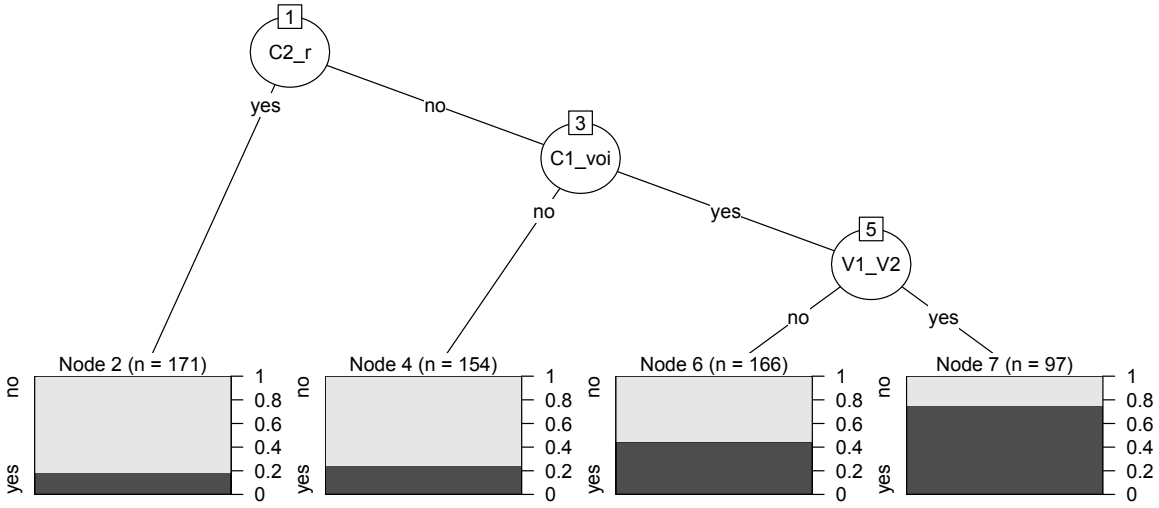
It was found that C1 voicing, vowel assonance, and the suffix /-N/ are more common in onomatopoeic ideophones than in non-onomatopoeic ideophones, whereas C2 /r/ prefers non-onomatopoeic ideophones.

Figure 3 is a classification tree that predicts onomatopoeicity from the five systematic features.

The tree was pruned at cp = 0.01843318 to minimize the error rate (see Baayen (2008: 151) for cp (cost-complexity parameter)). The results demonstrate that C2 /r/ is the most useful predictor of the (non-)onomatopoeicity of suffixed ideophones, with C1 voicing the next most useful. Specifically, suffixed ideophones with C1 voicing pairs and vowel assonance and without C2 /r/ (the rightmost branch; e.g., *bataN* 'falling/shutting with a slam,' *pataN* 'falling/shutting with a snap') are most likely to be onomatopoeic.

Figure 3 Classification Tree Predicting Onomatopoeicity from Systematic Features (This tree shows that C2 /r/ is the primary feature associated with non-onomatopoeic meanings and ideophones without C2 /r/ are further divided by C1 voicing and vowel assonance.)

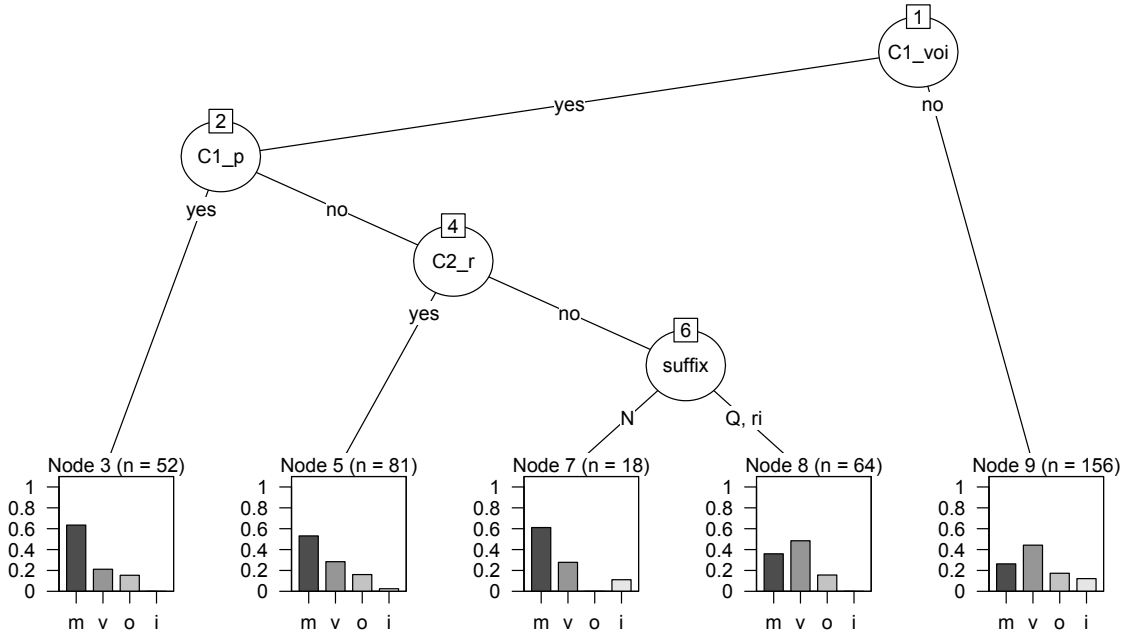
```
(rpart(onomatopoeicity~C1_voi+C1_p+C2_r+V1_V2+suffix,data=data,cp=0.01843318))
```



C1 voicing and C2 /r/, as well as C1 /p/ and suffix type, were also found to be relatively important in the classification tree in Figure 4, which predicts the fine-grained degree of iconicity (i.e., Dingemanse's (2012) semantic types) from the five systematic features (pruned at cp = 0.01212121). This figure also suggests that the correlation between C1 voicing and iconicity is gradual. That is, minimal pairs based on C1 voicing (the left four branches) are more common in ideophones with higher iconicity. This tendency becomes clearer in Figure 5, which shows the proportions of voicing-paired ideophones across different semantic domains. As was the case for onomatopoeicity, there is a positive correlation between the proportions and the degree of iconicity. A chi-squared test revealed a significant group difference ($\chi^2(3) = 33.05$, $p < .001$). Specifically, it was found that voicing pairs are particularly common in the MOVEMENT domain (adjusted residual = 4.82, $p < .001$) and particularly uncommon in the INNER FEELINGS AND COGNITIVE STATES domain (adjusted residual = −4.07, $p < .001$).

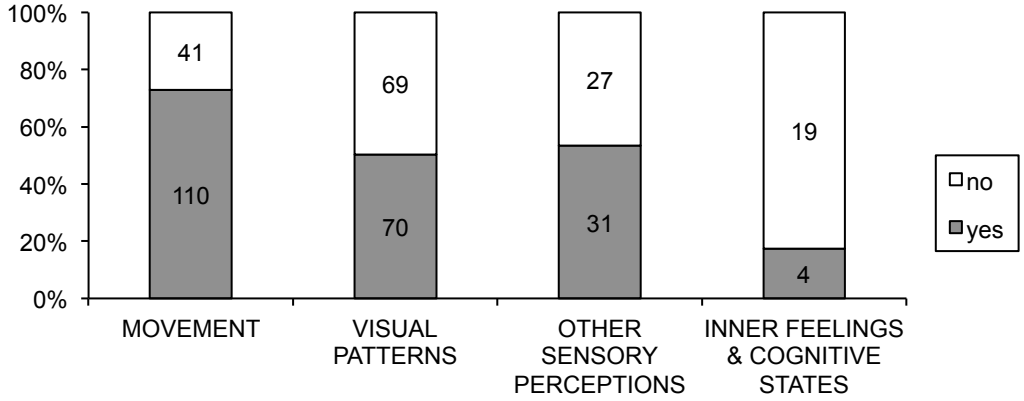
Figure 4 Classification Tree Predicting Fine-Grained Iconicity from Systematic Features (This tree shows that C1 voicing is the primary factor that predicts the semantic subtypes of non-onomatopoeic ideophones, and ideophones with C1 voicing pairs are further divided by C1 /p/, C2 /r/, and suffix type.)

`(rpart(crossmodal.meaning~C1_voi+C1_p+C2_r+V1_V2+suffix,data=data,cp=0.01212121))`



Notes: m = MOVEMENT; v = VISUAL PATTERNS; o = OTHER SENSORY PERCEPTIONS; i = INNER FEELINGS AND COGNITIVE STATES. In creating this tree, we excluded onomatopoeic ideophones (N = 217) from the dataset to focus on the crossmodal part of the iconicity hierarchy.

Figure 5 Proportions of C1 Voicing Pairs across Different Semantic Types of Suffixed Ideophones (Such pairs are more common in semantic domains in which ideophones have higher iconicity.)



Examples of paired and unpaired ideophones are given in (4).

(4) a. MOVEMENT:

buraQ 'strolling'	vs.	*puraQ* 'having a small stroll'
gururi 'going around'	vs.	*kururi* 'spinning'
ziwari 'inching'	vs.	**siwari*

b. VISUAL PATTERNS:

girari 'glaring'	vs.	*kirari* 'glistening'
**zikaQ*	vs.	*tikaQ* 'sparking'[5]

c. OTHER SENSORY PERCEPTIONS:

betoQ 'sticky'	vs.	*petoQ* 'a little bit sticky'
gusyori 'soaking wet'	vs.	**kusyori*

d. INNER FEELINGS & COGNITIVE STATES:

guraQ 'attracted'	vs.	*kuraQ* 'a little bit dizzy/attracted'
dokiQ 'startled'	vs.	**tokiQ*
zokuQ 'thrilled'	vs.	**sokuQ*

The inner feeling meaning of *guraQ* in (4d), illustrated in (5), may not be fully acceptable to some native speakers of Japanese. (This ideophone is usually used in a MOVEMENT meaning ('shaking').) This fact further confirms the limited productivity of paired ideophones with low iconicity.

(5) ... howaito-gakuwari-nara zero-en, kore-ni-wa tyotto
white-student.discount-if 0-yen this-DAT-TOP a.little.bit
guraQ-to ki-te i-mas-u.
IDPH-QUOT come-GER be-POL-NPST
'... White Student Fee (the name of a cellphone discount plan) is 0 yen—[I]'m a little bit attracted to that.'
(http://dennounikki.seesaa.net/category/2728660-1.html)[6]

In this section, we have shown that the five systematic features of suffixed ideophones in Japanese are correlated with their degree of iconicity in interesting ways. The two classification trees suggest that C1 voicing and C2 /r/ play a particularly important role. In the next section, we discuss general implications of these results.

6 Discussion

The classification tree analysis in the previous section revealed the particular significance of C1 voicing and C2 /r/ in the iconicity-based hierarchical lexicon of Japanese ideophones. The present findings are consistent with previous descriptive and experimental reports.

Initial voicing is a central phonetic feature in the sound-symbolic system of Japanese. This

[5] In Japanese phonology, /ti/ [t͡ɕi] is paired with /zi/ [d͡ʑi~ʑi] for a historical reason. For example, *ti* 'blood' may become *zi* in compounds, as in *hana-zi* 'nosebleed.'

[6] This example was obtained through the NINJAL Web Japanese Corpus (NINJAL 2017).

idea receives support from numerous minimal pairs of ideophones based on C1 voicing (Section 3). Moreover, Akita & McLean (to appear) argue that the centrality of C1 voicing manifests in sound symbolism experiments. They report that Japanese speakers have greater sensitivity to C1 voicing in their sound-symbolic ratings than English speakers, who are more dependent on vowels (see also Saji et al. (2019)). Note that sound-symbolic pairs in the English lexicon make greater use of vowel alternations, as in *jingle/jangle*, *snip/snap*, *snitch/snatch*, and *stamp/stomp*. Thus, the present study provides additional, more direct evidence for the special status of C1 voicing in Japanese sound symbolism.

In this connection, recent evidence suggests that voicing symbolism may not be as iconic as Japanese researchers have assumed. To our knowledge, vowel-based ideophone paradigms, such as that in the English, appear to be more common than consonant-based ideophone paradigms across languages (see Voeltz & Kilian-Hatz (2001)). In fact, according to Maddieson (2010: 536), voicing is distinctive in only 68.92% (439/637) of the languages he sampled. Furthermore, Haryu & Zhao (2007) and Iwasaki et al. (2007), respectively, show that Chinese and English speakers without prior knowledge of Japanese cannot sense the voicing symbolism of Japanese ideophones. These facts suggest that the primary function of C1 voicing in Japanese sound symbolism is systematicity, rather than iconicity. If this discussion is on the right track, the obtained positive correlation between C1 voicing and iconicity may indicate that the systematicity of C1 voicing facilitates the iconic signification of ideophones and supports a relatively high part of the ideophone hierarchy.

A similar situation may account for the observed importance of C2 /r/. As we saw in Section 3, C2 /r/ is markedly frequent in Japanese ideophones. This deviant distribution led Thompson (2017) to analyze this /r/ as "epenthetic" and sound-symbolically empty. In fact, it is often unclear whether Hamano's (1998) semantic generalization of C2 /r/ (i.e., "rolling; fluid movement") can be applied to individual ideophones, such as *hiriQ* 'one's skin stinging,' *kerakera* 'cackling with laughter,' and *noronoro* 'slow' (but see Hamano (2019)). If /r/ is the default realization of C2, we no longer need to worry about these possible exceptions. This epenthesis account may allow us to argue that C2 /r/, as well as C1 voicing, is a primarily systematic feature. The observed negative correlation between C2 /r/ and iconicity suggests that, unlike C1 voicing, C2 /r/ supports a relatively low part of the ideophone hierarchy.

The other three systematic features considered in this study are less likely to be assigned these special roles. To the best of our knowledge, no related discussion has been conducted regarding C1 /p/ or vowel assonance. Moreover, the morphological difference between /-Q/, /-N/, and /-ri/ appears to be less important than their superordinate category, "ideophonic suffixes." All three types of suffixed ideophones are associated with bounded aspect and, together, are contrasted with reduplicated ideophones for unbounded events (Akita 2009; Toratani 2018). Therefore, our next step will be a full-scale investigation of Japanese ideophones, including reduplicated and other forms.

7 Conclusion

In this paper, we have demonstrated that different systematic features are correlated with iconicity in different ways, reflecting their different roles in the system. Our classification tree analysis indicated that initial voicing and C2 /r/, respectively, support relatively "high" and "low" parts of the sound-symbolic system of Japanese ideophones as defined by the degree of iconicity. More generally, we argued that not all sound-symbolic features are equally iconic. This critical view of sound symbolism will help us to advance ideophone research on solid ground (Thompson & Do 2019).

Building upon the current study, future research will have to include other systematic features of Japanese ideophones, such as accent patterns and palatalization (Hamano 1998). Moreover, discussion on the (non-)iconicity of systematic features will benefit from crosslinguistic comparisons of ideophone systems, as iconic signs are expected to be similar across languages (but see McLean (2019) cited in Section 2.2). Particular importance will be attached to a sound-symbolic comparison between languages with and without numerous ideophones. Given that systematicity is more useful in large lexicons than in small lexicons (Gasser 2004; Monaghan et al. 2014), such a crosslinguistic comparison may shed new light on the origin of systematicity in language.

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音象徴の体系的側面

―日本語の接尾辞型オノマトペを例に―

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要旨

オノマトペにおける音と意味の対応は，類像的かつ（統計的規則性を有するという意味で）体系的である。近年，言語学・心理学におけるオノマトペへの関心が高まりを見せる一方，オノマトペの（非類像的で）体系的な側面は軽視されがちである。また，オノマトペにおける体系性と類像性の関係も未だ謎のままである。本稿では，日本語におけるいわゆる接尾辞型オノマトペ（例：バタッ，ブラリ，キラン）が持つ以下の体系的特徴を例に，各特徴と類像性の関係を探った。

i. 語頭有声性：有声・無声の最小対を持つ（例：バタッ vs. パタッ）
ii. 語頭/p/（例：ピクッ，ポキッ，プルン）
iii. 語中/r/（例：ブラリ，キラン，ザラッ）
iv. 母音一致（例：バタッ，プツン，キリリ）
v. 接尾辞タイプ（例：クラッ，フワン，キラリ）

分析方法としては，5 つの体系的特徴からオノマトペの類像性の程度を予測する分類木を用いた。類像性の指標としては，「音＞それ以外」（擬音語＞擬態語）という感覚モダリティに基づく階層に加え，「それ以外」を細分した「動き＞視覚的パタン＞他の感覚＞心情・認知状態」という Dingemanse (2012) の階層を用いた。

分析の結果，オノマトペの類像性を振り分ける要因として，語頭有声性と語中/r/が特に強く働いていることが判明した。具体的には，有声・無声の最小対は類像性の高いオノマトペ（例：ビリッ vs. ピリッ（紙などを破る音））に多い一方，語中/r/は類像性の低いオノマトペ（例：ピリリ（辛さよる舌の痛み））に多かった。この結果から，語頭有声性は類像性階層の上位部分を，語中/r/は下位部分を支える体系的特徴であることが示唆される。もしこれらの音韻的特徴の主たる機能が体系性であるとするなら，それらに対する音象徴的・類像的意味づけは，従来考えられてきたほどには重要でないのかもしれない。