Comprehension of mimetics by adult native speakers of Japanese

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Linguistics traditionally regards the relationship between a word's sound and its meaning as arbitrary; words which systematically relate sound and meaning – 'sound-symbolic' or 'mimetic' words – have been regarded as peripheral (Imai and Kita, 2014); however, increasingly, research has found that languages such as Japanese have highly developed and grammatically integrated lexical strata devoted to mimetic words (Hamano, 1998; Tsujimura, 2001, 2005; Tsujimura and Deguchi, 2003). In Japanese, Akita (2010) has posited that among mimetics that denote internal states ('psychomimes'), three categories can be identified based on semantic, morphosyntactic, and syntactic properties. With respect to syntax, Akita proposes that compatibility with locus noun phrases constitutes a syntactic constraint on these mimetic classes' naturalness that can serve to discriminate the three classes. In this experiment, we sought to find empirical evidence for this claim by way of native speakers' judgment of the naturalness of mimetics in sentences according to a five-point scale. Our results provided empirical support for Akita's claim, indicating that her categorization might indeed be a psychological reality for native speakers of Japanese.

Keywords: mimetics, syntax, semantics, naturalness judgments, Japanese

1. Introduction

1.1. Sound-symbolism in linguistics. A fundamental tenet of introductory linguistics is that the relationship between a sound and its meaning is arbitrary (see, for instance, Fromkin et al., 2010, Chapter 1, pp. 3-4). For example, all of the following words have the same basic meaning: *dog* (English), *Hund* (German), *sobaka* (Russian), *perro* (Spanish), *cane* (Italian), *inu* (Japanese), *gǒu* (Mandarin). Despite all meaning the same thing, 'dog', there are virtually no similarities between their sounds. Conversely, the same (or virtually the same) sequence of sounds – e.g., [gɪft] – may have one meaning in one language ('gift, present' in English) and an entirely different meaning in another language ('poison' in German). Thus, linguists have long argued that the relationship between sound and meaning is arbitrary (Imai and Kita, 2014).

This rule finds its exception in words called, among other things, *mimetics*, or *sound-symbolic words*. These are words in which the relationship between sound and meaning is *non*-arbitrary. For instance, in English, there are words such as *bang*, *buzz*, and *thud*; and in Japanese, there are corresponding words such as *ban*, *bii-bii*, and *dosun*. These words are conventionally called 'onomatopoeia', or, to use the technical term, 'phonomimes' (Hamano, 1998).

In languages like English (and indeed, virtually all Indo-European languages, according to Imai and Kita, 2014), this is essentially the extent of sound-symbolism: we have phonomimes, and occasionally some isolated, covert sound-symbolic effects. For example, Fromkin et al. (2010) identify the prevalence of the sequence [gl] in words pertaining to light, such as *glow, gleam, glisten, glimmer, glare*; however, there are counterexamples, such as *gloom*, which indeed is related to darkness not light, or *glower* or *glutton* which have nothing to do with either. Because of this marginality, modern linguistics has treated these items as 'peripheral' or 'primitive': more noise imitation than actual 'language', and therefore not deserving of linguistic treatment (Imai and Kita, 2014).

However, sound-symbolism is truly *not* a non-linguistic phenomenon, and while sound-symbolism appears to be quite restricted in Indo-European languages, there are languages outside of this family – particularly East Asian languages, including Japanese (the subject of this paper), Cantonese, and Korean; as well as sub-Saharan African languages, some Aboriginal Australian languages, some South American languages, and a few scattered non-Indo-European languages of Europe – in which mimetic words are by no means restricted (Imai and Kita, 2014). In Japanese, for instance, lexicography has often dedicated an entire stratum of the lexicon exclusively to mimetic words (Hamano, 1998; Frellesvig, 2010, Chapter 17).

1.2. Sound-symbolism in Japanese. In the case of Japanese, mimetic words are systematic in that they have identifiable phonosemantic, morphological, and syntactic properties that distinguish them from other linguistic items. For instance, in Japanese, the pitch pattern of a mimetic word systematically changes to match its syntactic role. We can see this in *pera-pera* – whose basic meanings are 'chatty, fluent, thin, flimsy, sparse' – below (in which the accented mora is marked by an acute accent, and the lack of such accent indicates an accentless word, whose pitch pattern in (standard) Tokyo dialect is rendered as uniformly high except for the first mora, which is low).[1]

(1) a. *Péra-pera   hanas-u*
         MIM   speak-NPST

         'chatter away incessantly'

     b. * *Pera-pera   hanas-u*
         MIM   speak-NPST

         'chatter away incessantly'

(2) a. * *Tomu-wa   nihongo-ga   péra-pera   da*
         Tom-TOP   Japanese-NOM   MIM   COP

         'Tom is fluent in Japanese.'

     b. *Tomu-wa   nihongo-ga   pera-pera   da*
         Tom-TOP   Japanese-NOM   MIM   COP

         'Tom is fluent in Japanese.'

In the sentences in (1), the mimetic word *pera-pera* is being used adverbially to modify *hanas-* 'speak'; in such a position, it must have the pitch pattern in (1a): e.g., with accent on the first mora, giving HLLL. The accentless pitch pattern (LHHH) is unnatural. In (2), where the mimetic is being used adnominally (with the copula *da*), the opposite is the case: The accented pattern is unnatural, and the accentless one is required. This is directly related to the different syntactic roles played by the mimetic in (1) and (2). (See Hamano, 1998, for additional information on the pitch accentual properties of mimetics).

As an additional example, mimetic adverbs in Japanese can take the particle *to*, which marks their adverbial function; this is quite distinct from the rest of the lexicon, in which *to* acts as a complementizer, quotative particle, or conjunctive or comitative particle for noun phrases, but not as an adverbial marker:[2]

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[1]The following abbreviations are used in glosses in this paper: MIM = 'mimetic'; TOP = 'topic'; NOM = 'nominative'; ACC = 'accusative'; GEN = 'genitive'; NPST = 'nonpast'; PAST = 'past'; PERF = 'perfective'; PASS = 'passive'; CSV = 'causative'; OBL = 'oblique'; COP = 'copula'; ADV = 'adverbial marker'; LOC = 'locative'; CONJ = 'conjunctive.' Because of the multiplicity of its role in Japanese grammar, the *te* morpheme of verbs will simply be glossed phonetically. Glosses in general are phonemic rather than morphophonemic (meaning, for instance, the verb *au* 'meet' is glossed as *a-u* meet-NPST, rather than *aw-u*, the latter of which reflects the underlying stem of the verb: *aw-*). Additionally, all glosses are given in the JSL Romanization of Japanese conventional in linguistic literature (as opposed to the Hepburn system used most commonly in lay circles); and translations of ungrammatical/unnatural sentences are in general of the intended meaning, but are more literal in, for instance, (4) below.

[2]At this point, we should mention that there is a very small class of words in Japanese that at least one reference grammar – that of Tanimori and Sato (2013) – identifies as "*taru*" adjectives, along with "*to sita*" adjectives (with some overlap between them). These are words that, in adnominal position, take *-taru* and *to sita* to indicate their function as adnominals, e.g., *doudou* 'grand, magnificent,' *rekizen* 'plain, clear, obvious.' These adjectives, like mimetic words, take *to* as an adverbial marker; and they do not all have the structural forms expected of mimetic words as delineated by Hamano (1998), so we cannot regard them as mimetics that have been misidentified. However, as noted, these words are exceedingly sparse (Tanimori and Sato, 2013, cite fewer than ten of both types — see the appendix of their work). Additionally, from Frellesvig (2010), Chapter 8, it seems that these words are an archaic literary relic from Early Middle Japanese (roughly from the ninth century to the thirteenth century). As such, they are not crucial to our analysis here. See Frellesvig's work for further details.

(3)   *Pera-pera   to   hanas-u*
      MIM   ADV   speak-NPST

      'chatter away incessantly'

Sentence (3) is identical to the sentence in (1a) (with accent marking omitted), only now the adverbial function of the mimetic is explicitly marked by *to* (see Toratani, 2006, for more on the optionality of *to*-marking, which is beyond the scope of this paper).

Finally, mimetics in Japanese also have unique phonotactic properties, a fact which constitutes one of the prime arguments for their constituting a discrete stratum in the lexicon. The classic example of this is that mimetics allow singleton [p] (as opposed to geminate [pp]), but disallow clusters of a nasal followed by a voiceless consonant [NÇ̥]. This distinguishes mimetics from the three other proposed strata of the lexicon, e.g., the native stratum, in which both singleton [p] and [NÇ̥] are disallowed; the Sino-Japanese stratum, in which singleton [p] is disallowed, but [NÇ̥] is not; and the loanword stratum, in which both singleton [p] and [NÇ̥] are allowed (Hamano, 1998; Tsujimura and Deguchi, 2003).

As the discussion above reveals, Japanese mimetics clearly have systematic grammatical properties; therefore, in Japanese at least, we cannot consider mimetic words to be 'peripheral' or 'non-linguistic' phenomena; they merit being given a proper linguistic treatment. Indeed, study of sound-symbolism not only is interesting *per se*, but also has provided insight into first language acquisition (where it has been proposed to play several powerful roles – see Imai and Kita, 2014, for more on this), and could potentially provide insight into such areas as language evolution (*ibidem*, and see also Frellesvig, 2010, Chapter 17, for the case of Japanese in particular) and auditory phonetics (e.g., Kanero et al., 2014, found that at least some Japanese mimetics are processed in different areas of the brain than non-sound-symbolic words).

Accordingly, this paper seeks to corroborate claims of Akita (2010), who attempted to characterize the semantics of mimetic words in Japanese on the basis of their interaction with syntax (i.e., a grammar-driven approach). This study will be reviewed in the next section.
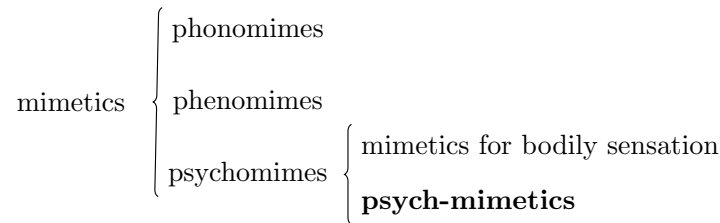
2. Literature review

2.1. Background. Since the 1990s, a good deal of research has been done on Japanese mimetics, and much has been learnt about the unique role they play in the language. Hamano (1998), for instance, is a seminal work in the characterization of Japanese mimetics and describes in detail their phono-semantic, morphosyntactic, and lexical properties.

Despite such gains, however, much of the work on mimetics up to this point relies on authors' individual native speaker intuitions and sometimes corpus data to make theoretical or analytical judgments about mimetic properties. For instance, Hamano (1998) draws on corpus data to examine the distribution of phonemes within the moraic structure of mimetic words, and Hamano (1988) analyzes the effect of syntax on the iconicity of mimetic words. Work by Tsujimura (2001, 2005) and Kita (1997) focuses on a theoretical analysis of mimetics, focusing in particular on the semantic integratedness of mimetics in sentences.

With respect to experimental approaches, Imai and Kita (2014) is a major study that empirically examines how sound-symbolism may play a role in first language acquisition (principally in Japanese, but in other languages as well). The difference between the current study and those such as Imai and Kita (2014) is that the current study seeks to assess native speakers' judgment of the naturalness of mimetic words in sentential contexts, whereas previous studies have either examined mimetics in isolation (such as Akita, 2010, see below), or have examined them only secondarily (such as Imai and Kita, 2014, for whom mimetic words are crucial to their study but are not the *object* of the study).

2.2. Akita's claim. Akita (2010) empirically examines the semantics of Japanese mimetics, building off of a previous characterization. We mentioned above that in a language like English, sound-symbolism mostly presents in the form of phonomimes — true onomatopoeia whose phonemic contents mimic sounds directly. Japanese, however, has been identified as having two other categories of sound-symbolic words: *pheno*mimes, in which the sound of the word mimics a manner of action or a texture (i.e., phenomimes are visual in the same way that phonomimes are aural); and *psycho*mimes, in which the sound of the word

mimics an internal state (Hamano, 1998; Akita, 2010).

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\text{mimetics} \left\{ \begin{array}{l} \text{phonomimes} \\[1em] \text{phenomimes} \\[1em] \text{psychomimes} \left\{ \begin{array}{l} \text{mimetics for bodily sensation} \\[0.5em] \textbf{psych-mimetics} \end{array} \right. \end{array} \right.
$$

Figure 1: Semantic typology of mimetics in Japanese, according to previous literature (Akita, 2010, p. 1197).

Psychomimes are the subject of scrutiny in Akita (2010): Previously, as Akita describes and as Figure 1 above (from Akita's own Figure 1) depicts, psychomimes have been divided into mimetics of bodily sensation (e.g., *zuki-zuki* 'throbbing pain') and so-called 'psych-mimetics', which aptly indicate psychological states (e.g., *waku-waku* 'exhilarated, ecstatic').

Akita's theoretical framework is 'embodiment theory', a notion from cognitive psychology in which abstract or intangible concepts are comprehended by metaphorically or metonymically linking them to concrete or tangible ones (e.g., the English expression *look downcast* has the meaning of 'appearing sad' because downcast eyes are considered to be a concrete (visible) reflection of sadness). Her analysis based on this theory leads her to propose two subcategorizations of the 'psych-mimetics' shown in Figure 1, e.g., 'somatopsych-mimetics', which embody psychological states as physical sensations (e.g., *waku-waku* above); and 'visuopsych-mimetics', which embody psychological states as visible behaviors (e.g., *kuyo-kuyo* 'brooding, fretting'). Combining these two types of psych-mimetics with the mimetics for bodily sensation, Akita's analysis posits three classes of psychomimes in total.

Furthermore, Akita argues that these classes display distinct grammatical behavior in various areas. The most important of these areas, the one in which Akita claims all three classes behave differently from one another, is compatibility with what she calls a 'locus NP'. A locus NP is a noun phrase which serves to localize the state denoted by the psychomime. Specifically, she claims that for mimetics of bodily sensation, locus NPs are obligatory; for 'somatopsych-mimetics', locus NPs are optional; and for 'visuopsych-mimetics', locus NPs are illicit. This proposal is summarized in the following item (4), which is a slightly simplified copy of Akita's item (3), p. 1200:

(4) a. Mimetics of bodily sensation (locus NP = obligatory)

      i. *Ken-wa   atama-ga   zuki-zuki si-te i-ta*
         Ken-TOP head-NOM MIM   do-*te* be-PAST

         'Ken's head was throbbing.'

      ii. * *Ken-wa   zuki-zuki si-te i-ta*
         Ken-TOP MIM   do-*te* be-PAST

         'Ken was throbbing.'

  b. Somatopsych-mimetics (locus NP = optional)

      i. *Ken-wa   mune-ga   waku-waku si-te i-ta*
         Ken-TOP chest-NOM MIM   do-*te* be-PAST

         'Ken's chest was exhilarated.'

      ii. *Ken-wa   waku-waku si-te i-ta*
         Ken-TOP MIM   do-*te* be-PAST

         'Ken was exhilarated.'

c. Visuopsych-mimetics (locus NP = absent)
   i. * *Ken-wa   kokoro-ga   kuyo-kuyo si-te   i-ta*
      Ken-TOP   heart-NOM   MIM   do-*te* be-PAST

      'Ken's heart was troubled.'
   ii. *Ken-wa   kuyo-kuyo si-te   i-ta*
      Ken-TOP   MIM   do-*te* be-PAST

      'Ken was troubled.'

In order to simplify the names given to these classes, we will hereafter refer to mimetics of bodily sensation as *Class 1 psychomimes*, 'somatopsych-mimetics' as *Class 2 psychomimes*, and 'visuopsych-mimetics' as *Class 3 psychomimes*. In other words, Akita's proposal is an alternative mimetic typology to that given in Figure 1, and this alternative is presented below in Figure 2.
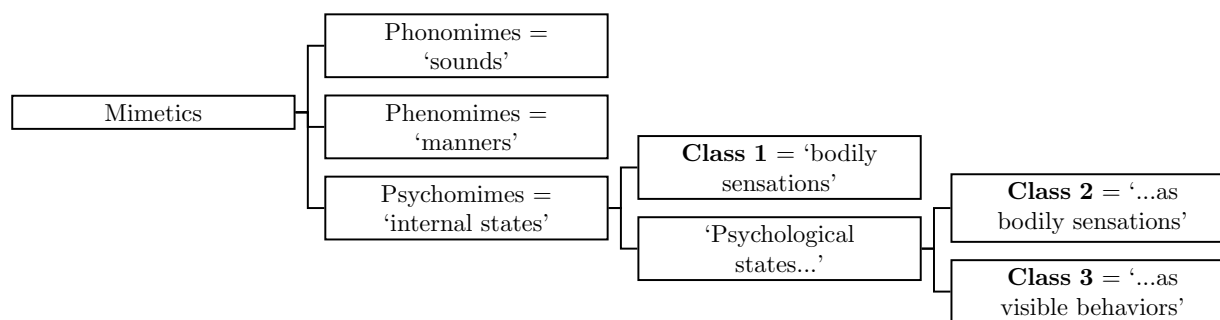
Figure 2: Akita's proposed semantic typology of mimetics in Japanese. The original names she uses have been replaced for clarity, and have been bolded to highlight that they constitute three distinct categories of psychomimes.

2.3. Akita's experiment. In order to find empirical support for this classification, Akita presented 12 psychomimes (4 from each of her proposed classes) to 20 adult native speakers and asked them each to draw a picture to depict the meaning of each word. These pictures – 240 in total – were then judged by both herself and one other, non-linguist native speaker of Japanese, each picture being assigned a binary 'yes' or 'no' as to whether or not it portrayed a 'bodily response' (which Akita exemplifies as shivering or putting the hands to the head) or a 'behavior' (such as sitting down); these answers were not mutually exclusive, meaning that a picture might receive a 'yes' for both, or even a 'no' for both (pp. 1211-1212).

Akita predicted that each class of psychomime would show a particular pattern of behavior in the results, e.g., Class 1 psychomimes, which denote bodily sensations, would elicit more 'bodily response' judgments than 'behavior' judgments; and that Class 3 psychomimes would elicit the converse pattern. The prediction for Class 2 pscyhomimes was identical to that of Class 1, since Class 2 psychomimes were posited to use bodily sensations as metaphorical/metonymical vehicles for denoting psychological states (p. 1212).

Akita's results confirmed her predictions for Classes 1 and 3, but not for Class 2: in her experiment, Class 2 psychomimes actually resembled Class 3 more than Class 1, showing no preference for 'behavior' judgments and actually dispreferring 'bodily response' judgments. These results constituted empirical evidence for, at least, the distinction between Class 1 and Class 3 psychomimes (pp. 1212-1214).

2.4. Akita's limitations and the present study. While Akita was the first to provide empirical evidence for this distinction, her methodological approach has some limitations. Firstly, pictures are an open-ended means of tapping native speakers' judgments and are as such quite difficult to interpret; additionally, the difference between a 'behavior' and a 'bodily response' – on which the empirical data hinged – is not entirely clear. Secondly, mimetics, being sound-symbolic words, are inherently inclined to polysemy, and since the mimetics in Akita's experiment were presented free of context, this leaves a great deal of latitude to the participant in interpreting exactly what should be depicted, contributing to the open-endedness of the

pictures. (Akita acknowledges this issue in her paper.) Thirdly, the open-ended picture drawing that Akita adopted as her experimental task did not allow for the discrimination of *all three* of her putative classes, since both Class 1 psychomimes and Class 2 psychomimes are semantically analyzed as denoting bodily sensations (as in Figure 2) and expected responses for those classes in picture drawing would therefore be indistinguishable.

This discussion leads us to the purpose of our current study. We aimed to corroborate Akita (2010)'s classification of Japanese psychomimes by testing the property that she claims distinguishes them clearly: their syntactic compatibility with a locus NP. That is, building off of Akita, who targeted the semantics of these classes through native speakers' interpretations of the mimetic words as revealed in pictures, we extended her approach and attempted to target these interpretations directly through the syntax.[3]

Specifically, we created sentences which included psychomimes according to Akita's proposed typology (recall Figure 2), and then had Japanese native speakers judge the naturalness of these sentences along a five-point scale, providing us with a quantitative measure of their judgments. Thus, complementing Akita's experiment, which relied on qualitative interpretation of pictorial depictions of psychomimes presented in isolation, our experiment extended the scope of inquiry to a direct, quantitative measure of native speakers' comprehension of the naturalness of pscyhomimes in sentential context.

We did this in order to answer the following question: is there empirical evidence that Akita's proposed three-way categorization of psychomimes is a psychological reality for native speakers of Japanese?

3. Materials

In order to test Akita's three-way categorization of psychomimes, six representatives from each class were selected from the appendix of her paper to serve as stimulus items; we did our best to minimize the polysemy of the stimuli chosen, but with mimetics this is difficult to do perfectly. Table 1 below presents these stimuli, along with a rough translation and the locus NP Akita claims that they prefer.

Sentence pairs were then constructed around these items to give them context for grammaticality judgment; in each case, the sentences in the pair differed *only* by the presence or absence of a locus NP (e.g., the locus NPs given in Table 1, which were claimed by Akita to correspond to those mimetic words), which appeared immediately before the mimetic, which was verbalized with the verb *suru* 'do'. This resulted in 36 (6 mimetics × 3 classes × 2 sentences per mimetic) sentences in 18 pairs to serve as stimuli.

As representative examples, we present in (5-7) below the first pair of sentences within each class, with the mimetic (along with its equivalent in the translation) in bold and the locus noun underlined (we omit this latter feature in translation); in each case, the *a* sentence contains the locus NP, and the *b* sentence does not; unnatural sentences are marked by *.

(5) Class 1 (locus NP = obligatory)

   a. [+NP]

Ken-wa	*sakuban*	*tetuya*	*si-ta*	*node,*	*kyou-wa*	*asa-kara*	<u>*atama*</u>-*ga*
Ken-TOP	last night	all nighter	do-PAST	because	today-TOP	morning-from	head-NOM

zuki-zuki	*si-te-i-ru*
MIM	do-*te*-be-NPST

   'Because Ken pulled an all-nighter last night, today, his head has been **throbbing** since morning.'

   b. [–NP]

* *Ken-wa*	*sakuban*	*tetuya*	*si-ta*	*node,*	*kyou-wa*	*asa-kara*	***zuki-zuki***
Ken-TOP	last night	all nighter	do-PAST	because	today-TOP	morning-from	MIM

si-te-i-ru
do-*te*-be-NPST

   'Because Ken pulled an all-nighter last night, today, his head has been **throbbing** since morning.'

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[3]It is unclear from Akita's manuscript why she did not elect to address the syntactic domain herself, but from a survey of her works, she appears to specialize in semantics; it may simply have been her preference to remain in this domain.

Class 1 (locus NP = obligatory)		
	Mimetic	Locus NP
1	*zuki-zuki* 'throbbing pain'	*atama* 'head'
2	*gan-gan* 'pounding/ringing sensation'	*atama* 'head'
3	*syobo-syobo* 'bleary'	*me* 'eye'
4	*kiri-kiri* 'sharp, tense pain'	*i* 'stomach'
5	*tika-tika* 'scratchy, irritating pain'	*me* 'eye'
6	*hiri-hiri* 'stinging pain'	*kuti* 'mouth'
Class 2 (locus NP = optional)		
	Mimetic	Locus NP
1	*uki-uki* 'elated, on cloud nine'	*kokoro* 'heart'
2	*waku-waku* 'exhilarated, ecstatic'	*mune* 'chest'
3	*kura-kura* 'awestruck, dazed'	*atama* 'head'
4	*muka-muka* 'disgusted, sick to one's stomach'	*mune* 'chest'
5	*uzu-uzu* 'itching to do something'	*kokoro* 'heart'
6	*saba-saba* 'relieved'	*kimoti* 'feelings'
Class 3 (locus NP = illicit)		
	Mimetic	Locus NP
1	*puri-puri* 'hopping mad'	*kokoro* 'heart'
2	*uzi-uzi* 'sulky, hesitating'	*kokoro* 'heart'
3	*guta-guta* 'dog tired, slothful'	*karada* 'body'
4	*kose-kose* 'fussing about trivial things'	*mune* 'chest'
5	*kuyo-kuyo* 'brooding, fretting'	*kokoro* 'heart'
6	*mago-mago* 'lost and confused'	*atama* 'head'

Table 1: List of mimetic stimuli used and the locus NPs that they select according to (Akita, 2010).

(6)   Class 2 (locus NP = optional)

a. [+NP]

Asita-kara   *natuyasumi-ga*   *hazimar-u*   *to*   *omo-u*   *to,*
tomorrow-from summer break-NOM begin-NPST COMP think-NPST whenever
Sakura-wa   kokoro-*ga*   ***uki-uki***   *su-ru*
Sakura-TOP heart-NOM MIM   do-NPST

'Whenever she thinks that summer break starts tomorrow, Sakura gets **giddy with excitement**.'

b. [–NP]

Asita-kara   *natuyasumi-ga*   *hazimar-u*   *to*   *omo-u*   *to,*
tomorrow-from summer break-NOM begin-NPST COMP think-NPST whenever
Sakura-wa   ***uki-uki***   *su-ru*
Sakura-TOP MIM   do-NPST

'Whenever she thinks that summer break starts tomorrow, Sakura gets **giddy with excitement**.'

(7) Class 3 (locus NP = illicit)

    a. [+NP]

* *Kenzi-wa*	*tomodati*	*ni*	*ni-zikan*	*mo*	*mat-as-are-te,*	*kokoro-ga*	***puri-puri***
Kenji-TOP	friend	by	two-hour	as long as	wait-CSV-PASS-*te*	heart-NOM	MIM

        site-i-ta
        do-be-PAST

        'Having been made to wait for *two hours* by his friend, Kenji was **hopping mad**.'

    b. [–NP]

Kenzi-wa	*tomodati*	*ni*	*ni-zikan*	*mo*	*mat-as-are-te,*	***puri-puri***	*site-i-ta*
Kenji-TOP	friend	by	two-hour	as long as	wait-CSV-PASS-*te*	MIM	do-be-PAST

        'Having been made to wait for *two hours* by his friend, Kenji was **hopping mad**.'

As shown in the sentences above, on Akita's analysis of these three classes of psychomimes, Class 1 mimetics, which require a locus NP, should be natural in the *a* sentence that contains one, and unnatural in the *b* sentence which does not; Class 2 mimetics, for which locus NPs are optional, should be natural in both *a* and *b*, with or without locus NPs; and Class 3 mimetics, for which locus NPs are illicit, should be unnatural in the *a* sentences that have them, and natural in the *b* sentences that do not.

An equal number of distractors were used which also targeted mimetics — specifically, *non*-psychomimic mimetics. Because the verb *suru* is not as useful with these mimetics (see, for instance Hamano, 1988, 1998, for reasons why), it was decided that none of the distractors would use this verb; instead, each mimetic appeared as an adverb modifying a different verb appropriate to the context of the sentence.

In each pair of distractor sentences, an effort was made to make one sentence natural and the other unnatural; the locus of this match-mismatch was of two types: For the first 9 of the 18 pairs, which we call Type 1, the locus was the mimetic itself (i.e., the difference between the sentences in these pairs was which mimetic was used); and for the second 9 of the 18 pairs, which we call Type 2, the locus was something else in the main clause, either the subject or the verb (i.e., in these pairs, the mimetic was the same in both sentences, but a subject or verb was changed) — in one case, it was both subject and verb which were changed (see Appendix).

For example, examples (8) and (9) below are the first pairs in Type 1 and Type 2 each, given in the same order as above, with the mimetics and their English equivalents in bold (again, the unnatural member of the pair is marked with a *).

(8) Type 1

    a.

Risa-ga	*ukkari*	*o-o*	*hun-simat-ta*	*node,*	*neko-wa*	***gyaa-gyaa***	*nai-ta*
Lisa-NOM	accidentally	tail-ACC	step-PERF-PAST	because	cat-TOP	MIM	cry-PAST

        'Because Lisa accidentally stepped on its tail, the cat **yowled repeatedly**.'

    b.

* *Risa-ga*	*ukkari*	*o-o*	*hun-simat-ta*	*node,*	*neko-wa*	***buu-buu***	*nai-ta*
Lisa-NOM	accidentally	tail-ACC	step-PERF-PAST	because	cat-TOP	MIM	cry-PAST

        'Because Lisa accidentally stepped on its tail, the cat **grunted repeatedly**.'

(9) Type 2

    a.

Kaoru-ga	*soto*	*ni*	*de-tara,*	*ame-ga*	***zaa-zaa***	*hut-te-i-ta*
Kaoru-NOM	outside	to	go out-when	rain-NOM	MIM	fall-*te*-be-PAST

        'When Kaoru went outside, it was **pouring** rain.'

    b.

* *Kaoru-ga*	*soto*	*ni*	*de-tara,*	*yuki-ga*	***zaa-zaa***	*hut-te-i-ta*
Kaoru-NOM	outside	to	go out-when	snow-NOM	MIM	fall-*te*-be-PAST

        'When Kaoru went outside, it was **pouring** snow.'[4]

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[4]Note that between (8a) and (8b), it is the mimetic which changes between the natural and unnatural member (the locus of this specific mismatch is that cats do not go *buu-buu* — but, for instance, pigs do), while between (9a) and (9b), it is the subject that changes (*ame* versus *yuki*, the latter of which cannot fall *zaa-zaa* — but, for instance, can fall *kon-kon*).

All stimuli were checked for naturalness and consistency, and were matched for length and syntactic structure. The sentences were then divided into two lists according to a Latin Square design, in which the *a* and *b* sentences were assigned alternately to one list or the other. Within the three target classes, *a* sentences had locus NPs (i.e., *a* = [+NP]), while *b* sentences did not (i.e., *b* = [–NP]); and within the distractors, *a* sentences were constructed to be natural, and *b* sentences to be unnatural.

4. Methodology

4.1. Participants. Our participants were 7 adult native speakers of Japanese, 6 female and 1 male; four were native speakers of western dialects, while the other three were native speakers of eastern or northern dialects. All participants were paid $5 US for their participation.

4.2. Task. Participants were given a response sheet with instructions written in Japanese (which were also given orally in English), along with a five-point scale from 'unnatural' (1) to 'natural' (5) (with (3) being neither) for each of the 36 sentences of a given list. They were instructed to, using only their native intuition and without thinking too deliberately, judge the naturalness of the sentences as they were presented to them one by one, and to not change their answers afterward. These sentences were presented individually, accompanied only by their order number, on PowerPoint slides with plain white backgrounds. Four participants were shown list 1, and three list 2.

After the participants had recorded their judgments for all 36 sentences, they were asked for a follow-up. In this phase, the experimenters took a sheet on which all of the sentences of the list were written in the order they had been presented, and, using the participants' collected response sheets, highlighted those sentences which the participants had judged as 1 or 2 — 'unnatural' or 'slightly unnatural'. These follow-up sheets were then given to the participants, and they were asked to, only for the sentences that had been highlighted, provide a brief explanation for why they gave the unnatural judgment, either by circling the unnatural part of the sentence or by writing a short sentence (in Japanese or English) explaining what made it unnatural.

4.3. Predictions. Our predictions were based on the hypothesis that Akita's analysis was correct, e.g., that for Class 1 psychomimes, for which locus NPs are claimed to be *obligatory*, *a* target sentences that contain locus NPs will be *natural* (and will receive a score towards 5), and *b* target sentences that do not contain locus NPs will be *unnatural* (and will receive a score towards 1); that for Class 2 psychomimes, for which locus NPs are claimed to be *optional*, both *a* and *b* sentences will be *natural*; and that for Class 3, psychomimes, for which locus NPs are claimed to be *illicit*, *a* sentences with locus NPs will be *unnatural*, and *b* sentences without them will be *natural*. These predictions are summarized in Table 2 below.

Class	[+NP] (*a*)	[–NP] (*b*)
1	Natural (5)	Unnatural (1)
2	Natural (5)	Natural (5)
3	Unnatural (1)	Natural (5)

Table 2: Predictions for target sentences. The number following the prediction indicates the corresponding number in the five-point scale by which participants judged the sentences.

5. Results

We converted the raw scores of the naturalness judgment into *z*-scores, and calculated mean *z*-scores for each participant. We then conducted one-tail pairwise *t*-tests to compare mean *z*-scores between *a* sentences and *b* sentences individually for each Class. The subject-based analysis revealed a significant difference between *a* sentences and *b* sentences for Class 1 $[t(6) = 2.394, p = 0.027]$ and for Class 3 $[t(6) = -3.788, p = 0.005]$, but not for Class 2 $[t(6) = 0.109, p = 0.458]$. The item-based analysis revealed a significant difference between *a* sentences and *b* sentences for Class 1 $[t(5) = 3.816, p = 0.006]$, but not for Class 2

$[t(5) = -0.358, p = 0.368]$ or for Class 3 $[t(5) = -1.238, p = 0.136]$. Solely from the subject-based analysis, the predicted naturalness judgment patterns were borne out for all of the Classes; however, the item-based analysis revealed a non-significant difference for Class 3, against the prediction, which drew our attention to further focus on the across-item variance (discussed below). The results of the naturalness judgment task are summarized in Figure 3.
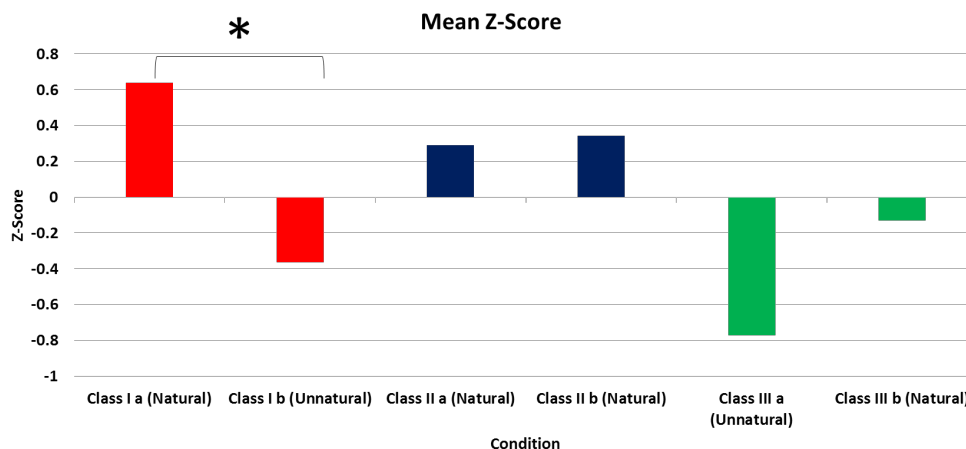
Figure 3: Mean standardized scores by condition. Class 1 is given in red, Class 2 in blue, and Class 3 in green; the prediction for each condition is given in parentheses. The bracket and asterisk over Class 1 indicate that in that class, the difference between the *a* [+NP] and *b* [–NP] sentences was statistically significant; the lack of such marking for Classes 2 and 3 indicates that for those classes, said difference was *not* statistically significant, based on the item-based comparisons.

6. Discussion

6.1. General results. Before we discuss the results, it is important to note that due to the low number of participants (indeed, roughly half the number in Akita, 2010), these results should be regarded as preliminary. Nevertheless, it is equally important to note that, as we will describe below, the predicted trends are present, in two out of three cases statistically supported, and consistent.

That said, the fact that [+NP] sentences were judged as natural, that [–NP] sentences were judged as unnatural, and that the difference was statistically significant in Class 1, confirms our prediction based on Akita's analysis that Class 1 psychomimes require locus NPs. Likewise, the results for Class 2 – e.g., [+NP] and [–NP] were both natural and not statistically different – accord with our predictions based on Akita's analysis that for Class 2 psychomimes, locus NPs are optional.

The results for Class 3, however, did not accord with prediction, at least according to our item-based analysis: We predicted that in this class, [+NP] sentences would be rated as unnatural, [–NP] sentences would be rated as natural, and that the difference would be statistically significant, since Akita claims that for these psychomimes, locus NPs are illicit. Although this pattern was borne out in the subject-based analysis, the result was not robust in the item-based analysis (in the item-based analysis, both [+NP] and [–NP] Class 3 sentences were judged as unnatural, and the difference between [+NP] and [–NP] was not statistically significant). Thus, overall, we argue that predicted patterns were borne out, but raise the question of why the trend for Class 3 was not robust.

6.2. Class 3. With respect to the responses for Class 3, we examined whether there was variability in the responses to specific stimulus items or variability on the part of the individual participants.

6.2.1 Items. Regarding the items, by examining the qualitative follow-up responses that our native speakers provided, in which they explained their assignment of unnatural ratings, we found that some items followed the predicted patterns more robustly than others, sometimes with rather wide differences. For instance, in Class 3, one mimetic, *puri-puri* (number 1 in Table 1) behaved perfectly as predicted: Every single participant rated it as either natural without a locus NP (if they saw the *b* sentence), or unnatural with one (if they saw the *a* sentence). But a second mimetic in that class, *uzi-uzi* (Table 1 number 2) did not behave at all as predicted: Not one of the three participants who saw it in an *a* sentence (with a locus NP, where it was predicted to be unnatural) judged it to be unnatural.

In examining our participants' follow-up responses more closely to discern any systematic patterns, we noted that two things accounted for the majority of unexpected unnatural judgments (i.e., unnatural judgments whose reason did not have to do with a locus NP): frequency and semantic naturalness.

Frequency was an evident issue mostly with the Class 3 mimetic *kose-kose* (Table 1 number 4): Two of our participants explicitly stated in their follow-up responses that they had never heard of this word before. We did not control for the frequency of the stimulus items in this experiment, and so it could be that some of the unnaturalness we encountered (in Class 3 in particular) was due to the words being so uncommon that they did not feel natural to our native speakers.

Interestingly, only three of our seven participants judged sentences with *kose-kose* as natural: Of the other four, two had never heard of the word, but the remaining two gave other reasons for finding the sentences unnatural, which invariably had to do with the mimetic itself (both of them replaced it with another mimetic expression as their suggestion for correcting the sentence). The three speakers who found the word natural were all westerners (though one western native speaker did judge it as unnatural, replacing it with another mimetic).

What all of this might suggest is that *kose-kose* is a low-frequency word — possibly restricted to some degree to western dialects, an issue we will return to momentarily.

Semantic naturalness was a more recurrent issue that we observed in the stimuli. In several cases, our participants explained the unnaturalness of a sentence as being driven by some semantic mismatch between the mimetic and the context of the sentence. For instance, (10) below shows the sentence used for the Class 3 mimetic *uzi-uzi* (the locus NP is given in parentheses, with the notation indicating that, according to prediction, it would be unnatural if present; as before, we bold the mimetic and its English translation).

(10)   *Midori-wa*   *kare-ga*   *hizyouni*   *suki-da*   *ga,*   *kare-ni*   *a-u*   *to*   *(*kokoro-ga)*
       Midori-TOP   he-NOM   extremely   like-COP   but   he-OBL   meet-NPST   whenever   (*heart-NOM)
       uzi-uzi   *su-ru*
   MIM   do-NPST

       'Midori is terribly fond of him, but whenever she meets him, she **gets all tongue-tied**.'

The general idea that we intended in creating this sentence was that Midori, upon meeting the boy of whom she is extremely fond, becomes unable to interact with him. We built this sentence from the definition of *uzi-uzi* given by Akita, which is 'hesitating' (a definition supported by Kakehi et al., 1996, pp. 1222-1223); however, although most of our participants were okay with this usage, two suggested that it did not match the context. One replaced the mimetic with *dere-dere*, another mimetic which more specifically describes someone who is besotted with someone to the point of being incapable of normal social interaction; but the other participant said that *uzi-uzi* described 'sulking' behavior specifically, and that it therefore did not match the context of interacting with someone one is fond of.

This kind of fine-grained semantic mismatch turned out to be accountable for several of the unnatural judgments given for this and the other two classes, and it seemed – for reasons that elude us – particularly prevalent in Class 3. These two effects together – frequency and semantic naturalness – could have contributed to the overall reduction in naturalness of the Class 3 sentences to our participants.

6.2.2 Participants. We also examined potential variability on the part of the individual participants. We observed that 4 of our 7 native speakers displayed individual results with the predicted directionality — e.g., they rated [+NP] sentences for Class 3 as less natural than [–NP] sentences (the other 3 rated both as

either natural or unnatural). This can be seen in Figure 4 below, which shows the individual mean raw scores for Class 3 for all 7 participants.
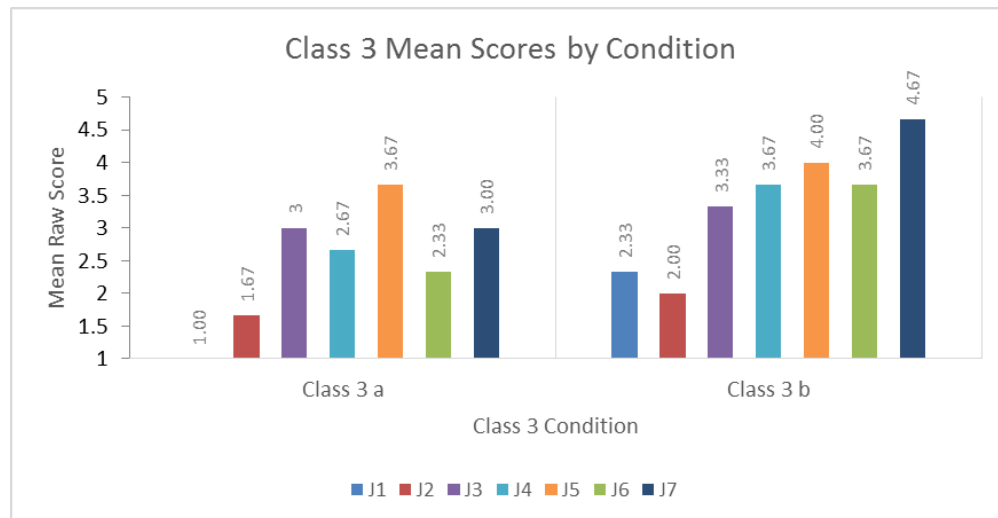
Figure 4: Class 3 mean raw scores by condition (*a/b*) for all 7 participants. Note that no bar appears for participant J1 in the *a* ([+NP]) condition because that participant's mean raw score for Class 3*a* sentences was 1.00.

In Figure 4, we can see that (if we count an *a* score of 3 'neutral' as fitting the pattern) participants J3, J4, J6, and J7 trend toward the predicted pattern. Of these four participants, all but J6 were speakers of western dialects, while of the three who did not trend toward the predicted pattern – e.g., J1, J2, and J5 – all but J5 were speakers of eastern or northern dialects. What this means is uncertain, but it is possible that the features of the mimetics themselves that we identified above – e.g., frequency and semantic naturalness (in the specific sentential context used) – could vary across dialects (as particular mimetics might be more or less common or have slightly different meanings in different dialects, as we speculated above for *kose-kose*), contributing to this pattern in participant judgments. Unfortunately, this claim is speculative because to our knowledge, there has been virtually no attempt that we know of in the current literature to catalog such dialectal variations in mimetic words in Japanese.

6.3. Class 2. To conclude our discussion, there is one final aspect of Figure 3 that merits attention: Although Class 1 and Class 2 both behaved as predicted, the reader will note that the Class 2 sentences were not *as natural* as the Class 1-[+NP] sentences. That is, the magnitude of the natural judgment appears slightly lower for Class 2 than for Class 1-[+NP]. Though we did not attempt to see if this difference was statistically significant, the presence of the numerical trend prompted us to look a bit more closely at the Class 2 data.

This investigation revealed that these lower scores were due to a single item, *saba-saba* (number 6 in Table 1). Only one participant rated it as natural (5), and one as neutral (3), with the other five rating it as either 1 or 2. Of these five, three saw the [+NP] sentence, and two saw [–NP] sentence, and not one of the five mentioned locus NPs as the crux of their judgment: Two of them explicitly stated that the issue was that *saba-saba* did not describe an emotional state of feeling 'relieved' (or 'refreshed' to use Akita's word; p. 1216) at the dissolution of some source of stress, as we used it in our sentence (see Appendix below); but rather, a personality type (though neither defined what that personality was in their response). Interestingly, both of these definitions are given in Kakehi et al. (1996, pp. 1061-1062). This issue appears to be yet another case of semantic naturalness, as in the case noted above for *uzi-uzi*.

Because *saba-saba* was receiving consistently unnatural judgments, we repeated our statistical tests on Class 2, this time excluding *saba-saba*. The result is shown in Figure 5 below. The magnitude issue that prompted our investigation is resolved, with Class 2 sentences – both [+NP] and [–NP] – being rated as natural with a magnitude on par with that of Class 1-[+NP]; and the difference between [+NP] and [–NP] is still not statistically significant (subject-based: $t(6) = 2.394$, $p = 0.458$; item-based: $t(4) = 1.309$, $p = 0.13$).

Thus, our conclusion above that the Class 2 sentences behaved as predicted still stands.

Mean Z-Score (Class 2 Item 6 Excluded)
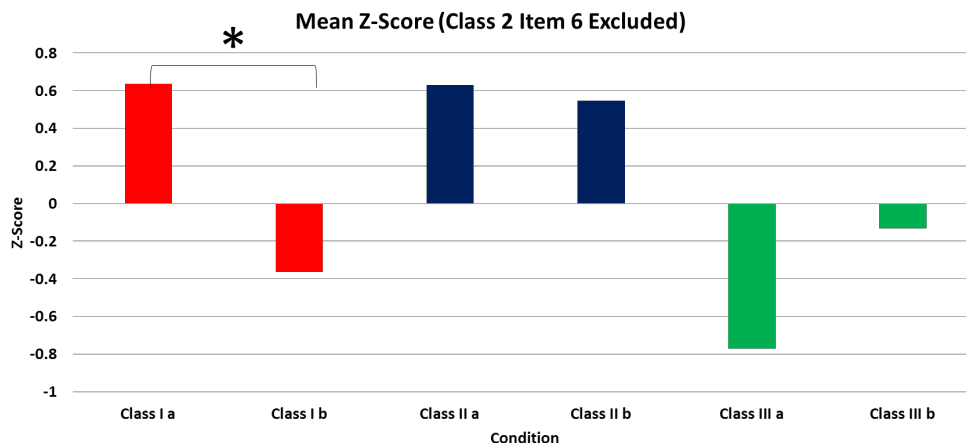
Figure 5: Average standardized scores per condition (predictions excluded this time), excluding Class 2 Item 6 (*saba-saba*). Note that as compared with Figure 3, the magnitude of the naturalness of Class 2 sentences is now on par with that of Class 1*a* ([+NP]) sentences, and the difference between Class 2*a* and Class 2*b* ([–NP]) is still not statistically significant.

7. Conclusions and future directions

In summary, our predictions based on Akita's analysis of Japanese psychomimes were borne out overall; in Class 3, the predicted directionality was less robust. According to our detailed analysis of Class 3, possible contributing factors to this might include the frequency of the mimetic stimuli used, as well as their naturalness in the sentential context in which they were presented to our participants.

Most importantly, our results constitute empirical evidence that Akita's putative classification of psychomimes in Japanese may indeed be a psychological reality for native speakers, which was our immediate motivation for conducting this study. Also, recall that her picture drawing experiment did not distinguish Classes 1 and 2, which were both semantically analyzed as denoting bodily sensations (though they did end up being different in her results): Our study, however, has provided empirical evidence of this distinction, which combined with Akita's original evidence for the distinction between Classes 1 and 3, provides further solidity to the conclusion that these classes may indeed be psychological realities.

Clearly, the most immediate goal of future research will need to be to attempt to obtain robust statistical support for all three classes simultaneously, which will require reinvestigating Class 3 (assuming that such research also targets the locus NP distinction) while more tightly controlling factors such as frequency and semantic naturalness, as well as, of course, attempting to recruit larger sample sizes and use even more stimuli. It may also be of interest to examine whether dialect has any effect on results of future experimentation.

Beyond this, there are some other interesting possibilities. For one, since to our knowledge there is very little research into second language acquisition of mimetic words in Japanese (at least with English as the L1), it is worth asking whether learners of Japanese are sensitive to the syntactic constraint of locus NPs *a priori* (particularly with an L1 like English, which as we have noted, has only covert sound-symbolism); as well as whether, if not, they can be taught these constraints and subsequently acquire them *a posteriori*, which certainly has implications for not only linguistics *per se*, but also for Japanese pedagogy. Another (even broader) possibility is to investigate whether there are other syntactic or morphosyntactic properties which can serve to distinguish these putative classes and how these different properties interact; as well as whether similar distinctions can be made in the phono- and phenomimes.

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Appendix: List of stimulus sentences

What follows is a list of the stimulus and distractor sentences used in our study, listed serially (i.e., not according to the Latin Square Design by which they were presented to participants). We divide our list into stimuli, subdivided by class, and distractors, subdivided by type; and for sake of brevity and convenience, *a* and *b* sentences are collapsed together. Recall that in stimuli, *a* sentences were constructed to contain a locus NP, *b* sentences to not contain a locus NP; and in distractors, *a* sentences were constructed to be natural, *b* sentences to be unnatural. Proposed unnaturalness will be marked by the conventional *.

Stimulus sentences are presented, as in the above paper, in italics and in conventional linguistic Romanization of the Japanese, followed by a (phonemic) gloss, followed by a (rough) English translation. Also as above, we will bold the mimetic words and their rough equivalent in English translation.

Target sentences

Class 1

1. *Ken-wa   sakuban   tetuya   si-ta   node,   kyou-wa   asa-kara   *(atama-ga)*
   Ken-TOP   last night   all nighter   do-PAST   because   today-TOP   morning-from   *(head-NOM)
   zuki-zuki *si-te-i-ru*
   MIM   do-*te*-be-NPST

   'Because Ken pulled an all-nighter last night, today, his head has been **throbbing** since morning.'

2. *Tomu-wa   sakuya   nomi-sugi-ta   ras-i-ku,   kyou-wa   futukayoi-de*
   Tom-TOP   last night   drink-exceed-PAST   seem-NPST-CONJ   today-TOP   hangover-with
   (atama-ga)   **gan-gan   si-te-i-ru*
   *(head-NOM)   MIM   do-*te*-be-NPST

   'It seems that Tom drank too much last night, and today his head is **pounding** from hangover.'

3. *Iti-niti-zyuu   pasokon no mae   ni suwat-te-i-tara, Anna-wa   *(me-ga)   **syobo-syobo***
   one-day-throughout   laptop   of   front at   sit-*te*-be-when   Anna-TOP   *(eye-NOM)   MIM
   si-te-ki-ta
   do-*te*-come-PAST

   'When she sat in front of a laptop all day, Anna's eyes started to **feel bleary**.'

4. *Sumire-wa   syourai no koto-o   kangae, huan-no-amari   *(i-ga)   **kiri-kiri***
   Sumire-TOP   future   of   thing-ACC   think   unease-of-excess   *(stomach-NOM)   MIM
   si-ta
   do-PAST

   'Thinking about her future, Sumire's stomach **tightened up painfully** from excessive unease.'

5. *Kono   kougyoutitai-wa   taikiosen-ga   hido-i   ras-i-ku,   Satosi-wa*
   this   industrial area-TOP   air pollution-NOM   severe-NPST   seem-NPST-CONJ   Satoshi-TOP
   (me-ga)   **tika-tika si-te-ki-ta*
   *(eye-NOM)   MIM   do-*te*-come-PAST

   'It seems that the air pollution in this industrial area is severe, and so Satoshi's eyes came to **feel irritated**.'

6. *Keito-wa,   ukkari   tougarasi-o   tabe-te-simat-ta   node,   *(kuti-ga)   **hiri-hiri***
   Keito-TOP   accidentally   chili pepper-ACC   eat-*te*-PERF-PAST   because   *(mouth-NOM)   MIM
   si-te-i-ru
   do-*te*-be-NPST

   'Because he accidentally ate a chili pepper, Keito's mouth is **stinging painfully**.'

Class 2

1. *Asita-kara   natuyasumi-ga   hazimar-u   to   omo-u   to,   Sakura-wa*
   tomorrow-from   summer break-NOM   begin-NPST   COMP   think-NPST   whenever   Sakura-TOP
   *(kokoro-ga)   **uki-uki** su-ru*
   (heart-NOM)   MIM   do-NPST

   'Whenever she thinks that summer break starts tomorrow, Sakura gets **giddy with excitement**.'

2. *Asita-wa   mati-ni-mot-ta   ensoku-da   to   omo-u   to,   Tsutomu-wa*
   tomorrow-TOP wait-and-wait-PAST trip-COP   COMP think-NPST whenever Tsutomu-TOP
   (mune-ga)   **waku-waku**   *si-ta*
   (chest-NOM) MIM   do-PAST

   'Whenever he thought that tomorrow was the long-awaited trip, Tsutomu's **spirit soared**.'

3. *Amarinimo kougousi-i   koukei-o   menisi-ta   node,   Miki-wa (atama-ga)*
   excessively sublime-NPST spectacle-ACC witness-PAST because Miki-TOP (head-NOM)
   kura-kura *si-te-ki-ta*
   MIM   do-*te*-come-PAST

   'Because she witnessed an excessively sublime spectacle, Miki's gotten **all dazed**.'

4. *Terii-wa   nomu-nu-ga   suki-da   ga,   nihonsyu-o   nomu-to   kanarazu*
   Terry-TOP drink-ing-NOM like-COP but, Japanese *sake*-ACC drink-whenever every time
   (mune-ga)   **muka-muka** *su-ru*
   (chest-NOM) MIM   do-NPST

   'Terry likes to drink, but whenever he drinks Japanese *sake*, he inevitably **feels sick to his stomach**.'

5. *Kouta-wa   hayaku paati-ni iki-takute (kokoro-ga)   **uzu-uzu** si-te-i-ru*
   Kōta-TOP   quickly party-to go-want   (heart-NOM)   MIM   do-*te*-be-NPST

   'Kōta is **itching** to go to the party quickly.'

6. *Naganen-no   nayami-ga   kaisyou s-are,   Satiko-wa   (kimoti-ga)   **saba-saba***
   long time-of worry-NOM   resolve do-PASS   Sachiko-TOP   (feeling-NOM) MIM
   si-te-i-ru
   do-*te*-be-NPST

   'With her long-standing worries resolved, Sachiko **feels a sense of relief**.'

Class 3

1. *Kenzi-wa   tomodati ni   ni-zikan   mo   mat-as-are-te,   (*kokoro-ga)   **puri-puri***
   Kenji-TOP friend   by   two-hour   as long as wait-CSV-PASS-*te*   (*heart-NOM)   MIM
   site-i-ta
   do-be-PAST

   'Having been made to wait for *two hours* by his friend, Kenji was **hopping mad**.'

2. *Midori-wa   kare-ga   hizyouni   suki-da   ga,   kare-ni   a-u   to   (*kokoro-ga)*
   Midori-TOP he-NOM   extremely like-COP but he-OBL   meet-NPST whenever (*heart-NOM)
   uzi-uzi *su-ru*
   MIM   do-NPST

   'Midori is terribly fond of him, but whenever she meets him, she **gets all tongue-tied**.'

3. *Kouzi-wa   kinou   undou   si-sugi-ta   node,   kyou-wa   (*karada-ga)   **guta-guta***
   Kōji-TOP   yesterday exercise do-exceed-PAST because today-TOP (*body-NOM)   MIM
   si-te-i-ru
   do-*te*-be-NPST

   'Because he exercised too much yesterday, today Kōji is **completely worn out**.'

4. *Makiko-wa   otto-ga   kuti-urusa-i   node,   sasaina koto-ni (*mune-ga)*
   Makiko-TOP husband-NOM mouth-loud-NPST because trivial thing-by (*chest-NOM)
   kose-kose *su-ru*
   MIM   do-NPST

   'Because her husband is faultfinding, Makiko **frets** over trivial matters.'

5. *Tooru-wa syousinmono na   node,   tumarana-i koto-o   ki-ni   kake-te   (*kokoro-ga)*
   Tōru-TOP coward   COP because silly-NPST thing-ACC spirit-OBL hang-ing (*heart-NOM)
   kuyo-kuyo *su-ru*
   MIM   do-NPST

   'Because he's a coward, Toru **gets himself all mopey** over silly things.'

6. *Mearii-wa minarena-i   mati-o   ryokou si-ta   toki, zutto   (*atama-ga)*
   Mary-TOP strange-NPST city-ACC travel do-PAST time for the whole time (*head-NOM)
   mago-mago *si-te-i-ta*
   MIM   do-*te*-be-PAST

   'When Mary traveled through an unfamiliar city, she was **lost and confused** the whole time.'

Distractor sentences

Type 1

1. *Risa-ga   ukkari   o-o   hun-simat-ta   node,   neko-wa {**gyaa-gyaa**/*buu-buu}*
   Lisa-NOM accidentally tail-ACC step-PERF-PAST because cat-TOP {MIM/*MIM}
   nai-ta
   cry-PAST

   'Because Lisa accidentally stepped on its tail, the cat {**yowled repeatedly**/*grunted repeatedly}.'

2. *Siken-ga   hazimat-ta   syunkan-ni, Zyeku-wa kaitou-o   {**kari-kari**/*siku-siku}*
   Test-NOM begin-PAST moment-at   Jake-TOP   answer-ACC {MIM/*MIM}
   kaki-dasi-ta
   write-putout-PAST

   'The moment the test began, Jake started {**scribbling**/*crying} his answers.'

3. *Robu-ga   ie-ni   kaette ki-ta   toki, suupu-wa konro-no ue-de*
   Rob-NOM house-to return come-PAST time soup-TOP stove-of top-LOC
   {***gutu-gutu***/*turu-turu} *nie-te-i-ta*
   {MIM/*MIM}   boil-*te*-be-PAST

   'When Rob came back home, the soup was boiling and {**burbling**/*slurping} on top of the stove.'

4. *Roi-ga   asa   oki-tara,   kotori-ga   mado-no   soto   de*
   Roy-NOM morning get up-when, small bird-NOM window-of outside at
   {***tii-tii***/*nyaa-nyaa} *saezut-te-i-ta*
   {MIM/*MIM}   chirp-*te*-be-PAST

   'When Roy got up in the morning, little birds were {**chirping**/*meowing} outside his window.'

5. *Megu-no   motte-i-ru   tiisa-i   ziki-no   suzu-wa, hur-u   to*
   Meg-GEN hold-be-NPST small-NPST ceramic-of bell-TOP shake-NPST whenever
   {***tiri-tiri***/*goro-goro} *nar-u*
   {MIM/*MIM}   sound-NPST

   'Whenever she shakes it, the small ceramic bell that Meg is holding {**rings**/*rumbles}.'

6. *Go-kiro   mo   hasit-ta   bakari na   node,   Zyessika-wa   ima   {**zee-zee**/***bii-bii**}*
    five-kilometer as long as   run-PAST just   COP   because   Jessica-TOP   now   {MIM/*MIM}
    aeide-i-ru
    breathe hard-be-NPST

    'Because she just ran five whole kilometers, Jessica is gasping {**raggedly/*whiningly**} for breath.'

7. *Erikku-no mise-ni araware-ta   nezumi wa,   tana-no   ura-gawa   e*
    Erik-GEN   shop-at appear-PAST mouse   TOP   shelf-of reverse-side   to
    *{**tyoro-tyoro**/***doka-doka**}   nige-te it-ta*
    {MIM/*MIM}   flee-*te* go-PAST

    'The mouse that appeared in Erik's shop fled, {**scampering/*plodding**} away to the underside of the shelf.'

8. *Umaretate-no koinu-wa,   youyaku {**yoti-yoti**/***dosi-dosi**} aruki-mawari-hazime-ta*
    newborn-of   puppy-TOP   finally   {MIM/*MIM}   walk-turn-begin-PAST

    'The newborn puppy finally began to {**toddle/*lumber**} about.'

9. *Akira-wa   kanozyo-o mi-ru   yainaya,   hanasikake-ru tame-ni   {**tuka-tuka**/***kuru-kuru**}*
    Akira-TOP she-ACC   see-NPST   no sooner speak to-NPST purpose-for {MIM/*MIM}
    ayumi-yotte   ku-ru
    walk-approach   come-NPST

    'The minute that Akira sees her, he comes {**charging/*spinning**} right up to her to talk to her.'

Type 2

1. *Kaoru-ga   soto   ni   de-tara,   {ame/*yuki}-ga   **zaa-zaa**   hut-te-i-ta*
    Kaoru-NOM   outside to go   out-when   {rain/*snow}-NOM MIM   fall-*te*-be-PAST

    'When Kaoru went outside, it was **pouring** {rain/*snow}.'

2. *Mitiko-ga   sigoto-kara   kaet-te-ki-ta   toki,   tonari-no   {inu/*neko}-ga*
    Michiko-NOM work-from   return-*te*-come-PAST time   next door-GEN   {dog/*cat}-NOM
    wan-wan *nai-ta*
    MIM   cry-PAST

    'When Michiko came back from work, her neighbor's {dog/*cat} **barked repeatedly**.'

3. *Arisu-ga   kyousitu   ni   toutyaku si-ta   toki, hokano gakusei-tati-wa   **gaya-gaya***
    Alice-NOM   classroom to   arrive   do-PAST   time   other   student-s-TOP   MIM
    *{sawaide-i-ta/*sizumari-kaet-ta}*
    {clamor-be-PAST/*remain silent-PAST}

    'When Alice arrived at the classroom, the other students {were clamoring/*fell silent} **uproariously**.'

4. *Gyuunyuu-ga tari-na-i   node,   Baabara-wa   suupaa   e   **teku-teku***
    milk-NOM   suffice-NEG-NPST because Barbara-TOP   supermarket to   MIM
    *{arui-te/*hasit-te}   it-ta*
    {walk-*te*/*run-*te*}   go-PAST

    'Because she was out of milk, Barbara {walked/*ran} **trudgingly** to the supermarket.'

5. *Timu-wa yoku tomodati to   booru-o **koro-koro** {korogasi-te/*nage-te} asob-u*
    Tim-TOP often friend   with ball-ACC MIM   {rolling/*throwing}   play-NPST

    'Tim often plays with his friends by {rolling/*throwing} a ball **round and round**.

6. *Sorosoro   huyu-ni   nar-u   node,   mainiti   {konoha/*kion}-wa   **hira-hira***
   before long winter-to become-NPST because   every day {leaves/*temperature}-TOP MIM
   {oti-te/sagat-te}   ik-u
   {fall-*te*/fall-*te*} go-NPST

   'Because it will be winter before long, every day the {tree leaves/*temperature} go(es) on {falling/falling}.'

7. *Maria-ga   kouen-o   tazune-ta   toki,   {hebi/*usagi}-ga   ki-no   usiro-kara*
   Maria-NOM   park-ACC   visit-PAST time,   {snake/*rabbit}-NOM   tree-of   behind-from
   nyoro-nyoro *de-te   ki-ta*
   MIM   emerge-*te* come-PAST

   'When Maria visited the park, a {snake/*rabbit} came **slithering** out from behind a tree.'

8. *Tiisa-kute   kawai-i   doubutu-o   mi-ru   to,   Misyeru-wa   itumo   **niko-niko***
   small-CONJ cute-NPST   animal-ACC see-NPST whenever   Michele-TOP   always   MIM
   {wara-u/*mayu-o   yose-ru}
   {smile-NPST/*eyebrow-ACC   draw together-NPST}

   'Whenever she sees a small, cute animal, Michele always {smiles/*scowls} **warmly**.'

9. *Mariko-wa   hizyouni   uwasa-zuki de,   itudatte   **pera-pera**   {hanas-u/*wara-u}*
   Mariko-TOP extremely   rumor-love COP   at any time MIM   {speak-NPST/*laugh-NPST}

   'Mariko is a gossip-lover, so she {speaks/*laughs} **in an incessant chatter** at any time.'