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Phonosemantic Evidence for the Mimetic Stratum in the Japanese Lexicon¹

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0. Introduction

This paper pursues phonosemantic evidence for the existence of the mimetic (or sound-symbolic, ideophonic) category in Japanese, especially with respect to lexical stratification. Specifically, I will discuss experimentally whether there is some difference in sound-symbolic phenomena between mimetic and nonmimetic words, or between the Mimetic stratum and other strata, in particular the Native stratum.

The organization of this paper is as follows. In Section 1, I will introduce two major standpoints toward the vocabulary stratification issue—one gives an independent status to mimetics and the other does not—in Japanese linguistics. In Section 2, citing the experimental consideration in Akita (2008), I will present a morphophonological definition of the mimetic category. Based on the idea, in Section 3, I will discuss on an experimental ground whether there is some difference in sound-symbolic effects between morphophonologically mimetic and nonmimetic words. Finally, in Section 4, I will conclude in favor of the viewpoint that posits a special (phono)semantic status for mimetics that it can be the case that sound symbolism works more effectively in mimetics than nonmimetics.

1. Three vs. Four Lexical Strata in Japanese

1.1. Lexical Stratification in Etymology and Phonology

In lexicological, etymological, and phonological studies, there have been two major hypotheses concerning lexical stratification of Japanese (for other hypotheses see Itô and Mester 1999; Tateishi 2003; Kurisu 2006). One is the three strata hypothesis, which is mainly taken in etymological descriptions (see Tokieda et al.

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1955:355; Miyajima 1977). The three strata are the Native (or Yamato) stratum, the Sino-Japanese stratum, and the Foreign (or Loanword) stratum. This hypothesis reflects where a word comes from: Japanese original, Chinese, or English (or other languages including French, German, and Portuguese).

The other hypothesis posits the fourth lexical stratum. Concretely, it separates the Mimetic stratum out of the (etymologically) Native stratum. This idea is the mainstream in current Japanese phonology (see McCawley 1968; Itô and Mester 1995; Fukazawa et al. 1998). The reason for positing the fourth stratum is phonological differences between mimetics and nonmimetics. For example, Itô and Mester (1995) argue for this latter hypothesis based on the unique constraint violation pattern of mimetics cited below. Mimetics are sole candidates for the membership of the phonological group which allows a single [p] (e.g. $pa^*tipati$, $poro^*ri$) but does not allow a voiceless obstruent following a nasal within a morpheme (e.g. * $koNka^*ri$, * $piNta^*ri$) and a voiced geminate cluster (e.g. * $koQga^*ri$, ??heQnahena) (see also Kurisu 2006; Akashi 2007).

(1) Phonological uniqueness of mimetics:

	[p]	NT	DD	
Native	*	*	*	
Sino-Japanese	*	$\sqrt{}$	*	
Mimetic		*	*	
Foreign		$\sqrt{}$		
C		1.0		

(adapted from Itô and Mester 1995:820)

My question regarding this issue is quite simple and naïve: is there any (phono)semantic basis for the separate status of the Mimetic stratum? This question is a natural one in light of the general assumption that mimetics are semantically peculiar (see Hamano 1998 among others).

1.2. Lexical Stratification in Phonosemantics

Phonosemantics is a (psycho)linguistic field that investigates the motivated or iconic properties of systematic correspondences found between sound and meaning of words within and sometimes across languages (Hinton et al. 1994; Magnus 1999). Some phonosemantic studies, such as Kawahara et al. (2005, 2008) and Shinohara et al. (2007), have pointed out the existence of sound-symbolic phenomena in *nonmimetic* words in favor of the three strata hypothesis (i.e. without distinction between the Native and the Mimetic strata; see also Makino 2007).³ In

² Abbreviations and symbols used in this paper are as follows: C = consonant; N = moraic nasal; Q = the first half of a geminate cluster; <math>V = vowel; $^ = accent nucleus$, pitch fall (specified only for mimetics)

³ Given that the traditional three- and four-strata hypotheses are purely based on lexicology, etymology, or phonology, it might be inappropriate to discuss a semantic issue in the same framework. In this respect, "the Mimetic stratum" here should be replaced with "the mimetic category."

fact, this cross-stratal characteristic is why sound symbolism is sound symbolism—more explicitly, why "sound symbolism" is deliberately distinguished from "sound-symbolic words" (i.e. mimetics) (Tamori and Schourup 1999).

If phonosemantic properties are not specific to mimetics, where does the sense of semantic peculiarity of mimetics come from? A possible moderate solution to this apparently contradictory situation is the following:

(2) A hypothesis on the phonosemantic status of mimetics: The mimetic category is the *best* locus of sound symbolism.

In preparation for an experimental examination of this hypothesis, I will establish a formal definition of mimetics in the next section.

2. Morphophonological Definition of Mimetics

This section, based on the findings in Akita (2008), gives a clear definition to Japanese mimetics in terms of their morphophonology. The declaration of the definition will offer a basis of the discussion in Section 3, where what is mimetic plays an essential part.

Despite the fact that mimetics sound "unambiguously mimetic" to native Japanese speakers (Hamano 1998:219; Tamori and Schourup 1999:6), definition of mimetics has been one of the biggest puzzles in mimetic studies (for similar puzzles in other languages see Abelin 1999; Wiltshire 1999; Newman 2001). Hamano (1998:6-7) discusses this difficulty from four aspects. First, the semantic idiosyncrasy of mimetics (i.e. their ability to imitate nonlinguistic sounds or manners by means of linguistic sounds) without a firm criterion is too unreliable to use in an objective definition. Second, indeed, some morphological processes, such as reduplication (e.g. metyametya, to^kotoko) and emphatic consonant insertion (e.g. biQku'ri, koNga'ri), frequently take place in mimetics. However, these are neither a necessary nor sufficient condition for mimetics. For example, neither morphological property is present in mimetics like hura^ri and gunyaO^. Moreover, these properties are shared with not a few nonmimetic words like reduplicated nouns like hitobito 'people' (< hito 'person') and intensified expressions like $Su\{Q/N\}$ gee! 'Grrreat!' (< sugoi 'great'). Third, we can observe some crosscategorial traffic into and out of the mimetic category (e.g. simi^zimi < simu 'soak' (a nonmodern verb); noNbi^ri < nobu 'get long' (a nonmodern verb); awate-huta-meku 'be flustered' < huta (a nonmodern mimetic root)). Hence, a historical/etymological definition does not necessarily work well. Finally, there is a phonological and grammatical phenomenon only observable in mimetics: [p]initial adverbs that take the quotative particle -to are mimetic (e.g. po^tapota-to, pita^ri-to; cf. [p]-initial loanword adverbs like pawahuru-{ni/*to} 'powerfully' and parareru-{ni/*to} 'in parallel'). This statement is true but far from defining the entire mimetic category.

In what follows, I will introduce an experimental study that shows that a set of morphophonological templates successfully define the category.

2.1. Morphophonological Templates for Mimetics

In the challenging situation stated above, Akita (2008) proposes that satisfying one of the limited number of morphophonological templates (or constructions) is the crucial condition for a canonical member of the mimetic category in Japanese. This proposal stems from the fact that almost all mimetics can be classified into one of the fifteen formal classes listed below:

- (3) Morphophonological templates for Japanese mimetics:
 - a. For CV-roots:

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CVQ^, CV(^)N(^), CViQ^, CV(^)V(^), CV^V-CVV, CVV-CVV, CV^N-CVN, CVN-CVN, CV^i-CVi
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b. For CVCV-roots:⁴
CVCVQ^, CVCV(^)N(^), CVCV^ri, CVCCV^ri, CV^CV-CVCV, CVCV-CVCV

As Hamano (1998) discusses in detail, Japanese mimetics can be basically reduced to one- or two-mora roots. For example, suQ^{\wedge} and $pyo^{\wedge}NpyoN$ can be analyzed as based on the one-mora (CV) roots su and pyo, respectively. Likewise, $poQka^{\wedge}ri$ and meromero can be reduced to the two-mora (CVCV) roots poka and mero, respectively. Seen differently, one- and two-mora mimetic roots enter one of the nine and six morphophonological templates in (3), respectively. For example, suQ^{\wedge} fills the template CVQ $^{\wedge}$, $pyo^{\wedge}NpyoN$ fills CV $^{\wedge}N$ -CVN, $poQka^{\wedge}ri$ fills CVCCV $^{\wedge}ri$, and meromero fills CVCV-CVCV. As an illustration of the wide coverage of the templates, Akita (2008) shows how many mimetics registered in Kakehi et al. (1996) (with some supplementation, 1,652 in total), one of the largest Japanese mimetic dictionaries, fill the templates.

(4)	a. Mimetics satisfying a template:	1627 (98%)
	Reduplicative templates (e.g. bu^ubuu, do^kidoki):	785 (48%)
	$-Q^{-}$ -ending templates (e.g. saQ^{-} , $dokiQ^{-}$):	269 (16%)
	$-(^{\wedge})N(^{\wedge})$ -ending templates (e.g. poN^{\wedge} , $doki^{\wedge}N$):	122 (7%)
	CVCV^ri (e.g. huwa^ri, doki^ri):	146 (9%)
	CVCCV^ri (e.g. geNna^ri, doQki^ri):	133 (8%)
	Derivatives (e.g. <i>kururiN</i> ^, <i>paQpaQ</i> ^):	117 (7%)
	Fossilized templates (e.g. haQ^si, huQku^ra): ⁵	55 (3%)
	b. Mimetics satisfying no template (e.g. hihii^N, ogya^a):	25 (2%)

Akita's (2008) templatic approach is critically different from previous ones in two points. First, it emphasizes *accentuation* (i.e. presence/absence and position

⁴ Throughout this paper, in naming templates, I will omit the numbers indicating the positions of consonants and vowels. Note that C1 and C2 are basically different in Japanese mimetics (Hamano 1998).

⁵ "Fossilized templates" include templates that were once productive (e.g. CV^CCV, CVCCV^ra) (Yamaguchi 2002:34-5, 39). Now mimetics filling these templates give some old-fashioned tones.

of "^") in setting up the mimetic templates (cf. Lu 2006). Second, it uses the fifteen templates as a *set* which as a whole participates in the definition of mimetics.

2.2. Morphophonological Templates and Mimeticity

Akita (2008) submits an experimental piece of evidence for the validity of the templatic definition of Japanese mimetics. The experiment measures the "mimeticity" of four types of nonsense words (i.e. sequences of phonemes that do not exist as a word in the vocabulary of Japanese). 100 stimulus words in total were created under two parameters: namely, whether to fill one of the templates for two-mora mimetic roots in (3b) and whether to possess one of the three segmental properties below that Tamori and Schourup (1999) claim are unique to mimetics.

- (5) Segmental features "unique to mimetics":
 - a. Free from sequential voicing in reduplication (e.g. *ko^rogoro; cf. hitobito 'people')
 - b. Free from nasalization of C1 /g/ of a reduplicant (e.g. *ga^yaŋaya; cf. kamiŋami 'gods')
 - c. High frequency of initial [p] (about one-sixth of all; e.g. *pariN*^, *pi*^*kupiku*, *poQku*^*ri*)

(adapted from Tamori and Schourup 1999:210-1)

Thirty native Japanese speakers were asked to rate the mimeticity of each audiorecorded word presented twice at random via a headphone in a quiet room. Ratings were made on a seven-graded scale: from "1" (does not sound mimetic at all) to "7" (sounds very mimetic) with "4" as moderate.

Results were consistent with the templatic definition hypothesis. Mean scores (recalculated between 0 and 1) for the four types of words are given in (6) with some stimulus samples.

(6) Results of the mimeticity experiment (Akita 2008):

	Templatic/segmental factor	Stimulus samples	Mean scores
a.	$\sqrt{/}$	pu^sipusi, paruN^	.65
b.	√/*	hemo^ri, se^mozemo	.57
c.	*/√	pa^muto, pekiro^iwa	.10
d.	*/*	me^toa, ponusame	.15

A two-way repeated measures analysis of variance revealed that the main effects of both templatic and segmental factors were significant (templatic factor: F(1, 2998) = 94.14, p < .001; segmental factor: F(1, 2998) = 7.33, p < .01). However, the effect sizes of these factors showed a remarkable contrast. As the partial eta squares (from 0 to 1) indicate, more than the half of the results were determined by the templatic condition (templatic factor: $np^2 = .66$; segmental

factor: $\eta p^2 = .003$). This consequence offers strong support to the idea that the membership of the mimetic category in Japanese is guaranteed by the aforementioned set of morphophonological templates. In the following section, I will use the template satisfaction discussed here as a criterion of mimetics.

3. Morphophonological Templates and Sound-Symbolic Effects

In order to examine the hypothesis put forward in (2) above (i.e. "the mimetic category is the best locus of sound symbolism"), I conducted an experiment that compared sound-symbolic effects in mimetics with those in nonmimetics. I limited my concern to what is called magnitude symbolism (or size sound symbolism) of vowels and consonants, which has been most widely discussed in the sound symbolism studies since Sapir (1929). For example, numerous experiments have been done to show that words starting with a voiced consonant (e.g. *beep*) tend to represent bigger referents than those starting with a voiceless consonant (e.g. *peep*). Likewise, words with a low/broad vowel (e.g. *mal*) are said to represent larger referents than those with a high/narrow vowel (e.g. *mil*) in many languages (to mention a few, Johnson 1967; Ultan 1978; Diffloth 1994).

3.1. Method

I asked twenty native Japanese speakers (11 females, 9 males; from 19 to 55 years old, 29.25 on average) to rate how large the imagined referents (e.g. a desk) of thirty-six nonsense words seemed. The rating scale was from "1" (small) to "4" (large). Twelve audiorecorded triads of CVCV-based words were created with C1/g, z, b; k, s, p/, V1/a/ or /i/, and CV2 /no/. As listed in (7), all possible combinations of C1 and C2 were put in a nonmimetic template (i.e. CV^CV) and two mimetic templates identified in Section 2 (i.e. CV^CV-CVCV and CVCV^ri). These male vocal stimuli were recorded on Audacity, an audioeditor-recorder, and presented twice per word at random on Windows Media Player or Apple Quick-Time Player. Every test trial followed ten practice questions.

(7) A list of stimuli:

(/)							
			Mimetic template				
C1			V1	1 *CV^CV			
Velar plosive	voiced	/α/	/a/	ga^no	ga^no-gano	gano^ri	
		/g/	/i/	gi^no	gi^no-gino	gino^ri	
	voiceless /	/k/	/a/	ka^no	ka^no-kano	kano^ri	
		/ K/	/i/	ki^no	ki^no-kino	kino^ri	
Alveolar fricative	voiced /	/z/	/a/	za^no	za^no-zano	zano^ri	
			/i/	zi^no	zi^no-zino	zino^ri	
	voiceless /s	/s/	/a/	sa^no	sa^no-sano	sano^ri	
		/ 3/	/i/	si^no	si^no-sino	sino^ri	

⁶ I used *two* mimetic morphophonological templates in case magnitude-symbolic effects are ascribed to a particular mimetic template, not mimetic templates in general (see also footnote 8).

Bilabial plosive	voiced	/b/	/a/ /i/	ba^no bi^no	ba^no-bano bi^no-bino	bano^ri bino^ri
	voiceless	/p/	/a/ /i/	pa^no pi^no	pa^no-pano pi^no-pino	pano^ri pino^ri

3.2. Prediction

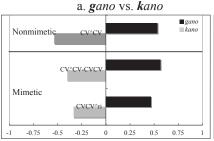
A specific prediction within Hypothesis (2) is as follows. If magnitude symbolism is more effective—i.e. the largeness effects of voiced Cs and /a/ and the smallness effects of voiceless Cs and /i/ are promoted—in mimetics, then the difference in magnitude symbolism between a voiced C and a voiceless C or between /a/ and /i/ will be greater in morphophonologically mimetic (i.e. CV^CV-CVCV, CVCV^ri) words than in morphophonologically nonmimetic (i.e. CV^CV) words.

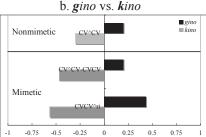
3.3. Results

Results of the experiment partially supported the hypothesis. First of all, in accordance with the previous findings, nonmimetic as well as mimetic words instantiated magnitude symbolism. A three-way analysis of variance showed the significance of the main effects of all the three factors (voicedness of C1: F (11, 708) = 457.18, p < .001; /a/ vs. /i/ of V1: F (11, 708) = 37.50, p < .001; mimetic vs. nonmimetic: F (11, 708) = 4.70, p < .01). Intriguingly, the effect size of the voicedness factor was overwhelmingly greater than those of the other two factors (voicedness: $\eta p^2 = .39$; /a/ vs. /i/: $\eta p^2 = .05$; mimetic vs. nonmimetic: $\eta p^2 = .01$).

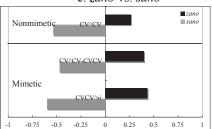
What is directly concerned with the present discussion is the mimeticity factor. Subjects' ratings were recalculated in order that "large" and "small" judgments have positive and negative numbers, respectively (from "-1" to "+1" with "0" as moderate). The graphs in (8) give a mean score for each stimulus, comparing each two roots constituting a minimal pair with respect to the voicedness of their first consonants. In each graph, the first pair of bars indicates mean scores for nonmimetic stimuli (i.e. CV^CV), and the second and third pairs of bars indicate those for mimetic stimuli (i.e. CV^CV-CVCV and CVCV^ri, respectively).

(8) Mean scores for magnitude symbolism of C1 (voiced vs. voiceless):

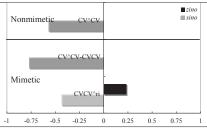




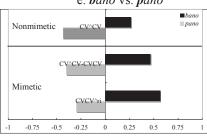
c. zano vs. sano



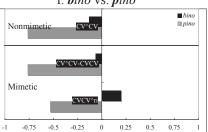
d. zino vs. sino



e. bano vs. pano



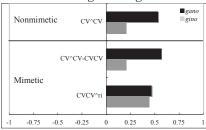
f. bino vs. pino



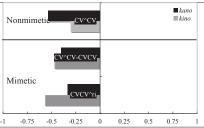
The graphs in (9) compare each two roots constituting a minimal pair with respect to their first vowels (i.e. /a/ and /i/).

(9) Mean scores for magnitude symbolism of V1 (/a/ vs. /i/):

a. gano vs. gino

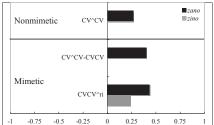


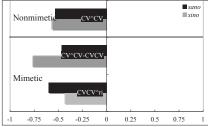
b. kano vs. kino





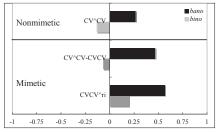


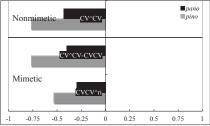




e. bano vs. bino

f. pano vs. pino





3.4. Analysis and Discussion

For examination of the prediction set in Section 3.2, differences between the scores for nonmimetic stimuli and those for mimetic stimuli—namely, between CV^CV and CV^CV-CVCV stimuli and between CV^CV and CVCV^ri stimuli—were calculated. Statistical comparisons were drawn between nonmimetic CV^CV and mimetic CV^CV-CVCV scores and between nonmimetic CV^CV and mimetic CVCV^ri scores. Post-hoc tests (one-tailed Wilcoxon signed-rank tests) for the Friedman test revealed that most mimetic-nonmimetic pairs form no significant contrast in their magnitude-symbolic effects. However, in two cases, mimetics produced significantly greater magnitude-symbolic effects than nonmimetics ((8b) gi^no -minus- ki^no < $gino^ni$ -minus- $kino^ni$: Z(19) = -2.58, p < 10.007 = adjusted significance level; (9b) kaⁿo-minus-kiⁿo < kano^{ri}-minus $kino^ri: Z$ (19) = -2.13, p < .03). Moreover, approaching significance was obtained for two cases ((8b) gi^no -minus- $ki^no < gi^nogino$ -minus- $ki^nokino : Z(19)$ = -1.51, p < .07; (9d) sa^no -minus- $si^no < sa^no$ sano-minus- si^no sino: Z(19) = .07-1.80, p < .07). What is crucial for the current context is the fact that there was only one case in which nonmimetic words surpass mimetic words in their magnitude-symbolic effects—although merely with approaching significance ((9d) sa^no -minus- $si^no > sano^ni$ -minus- si^no^ni : Z(19) = -1.51, p < .07). This set of

⁷ The Friedman and the Wilcoxon tests, nonparametric alternatives to repeated measures ANOVA and the paired Student's *t*-test, respectively, were used because the current experiment employed an ordinal scale (see Section 3.1), which is unfit for the parametric tests (Pett 1997).

results suggest, even if they do not guarantee, that magnitude symbolism of consonants and vowels is more effective in mimetic words, although it can work in nonmimetic ones as well.⁸ Note, however, that the inequality in magnitude-symbolic effects observed between the two mimetic templates used in the present experiment suggests the need for consideration of other mimetic templates.⁹

4. Conclusion

In this paper, I have claimed that sound-symbolic effects work more effectively in morphophonologically mimetic words than in morphophonologically nonmimetic ones with magnitude symbolism of consonants and vowels as examples. At the moment, we have more positive than negative evidence for the hypothesis. Larger-scale follow-up experiments are expected to clarify the phonosemantically as well as morphophonologically definable status of the Mimetic stratum of Japanese. This clarification will substantiate the alleged existence of the semantic peculiarity that native Japanese speakers' intuitions find for the word class at issue.

There are some specific improvements to be made in future research. First, since the present study employed a mere four-graded scale for rating, it will be useful for clearer discrimination among stimulus words to adopt a scale that allows finer-grained evaluations. Second, we need to extend our observation to other semantic scales than magnitude—softness, roundness, loudness, for example. Finally, we have to examine the sound-symbolic properties of words with various segmental combinations. Investigations in this line will surely contribute to the identification of the fundamental characteristics of sound symbolism and mimetics.

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⁸ An experiment using existent words as stimuli might give still milder results, for sound-symbolic interpretation tends to be strong in nonwords (Bentley and Varon 1933; Brown 1958; Westbury 2005).

⁹ The results for the reduplicative template were more consistent with my prediction than those for the suffixed template. This seems to stem from the templatic magnitude symbolism of the reduplicative construction. As Sharon Inkelas pointed out at the conference, reduplication generally enhances the spatial, temporal, or more abstract size of referent entities, properties, and eventualities, as in Japanese *ieie* 'houses' (< *ie* '(a) house') and *akaaka* 'bright red' (< *aka* 'red'). Furthermore, we have to consider the possibility that the template CVCV^ri carries the segmental sound symbolism of /r/ and /i/ as well as a templatic sound symbolism.

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