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What do English Speakers Know about *gera-gera* and *yota-yota*?: A Cross-linguistic Investigation of Mimetic Words for Laughing and Walking

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Summary

The relation between word form and meaning is considered arbitrary; however, Japanese mimetic words, *giseigo* and *gitaigo*, are exceptions. For *giseigo* (words mimicking voices), there is a direct resemblance ('iconicity') between the sound of the word and the sound it refers to; for *gitaigo* (words that mimic manners/states) there is a symbolic relationship ('sound symbolism') between the sound and the manner/state to which the word refers. While native speakers intuitively recognize these relationships, it is questionable whether speakers of other languages are able to access the meaning of Japanese mimetic words from their sounds. In the current study, we asked native English speakers with no prior experience with the Japanese language to listen to Japanese mimetic words for laughing (*giseigo*) and for walking (*gitaigo*), and rate each word's meaning on semantic differential scales (e.g. "GRACEFUL-VULGAR" (laughing), "GRACEFUL-CLUMSY" (walking)). We compared English and Japanese speakers' ratings and found that English speakers construed many of the features of laughing in a similar manner as Japanese native speakers (e.g., words containing /a/ were rated as more amused, cheerful, nice and pleasant laughs). They differed only with regard to a few sound-meaning relationships of an evaluative nature (e.g., words for laughing containing /u/ were rated as more feminine and graceful, and those containing /e/ were rated as less graceful and unpleasant). In contrast, for the words referring to walking, English speakers' ratings differed greatly from native Japanese speakers'. Native Japanese speakers rated words beginning with voiced consonants as referring to a big person walking with big strides, and words beginning with voiceless consonants as more even-paced, feminine and formal walking; English speakers were sensitive only to the relation between voiced consonants and a big person walking. Hence, some sound-meaning associations were language-specific. This study also confirmed the more conventional and lexicalized nature of the mimetic words of manner.

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1. Introduction

Mimetic words (*giongo*/*giseigo* ' words that mimic sounds/voices ' and *gitaigo* ' words that mimic states or manners ') are indispensable in vivid and precise descriptions and narratives in Japanese (e.g., Kakehi 2001). They are commonly used in spoken language as well as in written language such as in magazines and literature (see, for example, Schourup 1993, Yamaguchi 1986), and are thus essential items for learners of Japanese as a second language (JSL) to learn (Makino and Tsutsui 1986). Yet, the acquisition of mimetic words seems problematic for JSL learners (e.g., Yamaguchi 1986, Hamano 1998).

Banana Yoshimoto, for example, uses mimetic words frequently in works such as *Kitchen*. Examples (1–2) below show the use of the mimetic words *kusu-kusu* and *zoro-zoro* by Yoshimoto (1a, 2a) and the English translations by Megan Backus (1b, 2b). Despite natural and lucid translation into English, native Japanese speakers may feel that the English translations do not sufficiently convey the senses expressed by the mimetic words.

(1) a.「(略) だからあなたのことも人ごととは思えないのね. 男女の愛かどうかは保証できないけど.」くすくすお母さんは笑った.

" *... dakara anata no koto mo hito goto to wa omoenai no ne. Danzyo no ai ka doo ka hosyoo dekinai kedo.* " *Kusu-kusu okaasan wa waratta*[1]

(Yoshimoto 1991, 29)

b. " ... So it follows that Yuuichi feels close to you. I can't guarantee it's romantic, though ! " Mom shook with laughter. (translation by Megan Backus 1993, 18–19)

(2) a. (Talking about a bus). 目の前に流れてきてゆっくり止まり, 人々は並んでぞろぞろ乗り込む. (Yoshimoto 1991, 52)

Me no mae ni nagarete kite yukkuri tomari, hitobito wa narande zoro-zoro norikomu.

b. It seemed to float to a bus stop before my eyes, and people lined up, got on, one by one. (translation by Megan Backus 1993, 33).

Kakehi et al. (1996) define *kusu-kusu*, used in (1), as " the manner of laughing to oneself " (720), and *zoro-zoro*, used in (2), as " the manner in which a number of (usually living) things follow one after another or gather together " (1302). Kakehi et al.'s dictionary is the most comprehensive dictionary written in English, yet native Japanese speakers may feel that these words (and their sounds) convey more than these definitions imply.

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[1] Following Hamano (1998), we represent Japanese words phonemically (e.g., 't' refers to [tˢ] followed by /u/ and to [tʃ] followed by /i/ as well as [t]), using Hepburn Romanization.

A question arises as to whether JSL learners can decipher any aspects of the manner of laughing or the manner of entering a bus simply by the sounds of these mimetic words. In other words, can JSL learners sense any relationships between the sounds of these mimetic words and their meanings upon hearing or reading them? Although the relationship between words' sounds and their meanings is generally considered to be arbitrary in linguistic theory (Saussure 1916), Japanese speakers may intuitively feel that there is some resemblance between the sound of mimetic words and their meanings. Some linguists argue that this sound-meaning correspondence that native Japanese speakers sense is primarily due to associations among Japanese words and meanings that they have learned over time, associations which, therefore, are culture-specific (Jorden 1982). Others, however, argue in favor of a sound-meaning relationship in mimetic words in the Japanese language and have analyzed this relation (e.g., Hamano 1998, Tamori & Schourup 1999).

The sound forms of mimetic words may resemble the meanings of the words (i.e., iconicity) or they may symbolize their meanings (i.e., a sound symbolism—presumably on the basis of iconicity in some cases). Some scholars have suggested that there exists universal sound symbolism. For example, the vowels /i/ and /a/ are broadly associated with smallness and largeness respectively (Jespersen 1928, Sapir 1929, Newman 1933).[2] While some researchers dispute the universality of sound symbolism (e.g., Taylor & Taylor 1962), others find some commonalities of sound-meaning relations across speakers of different languages (see, for example, Miron 1961, who compared English and Japanese speakers). If sound symbolism is indeed universal to a certain extent, and if Japanese mimetic words (at least partially) reflect this, then JSL learners may sense and appreciate certain semantic dimensions of previously unheard or unseen Japanese mimetic words. If so, it is important to distinguish between those semantic dimensions of Japanese mimetic words that are readily perceived by learners of JSL and those that are not (i.e., associations built over time within Japanese culture).

The current study investigates whether and to what extent English speakers with no prior knowledge of Japanese can appreciate the imagery of different aspects of the mimetic words for laughing and walking. The former is representative of *giseigo* (words that mimic voices) and the latter representative of *gitaigo* (words that mimic manners) although it should be noted that many mimetic words seem to refer to both sounds and manners at the same time, evoking both auditory and visual imagery (for example, *dosun-dosun* refers to noises created by heavy people and of walking and floor-shaking at the same time). We chose these two types of mimetic words because these two are presumably on the opposing

[2] The association of /a/ with largeness and that of /i/ with smallness may not be entirely universal. According to Diffloth (1994), in Bahnar (Mon-Khmer language of Vietnam), high vowels such as /i/ signify largeness and low vowels such as /a/ smallness.

ends of the iconicity continuum: mimetic words for laughing being the most iconic, and the mimetic words for walking being close to the least iconic. Because the former mimic laughing sounds which are produced by the same organs as those used to articulate words, the sounds of these words are likely to resemble the quality of voices and manners of laughing that the words refer to. In contrast, mimetic words for walking refer to sounds made by footsteps and to manners that can be perceived visually or by proprioception. There can only be an indirect resemblance between the words' sounds and meanings in a more abstract, symbolic sense, especially in cases of mimetic words of manner. Hence, it is likely that mimetic words for laughing possess iconic relationships that learners can take advantage of, but less likely that mimetic words for walking do.

Specifically, we examine which semantic dimensions of these two types of Japanese mimetic words native English speakers with no prior knowledge of the Japanese language can decipher. This is to avoid two confounding factors (i.e., prior knowledge of any mimetic words and proficiency levels of learners) and to limit the potential influence of the first language to one language (English, in this case, which possesses only a limited repertoire of mimetic words). English speakers with no prior knowledge of Japanese should be able to decipher more aspects of the mimetic words of laughter than of the mimetic words for the manner of walking. We use existing lexicalized Japanese mimetic words in order to assess the extent to which these words are associated with their meanings by conventionalized language and cultural experience, versus the extent to which their sound-meaning relationships reflect iconicity and sound symbolism.

2. Previous literature

2-1. Sound-meaning relationships in mimetic words of laughing and walking.

Hirose (1981) compared English and Japanese words that describe laughing and walking (as well as other semantic domains). While English verbs are synthetic in that different manners of laughing and walking are expressed by single verbs (e.g., *giggle*, *chuckle*, *snigger* for laughing; *stroll*, *lumber*, *toddle*, *swagger* for walking), the Japanese equivalents of these verbs are compositional as they are comprised of combinations of a generic verb (*warau* 'laugh' or *aruku* 'walk') and mimetic words, such as *kusu-kusu warau* '*giggle*' and *bura-bura aruku* '*stroll*.' He divides mimetic words for laughter and those for walking into sub-groups: mimetic words for laughter into loud laughter (e.g., *hahaha*, *keta-*

[3] Q is used to refer to the first consonant of geminates [double consonants], following Hamano (1998).

keta) and quiet, suppressed laughter (e.g., *uhuQ*[3], *kusu-kusu*), and the mimetic words for walking into three: (1) those that capture auditory aspects of walking such as *dosin-dosin*, *dosun-dosun*, and *peta-peta*; (2) those that express visual aspects such as *yoro-yoro*, *yota-yota*, *syanari-syanari*, and *yoti-yoti*; and (3) those expressing affective aspects (i.e., how people feel) such as *uro-uro*. Hirose argues that sequences $-V_1C_2V_2$ (first vowel, second consonant, second vowel) in $C_1V_1C_2V_2$ are the 'correct' elements that are associated with meanings, rather than individual phonemes. Among such sequences he discusses are *-era* (referring to lowbred, vulgar taste) and *-ura* (referring to unsteadiness and swaying). The former occurs in some mimetic words for laughing (e.g., *kera-kera*, *gera-gera*), and the latter in some mimetic words for walking (e.g., *hura-hura*, *bura-bura*).

Kakehi (1986), who also compared Japanese and English mimetic words, argues that while English counterparts reflect some sound symbolism, Japanese mimetic words do so more systematically and extensively. Hamano (1998) made a comprehensive study of this systematic and extensive sound symbolism. She distinguishes between CV (Consonant-Vowel)-based words such as *pi*, *pii*, *piQ*, *pipiQ* and CVCV-based words such as *pisi*, *pisiQ*, *pisi-pisi*, considering the former more iconic and the latter more conventionalized and lexicalized. According to her, /e/ has evaluative meanings (i.e., inappropriateness and vulgarity), and the other four Japanese vowels, /a/, /i/, /u/, and /o/ indicate shape of an object or the size of an affected area. The vowel /a/ signifies a large area, /i/ straightness and tenseness, /u/ smallness and protrusion, /o/ a small area, modesty, and inconspicuousness. In CVCV-based mimetic words, these aspects of meaning are reflected only in the first vowel. Voiced and voiceless consonants contrast with each other in that voiced consonants signify massiveness and heaviness while their voiceless counterparts signify the opposite. The first consonant in CVCV sequence is related to tactile properties, and the second consonant is related to movement. Table 1 summarizes the consonant meanings that Hamano discusses. In addition, palatalization in such sequences as *kyaQ-kyaQ*, and *yoro-yoro* are associated with unsteadiness and childishness (Hamano 1994, 1998). A number of other systematic sound-meaning associations have been described in the literature: moraic nasal signifying echoing, voiced consonants (e.g., /g/, /d/) referring to loudness, geminates referring to forceful and rigorous action, and a final *-ri* referring to completion or quiet ending (e.g., Hamano 1998, Hirose 1981, Tamori & Schourup 1999).

Tamori & Schourup (1999) examine Hamano's (1986) analyses of sound symbolism found in Japanese mimetic words and compare English and Japanese sound symbolism. They argue for common sound symbolism across the two languages, finding that words for similar referents share similar segments: e.g., words referring to sounds made by water contain bilabial stops and sibilants both in English (e.g., *splash*, *sprinkle*, *spray*, *spatter*) and in Japanese (e.g., *batyaQ*, *basya*, *potyari*). They also found

Table 1 Sound (consonants)-Meaning relationships according to Hamano (1998).

	First consonants in CVCV	Second consonants in CVCV
/p/	taut surface; light, small, fine	explosion, breaking, decisiveness
/b/	taut surface; heavy, large, coarse	
/t/	lack of surface tension, subduedness; light, small, fine	hitting of a surface, coming into close contact, complete agreement
/d/	lack of surface tension, subduedness; heavy, large, coarse	
/k/	hard surface; light, small, fine	opening, breaking up, swelling, expanding, puffing out, emission from inside, surfacing, in-out movement.
/g/	hard surface; heavy, large, coarse	
/s/	non-viscous body, quietness; light, small, fine	soft contact, friction
/z/	non-viscous body, quietness; heavy, large, coarse	
/h/	weakness, softness, unreliability, indeterminateness	breath
/m/	murkiness	?
/n/	viscosity, stickiness, sliminess, sluggishness	bending, elasticity, unreliability, lack of force, weakness
/y/	leisurely motion, swinging motion, unreliable motion	sound from many sources, haziness, childishness
/w/	human noise, emotional upheaval	softness, faintness, haziness
/r/		rolling, fluid movement

Note: Blanks indicate that the given consonant never or rarely occurs in the position

similar sound symbolism in the closest equivalents of vowels in the two languages: /a/ referring to flatness, /o/ roundedness, /u/ small protrusion, /e/ to vulgar or negative referents (e.g., *belch*, *fleck*, *mess*, *squelch*, and *fret* in English). Tamori & Schourup's (1999) study is based on existing words in the two languages; so it is difficult to tell whether conventionalized sound-meaning relationships happen to correspond between the two languages in the specific cases investigated or if there exists a more general level of sound symbolism such that speakers of English speakers can comprehend Japanese mimetic words (or vice versa). Some researchers discussed below have investigated how speakers of different languages comprehend Japanese mimetic words.

2-2. Experimental studies on sound symbolism in Japanese mimetic words.

Several experimental studies have examined whether non-native speakers of Japanese were able to guess the meaning of mimetic words. Ihara and Iwahara (1938) asked four Japanese and three Chinese speakers to give short sentences using each of 418 Japanese mimetic words. The data for the Japanese

showed that only 61 words were used to express the same meanings across the four speakers, suggesting the flexibility of sound symbolism. The data for the Chinese indicated that symbolic sounds do not have the same meaning in Chinese culture and that sound-meaning relationships are established as a custom of the linguistic community. Likewise, Frei (1970 cited in Hirose 1981) investigated whether French speakers were able to guess the meaning of Japanese mimetic words by asking four French speakers to write down the meanings of words uttered by a native Japanese speaker. The French speakers were given isolated words in the first experiment and then words with contexts given in French in a second experiment. Frei found that French speakers also had difficulty guessing the meaning of the Japanese words, but found that French speakers could guess slightly better when contexts were given, and better with auditory mimetic words.

Oda (2000) argued that the sensations experienced by the movement of articulatory organs mediate the connection between the linguistic sounds and meanings of mimetic words, and supported his hypothesis with experimental results. He provided mimetic words related to tactile sensations and movements to two groups of participants (primarily English speakers) and asked both groups to perform two tasks: to choose a mimetic word (out of three words listed) appropriate for a given English definition accompanied by a drawing; and to match two definitions accompanied by drawings with two minimally-paired mimetic words. Participants in one group were asked to concentrate on sound images after hearing a native speaker read the words; those in the other group were asked to pronounce the words after a native speaker read them. Those who pronounced the words made more correct responses, providing evidence that articulation facilitated the connection between the sound and its meaning.

These previous studies show that speakers of other languages could not easily guess the meaning of Japanese words, but that their performance improves in some situations. However, because these studies did not investigate any specific semantic dimensions, they cannot explain which semantic dimensions are associated with which phonological qualities of the Japanese mimetic words among speakers of other languages. To answer this question, Iwasaki et al. (2005) compared Japanese speakers ' ratings and English speakers ' ratings of 20 semantic dimensions of *giongo*, mimetic words for sounds. They found that English speakers without prior Japanese study experience rated the meaning of *giongo* similarly to Japanese speakers for several semantic dimensions: whether the word refers to sounds that are continuous, high-pitched, sharp, and deep. At the same time, English speakers ' ratings diverged from Japanese speakers ' ratings for certain semantic dimensions, most notably the pleasantness and beauty of the sounds to which the words refer.

2-3. Acquisition of Japanese mimetic words

To our knowledge, no studies address JSL acquisition of mimetic words except for Yang (1984), who concluded that those who have more experience with Japanese culture (e.g., those who had lived in Japan, had Japanese relatives, had been exposed to Japanese TV programs, etc) were better at choosing appropriate mimetic words. Unfortunately, proficiency in Japanese was not assessed, so it is impossible to rule out the possibility that this "cultural experience effect" may instead simply be related to greater Japanese proficiency.

More studies can be found on children learning Japanese as a first language. Toda et al. (1990) found that Japanese mothers used more onomatopoetic words with their 3-month-old infants than US mothers did, and that learning mimetic words appeared to pose no difficulty for Japanese children. Ishiguro (1993) states that children first create their own idiosyncratic mimetic words and then gradually start using lexicalized mimetic words. He also notes that children first learn auditory mimetic words, citing Okubo (1967), who found that children started using sound mimetic words around the ages of 2–3, and only later (ages 4–5) began using mimetic words of manner. Harlofsky (1998) confirmed through the testing of 3– to 6–year–old children that the occurrence of auditory mimetic words preceded that of visual mimetic words.

These findings are compatible with Frei's (1970) finding that French speakers were able to guess the meanings of auditory mimetic words better and Iwasaki et al's (2005) finding concerning auditory mimetic words that Japanese and English speakers' ratings were correlated for a number of words and semantic dimensions. This compatibility suggests that JSL learners may find it easier to learn auditory mimetic words than visual mimetic words. It is important, however, to first examine which aspects (i.e., relationship between sound and semantic dimension) of Japanese mimetic words are more iconic and are readily perceived by speakers of other languages in a manner similar to Japanese speakers, and how auditory mimetic words differ from visual mimetic words. The current study specifically addresses differences between mimetic words that are primarily auditory (laughing) and those of the manner of walking that are more non-auditory and/or visual. Moreover, this study examines specific sound-meaning relationships (e.g., the relation between the respective vowel and its meaning).

3．Method

3-1．Materials and Procedures

We adopted Iwasaki et al.'s (2005) method and created two questionnaires: one containing the 24 mimetic words for laughing listed in Appendix A and the other containing the 28 mimetic words for manner of walking listed in Appendix B. The selection of mimetic words for laughing does not include mimetic words for smiling (e.g., *nikkori*, *niyari*, *niko-niko*), as these words refer to the visual aspect of smiling rather than auditory aspects and are thus not *giseigo* (words describing voices). The 24 mimetic words for laughing consist of 17 CV-based words and 7 CVCV-based words. Of the 24 words for laughter, 13 refer to loud laughter (e.g., *ahaha*, *hahaha*, *haQhaQ*, *waQhaQha*, *kera-kera*, *gera-gera*,

Table 2　Semantic dimensions of laughing used in the questionnaire in two languages

In English	In Japanese
Loud—Soft (in volume)	大きい声—小さい声
Pleasant voice—Unpleasant voice	快い声—不快な声
Graceful—Vulgar	上品—下品
Beautiful voice—Ugly voice	きれいな声—きたない声
Energetic—No energy	元気がある—元気がない
Good—Bad	いい—悪い
Mouth wide open—Mouth shut	口を大きく開けて—口を閉じて
High pitched—Low pitched	高い声—低い声
Purposeful—Involuntary	わざと—思わず
Resonant voice—Non-resonant voice	響く声—響かない声
Continuous—Momentary	継続—瞬時
Amused—Not amused	おもしろがって—おもしろがらず
Formal—Informal	フォーマル—インフォーマル
Cheerful—Not cheerful	明るい—暗い
Many people—One person	大勢—ひとり
Feminine—Masculine	女性的—男性的
Unrestrained—Restrained	おさえず—おさえて
Excited—Calm	興奮して—落ち着いて
Young child—Adult	幼い子供—大人
Nice/kind—Nasty/mean	好意的な—意地悪な

Table 3 Semantic dimensions of walking used in the questionnaire

In English	In Japanese
Noisy—Quiet	うるさい—静か
Big strides—Small strides	大また—小また
Echoing noise—Non-echoing noise	響く音—響かない音
Fast—Slow	速い—遅い
Recreational—Non-recreational	娯楽的—娯楽的でない
Wet surface (ground, floor)—Dry surface (ground, floor)	濡れた地面・床—乾いた地面・床
Hard sole shoes—Soft sole shoes	底の固い靴—底のやわらかい靴
Purposeful—Aimless	目的がある—目的がない
Many people—One person	大勢—ひとり
Steady—Unsteady	安定してる—不安定
Formal—Informal	フォーマル—インフォーマル
Big person—Small person	大きい人—小さい人
Even paced—Uneven paced	同じ調子—乱れた調子
Feminine—Masculine	男性的—女性的
Energetic—No energy	元気がある—元気がない
Graceful—Clumsy	優雅—ぎこちない
Long distance—Short distance	長距離—短距離
High self image—Low self image	気取って—気取らず
Good—Bad	いい—悪い
Hard surface (ground, floor)—Soft surface (ground, floor)	固い地面・床—やわらかい地面・床
Young child—Adult	幼い子供—大人

keta-keta, *keQkeQ*, *geta-geta*, *ohoho*, *kara-kara*, *koro-koro*, *kyaQkyaQ*) and 11 to quiet suppressed laughter (*uhuhu*, *huhuQ*, *puQ*, *huhuhu*, *uhuQ*, *kusu-kusu*, *kusuQ*, *ehehe*, *hehehe*, *hihihi*, *heQheQhe*). The English definitions of these words from Kakehi et al. (1996) are given in Appendix A.

The 28 mimetic words for walking in the present study are largely CVCV-based (except for one word, *taQtaQ*) because most common mimetic words for walking are CVCV-based. They consist of 8 words that capture auditory aspects of walking (*dosi-dosi*, *dosin-dosin*, *dosun-dosun*, *dota-bata*, *bata-bata*, *kotu-kotu*, *katu-katu*, *peta-peta*), and 20 that capture visual and/or affective aspects (*yoro-yoro*, *yota-yota*, *yoti-yoti*, *noQsi-noQsi*, *syanari-syanari*, *teku-teku*, *bura-bura*, *hura-hura*, *sorori-sorori*, *noso-noso*, *zoro-zoro*, *suta-suta*, *taQtaQ*, *tuka-tuka*, *toko-toko*, *tyoko-tyoko*, *uro-tyoro*, *hyoko-hyoko*, *uro-uro*, *tobo-tobo*); see Appendix B for English definitions. Although these words can be classified

into different modalities (auditory, visual, or affective) according to their primary or dominant interpretation, it is highly plausible that auditory mimetic words evoke certain visual as well as auditory images. Thus, it is important to capture senses related to other semantic dimensions rather than limiting the semantic dimensions in question.

These mimetic words and semantic dimensions for investigation were selected through the consultation of several dictionaries of mimetic words (e.g., Atoda & Hoshino 1995, Kakehi et al. 1996, Shogakkan 1991). We selected 20 semantic dimensions relevant to the mimetic words for laughing as shown in Table 2, and 21 semantic dimensions of the mimetic words for manner of walking as shown in Table 3.

For each word, a seven-point semantic differential scale was created for the 20 (laughing) or 21 (walking) dimensions. These scales were later converted to −3 to +3 to express polarity, with positive values corresponding to the label of the scale (e.g. an item rated the most loud is given a value of +3 on the loud scale, and one rated the most soft, a value of −3). Japanese speakers were given printed words (each word was written both in hiragana and katakana), while English speakers listened to digitized audio recordings of a native Japanese speaker pronouncing each of the words.

3-2. Participants

The laughter questionnaire was completed by 12 native Japanese speakers (11 females and 1 male, ranging in age between 18-49, median 29), and the walking questionnaire was also completed by 12 native Japanese speakers (11 females and 1 male, ranging in age between 21-53, median 28.5). Three speakers participated in both. The English versions were completed by native English speakers with no prior Japanese learning experience. The laughter questionnaire was completed by 15 English speakers (10 females and 5 males, ranging in age between 18-33, median 21), and the walking questionnaire was completed by 12 English speakers (8 females and 4 males, ranging in age between of 18-41, median 21). All participants were paid a small sum for their participation.

3-3. Analyses

Two sets of correlation analyses were conducted initially. The ratings were averaged across participants within each language group (Japanese and English), and separate Pearson's correlation coefficients for each word were calculated between the two groups' mean ratings of the various semantic dimensions. This analysis assesses the extent to which Japanese and English speakers agreed on their ratings of the 20 or 21 semantic dimensions for any given word, and reveals those words for which the

[4] The words that start with vowels (e.g., *uhuhu*, *ahaha*) were excluded from this analysis.

two populations agree more than chance would predict. In addition, for mimetic words for laughing, the average correlation of CV-based words (N=10) and that of CVCV-based words (N=8) were also computed to see if there is greater correlation for CV-based words, which are claimed to be more iconic than CVCV-based words (Hamano 1998).[4]

Furthermore, separate correlation coefficients were calculated for each semantic dimension between the two groups' mean ratings of the various words. This analysis assesses whether Japanese and English speakers agreed on their application of a given semantic scale across the words in the test set, and reveals which of the scales are commonly applied by the two groups. In addition, the numbers of scales for which the English-Japanese correlation reached significance for CV-based words and for CVCV-based words were counted.

Further, we also analyzed the effects of certain phonological qualities that have been argued to be relevant in the mapping between meaning and sound. For words for laughing, we examined the effects of vowels (i.e., /a/, /e/, /u/ in the V_1 positions of C_1V_1- and $C_1V_1C_2V_2$-based words), onsets (i.e., whether the initial sound is a consonant or vowel), and geminates (i.e., whether the word contains double consonants or not). For the vowel comparison we used one-way ANOVA with ratings as the dependent variable and the different vowels as levels of the independent variable. For the other sound properties we employed t-tests comparing the average ratings across the two languages. For words for manner of walking, we analyzed the effects of different vowels (i.e., /a/, /o/, /u/) by one-way ANOVA as above, and the effects of voiced/voiceless word-initial consonants by t-test. The voiced/voiceless contrast can be examined only in word-initial consonants because voiced consonants do not occur in C_2 positions. In order to ensure that these comparisons generalize across participants and materials (Clark 1973), all of these analyses of phonological properties were conducted using participants as a random factor (averaging across the different words in each condition for each participant, and treating phonological factors such as the voiced/voiceless contrast as within-subjects), and with items as a random factor (averaging across the individual participants in each language group for each word and treating phonological factors as between-items). Only those cases for which both subject and item analyses reach significance (alpha=.05) are discussed as differences. Moreover, we compared means of English and Japanese speakers' ratings for words containing *-era* (laughing) and *-ura* (walking) for their most relevant semantic dimensions (according to Hirose 1981): Graceful (as opposed to vulgar) for *-era*, and Steady and Even-Paced for *-ura*.

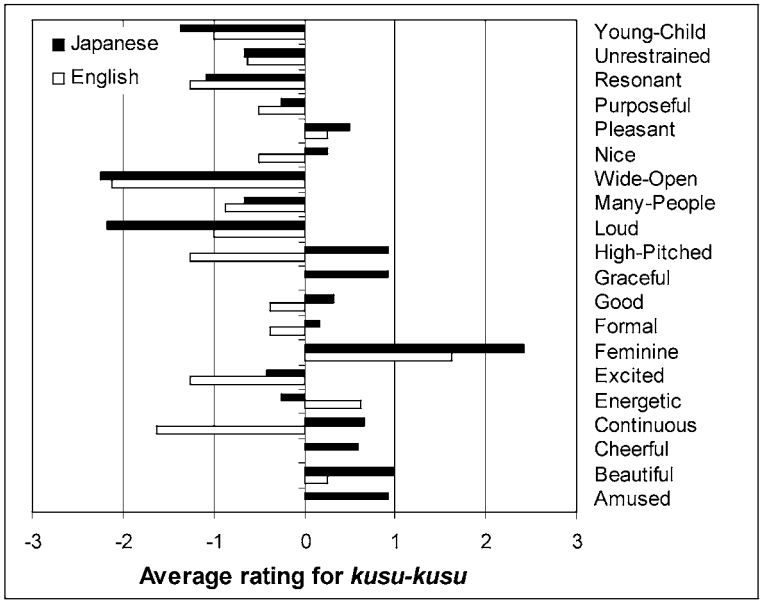

Figure 1 Average ratings by Japanese and English speakers for *kusu-kusu*

4. Results

4-1. Mimetic words for laughter

4-1-1. Correlation analyses for words

Japanese and English speakers' ratings were significantly correlated for half (12 of 24) of the words used in this study. The most highly correlated ratings were for *kusu-kusu* ($\underline{r}$=0.686, p<.001), rated by both Japanese and English speakers as quiet, restrained, non-resonant laughter produced by a female adult with her mouth shut (see Figure 1 for average ratings across all the semantic dimensions). This was followed by *kera-kera* ($\underline{r}$=0.679, p<.001), *hahaha* ($\underline{r}$=0.664, p<.001), *waQhaQha* ($\underline{r}$=0.662, p <.001), *keQkeQke* ($\underline{r}$=0.617, p=.002), *ehehe* ($\underline{r}$=0.575, p=.004), and *kara-kara* ($\underline{r}$=0.559, p=.005). Ratings for four more words were significantly correlated albeit with lower correlation coefficients: *huhuQ* ($\underline{r}$=0.456, p=.022), *hehehe* $\underline{r}$=0.449, p=.024), *uhuQ* ($\underline{r}$=0.399, p=.041), and *keta-keta* ($\underline{r}$=0.388, p =.045). The words for which English and Japanese speakers' ratings were correlated include a mixture of both loud and quiet laughter. It is also interesting to note that the highest correlations were found for the CVCV-based mimetic words *kusu-kusu* and *kera-kera*, words which are less iconic/more lexicalized according to Hamano (1998). The overall average correlation for CV-based words was $\underline{r}$=+0.113 and

that for CVCV-based words was r=−0.069, although this difference did not reach statistical significance.

4-1-2. Correlation analyses for semantic dimensions

As expected from the above correlation patterns, there were also semantic dimensions for which Japanese and English speakers' ratings were very highly correlated. The most significantly correlated was Loud (r=0.78, p<.001), followed by Mouth-Wide-Open (r=0.72, p<.001), Continuous (r=0.68, p <.001), Resonant-Voice (r=0.63, p<.001). Only these four were significantly correlated across languages; the next highest correlation failed to reach significance (Many-People, r=.315, p=.067). Interestingly, there were also two semantic dimensions for which English and Japanese speakers' ratings were significantly negatively correlated: Beautiful-Voice (r=−0.345, p=.049) and Graceful (r=−0.389, p =.030). In other words, English speakers' impressions of the beauty and grace of the mimetic words for laughing were the opposite of the meanings that Japanese speakers attribute to these words.

When CV-based words and CVCV-based words were considered separately, significant correlations were found for three dimensions of CV-based words (Continuous, Loud, Mouth-Wide-Open), and four of CVCV-based words (Resonant-Voice, Mouth-Wide-Open, Good, and Nice). However, for two of the four dimensions (Good, Nice), the correlation was negative. Thus, there is more agreement between English and Japanese speakers' ratings for CV-based words.

4-1-3. Effects of Vowels

In order to assess the effects of different vowels, the mimetic words were divided into three groups: those that contain /a/, which is iconic of laughing with one's mouth wide open (N=6), those that contain /e/, which presumably indicates a vulgar, negative type of laughing (N=8), and those that contain /u/ (N=7). One-way ANOVA by subjects and items revealed significant effects that are broadly similar between Japanese speakers' ratings and English speakers' ratings of seven of 20 semantic dimensions: Amused, Cheerful, Energetic, Excited, Loud, Mouth-Wide-Open and Resonant-Voice (all of which appear to be characteristic of /a/ words and uncharacteristic of /u/ words in both languages). Table 4 summarizes the significant differences between different vowels by semantic dimension and language group.

Overall, English speakers exhibited more variability in their responses, so fewer fine-grained differences were observed in English speakers' ratings. English speakers almost always rated words containing /a/ toward one end of a scale, and words containing /u/ toward the other end (with words containing /e/ numerically intermediate, but hardly ever significantly different from the other two vowel conditions) while Japanese speakers' ratings varied considerably depending upon the semantic dimension.

For two of these dimensions, Amused and Cheerful (labeled as "SAME" in Table 4), the effects of

Table 4 Mimetic words for Laughing: Effects of Vowels between English and Japanese Speakers

	Speakers	/a/ N=6	/e/ N=8	/u/ N=7	Cross-linguistic similarity	Significant differences*
Amused	English	0.96	0.91	0.04	SAME	a>u
	Japanese	1.76	1.05	0.69		a>u
Beautiful Voice	English	0.42	0.22	−0.63	J. ONLY	-
	Japanese	0.13	−0.80	0.85		u>e
Cheerful	English	0.90	0.73	−0.54	SAME	a>u
	Japanese	2.08	0.54	0.56		a>u
Continuous	English	−0.08	0.48	−1.82	DIFF	e>u
	Japanese	0.92	0.68	−1.38		a>u
Energy	English	0.98	0.69	−0.66	SAME (J. more sensitive)	a>u
	Japanese	1.71	0.95	−0.19		a>e>u
Excited	English	0.88	0.58	−0.88	SAME (J. more sensitive)	a>u
	Japanese	0.96	0.16	−0.80		a>e>u
Feminine	English	0.75	0.68	0.13	J. ONLY	-
	Japanese	−0.31	−0.52	2.02		u>a, e
Formal	English	−0.08	−0.50	−0.79	J. ONLY	-
	Japanese	−0.93	−1.80	0.01		u>a>e
Good	English	1.00	0.27	−0.68	DIFF	a>u
	Japanese	1.03	−0.58	0.43		a>e
Graceful	English	0.27	−0.02	−0.82	DIFF	a>u
	Japanese	−0.40	−1.53	0.77		u>e
High Pitched	English	0.40	0.56	−1.45	E. ONLY	a, e>u
	Japanese	0.68	0.09	0.71		
Loud	English	0.60	0.27	−1.29	SAME (J. more sensitive)	a>u
	Japanese	1.31	0.50	−1.93		a>e>u
Many People	English	−1.05	−1.05	−1.64	J. ONLY	-
	Japanese	0.33	−0.83	−1.85		a>e, u
Nice	English	0.85	0.42	−0.50	DIFF	a>u
	Japanese	1.04	−0.42	0.64		a>e
Pleasant	English	0.83	0.09	−0.70	DIFF	a>u
	Japanese	1.00	−0.76	0.41		a>e
Purposeful	English	0.54	0.47	−0.18	J. ONLY	-
	Japanese	−0.94	0.29	−0.87		e>a, u
Resonant	English	0.75	0.20	−0.57	SAME (J. more sensitive)	a>u
	Japanese	1.38	0.38	−0.86		a>e>u
Unrestrained	English	0.46	0.53	−0.46	J. ONLY	-
	Japanese	1.56	0.44	−0.62		a>u
Mouth Wide Open	English	1.50	0.36	−0.95	SAME (J. more sensitive)	a>u
	Japanese	1.63	0.55	−2.16		a>e>u
Young	English	−1.29	−1.06	−1.32	n/a	-
	Japanese	−0.81	−0.80	−1.48		-

*Differences are listed as significant only if $p<.05$ both by subjects and items. If a vowel condition is not listed, it does not differ significantly from the other vowels.

the vowels were the same in both languages: /a/ words were perceived as more Amused and Cheerful than /u/ words. For five additional dimensions（Energetic, Excited, Loud, Resonant, Mouth-Wide-Open, labeled as“SAME:（J. more sensitive）”in Table 4）, response patterns were broadly similar, but with Japanese speakers exhibiting a finer level of contrast than English speakers（in each case, both English and Japanese speakers rated /a/ words higher than /u/ words, while Japanese speakers also significantly differentiated /e/ words, placing them between /a/ and /u/ on the scales）. These results demonstrate a substantial degree of cross-linguistic similarity for mimetic words for laughing, despite the lack of correlation between the two language groups for many of these dimensions when analyzed at an item-specific level.

There were also strikingly different effects of vowels between English and Japanese speakers concerning the dimensions of Continuous, Good, Graceful, Nice and Pleasant（labeled as“DIFF”in Table 4）. For Continuous, both groups rated /u/ words the lowest, but Japanese speakers considered /a/ words to be the most Continuous while English speakers rated /e/ words as most Continuous. The three related dimensions of Good, Nice and Pleasant exhibited similar patterns among them: English and Japanese speakers agreed in rating /a/ words high on these scales, but differed in words given low ratings. English speakers gave lower Good/Nice/Pleasant ratings to words containing /u/ while Japanese speakers gave lower ratings to words containing /e/. Finally, completely different patterns were observed for Graceful. English speakers rated /a/ words as high and /u/ words as low, while Japanese speakers gave high ratings to /u/ words and low ratings to /e/ words. These differences in ratings, with words containing /e/ given low ratings by Japanese speakers on a number of evaluative dimensions, might be attributed to differences in the implications of /e/（inappropriateness/vulgarity in Japanese）.

Because English speakers exhibited greater variability in their responses, it is not surprising that differences between vowels were observed only among Japanese for a number of dimensions: Beautiful-Voice, Feminine, Formal, Many-People, Purposeful and Unrestrained. Words containing /u/ were more Beautiful-Voice, Feminine and Formal while words containing /e/ were consistently lowest on these scales（again consistent with the link between /e/ and vulgarity in Japanese）. This pattern was reversed for Purposeful（/e/ rated highest, /a/ and /u/ lowest）. For Many-People and Unrestrained, words containing /a/ were rated highest, and words containing /u/ lowest.

There was only one dimension, High-Pitched, for which English speakers rated words containing different vowels significantly differently while Japanese speakers did not. English speakers rated words containing /a/ and /e/ high on the High-Pitched scale, and words containing /u/ low on the scale. English speakers may have relied more upon the acoustic characteristics of the words for this scale（the only one overtly referring to acoustic dimensions）as a consequence of hearing the words rather than reading

them. Finally, different vowels did not have any effect on the ratings of the laugher's age (Young-Child) for either language group.

4-1-4. Effects of Geminates /Q/

Because geminates are considered to indicate abrupt, short, forceful movements (e.g., Hamano 1998), we expected Japanese speakers to rate 9 words containing Q (e.g., *huhuQ*) as less Continuous than 15 words that do not contain Q. This was indeed the case. The mean Continuous rating for words containing Q was -0.630 as compared to 0.639 for words that do not contain Q. The difference was significant; (subjects $t(12)=4.112$, $p=.002$; items $t(22)=2.344$, $p=0.028$). However, such an effect was not observed among English speakers (both $|t|<1$, $p>.4$), for whom there were no dimensions for which words containing Q significantly differed from those which did not. English speakers do not appear to be sensitive to this phonological property of Japanese words.

4-1-5. Effects of Onsets

The words were divided into two groups depending on whether the word-initial segments are vowels (N=5) or consonants (N=19). The former group includes *ahaha*, *ehehe*, *uhuhu*, *uhuQ* and *ohoho*. Japanese speakers rated words beginning with vowels as significantly more Beautiful-Voice (ratings for vowel onsets=.92, consonant onsets=−.20), Feminine (vowel onsets=1.78, consonant onsets=.16), and Formal (vowel onsets=.22, consonant onsets=−1.15) than the words that start with consonants: Beautiful-Voice (subjects $t(11)=2.505$, $p=.029$; items $t(22)=2.365$, $p=.027$); Feminine (subjects $t(11)=3.008$, $p=.012$; items $t(22)=2.274$, $p=.033$); Formal, (subjects $t(11)=2.251$, $p=.046$; items $t(22)=2.848$, $p=.009$). In contrast, English speakers did not rate these two types of words significantly differently for any dimension.

4-1-6. -$V_1C_2V_2$ sequence -era

The mean Graceful ratings for *kera-kera* and for *gera-gera* for Japanese speakers were −0.75 and −2.17, respectively, and those for English speakers were −0.25 and −1.25, respectively. To assess whether these ratings tend toward Vulgar (the opposite end of the Graceful scale) one-sample t-test was conducted against a value of zero (halfway between Graceful and Vulgar on the scale). These tests were significant both for Japanese speakers (subjects $t(11)=4.901$, $p<.001$) and for English speakers ($t(14)=2.613$, $p=.021$); both groups felt that the words referred to vulgar rather than graceful laughing (although this effect was more pronounced for Japanese speakers). Thus, the sound symbolism in this case may exhibit both culturally learned conventional aspects and some commonality between sound-

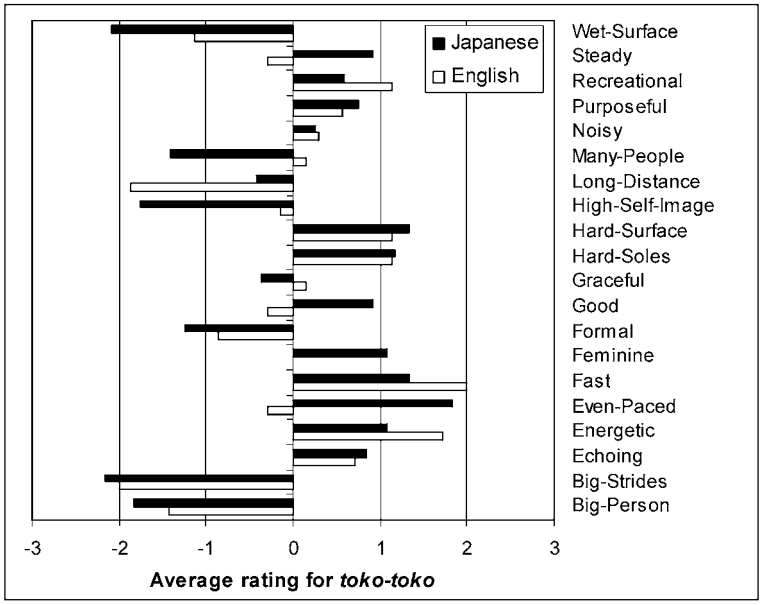

Figure 2　Average ratings by Japanese and English speakers for *toko-toko*.

meaning association for English and Japanese speakers.

These results indicate a certain degree of correspondence between speakers of the two languages for mimetic words for laughing, although not to the extent of correspondence for mimetic words that directly refer to sound (Iwasaki, et al. 2005). We now turn to mimetic words for manner of walking, for which we expect to see less correspondence as the meanings of such words are less iconic and less directly linked to articulatory mechanisms.

4-2. Mimetic words for walking

4-2-1. Correlation analyses for words

As expected, there were far fewer mimetic words for walking for which Japanese and English speakers' ratings were significantly correlated, compared to mimetic words for laughter. We found significant correlations between English and Japanese speakers' ratings for only seven of 28 words used in the questionnaire. The most highly correlated of these was *toko-toko* ($\underline{r}$=0.69, $\underline{p}$<.001), rated by both Japanese and English speakers as referring to a small person wearing hard-soled shoes walking quickly and energetically with small strides on a hard, dry surface in an informal manner (see Figure 2 for average ratings across all the semantic dimensions). This was followed by *kotu-kotu* ($\underline{r}$=0.67, $\underline{p}$<.001), *katu-katu* ($\underline{r}$=0.65, $\underline{p}$<.001), *dota-bata* ($\underline{r}$=0.62, $\underline{p}$=.002), *taQ-taQ* ($\underline{r}$=0.56, $\underline{p}$=.005), *hyoko-hyoko* ($\underline{r}$=0.47,

p=.018), and *tuka-tuka* (r=0.43, p=.029). Among these, significant correlations are observed not only for some mimetic words for walking that are closely related to the auditory domain (*kotu-kotu*, *katu-katu*, *dota-bata*) but also some that are much more visual in nature (*toko-toko*, *taQ-taQ*, *hyoko-hyoko*, *tuka-tuka*).

4-2-2. Correlation analyses for semantic dimensions

As expected from the few significant correlations for words, English and Japanese speakers' ratings were significantly correlated for only a small number of semantic dimensions, and with substantially lower correlation coefficients than for dimensions of laughing: Hard-Soles (r=0.37, p=.026) and Wet-Surface (r=0.32, p=.048). There were also some weak positive correlations (r>=0.20) for Hard-Surface, Big-Stride, and Steady, but these were not statistically significant. Interestingly, there were also weak negative correlations that approached statistical significance for two dimensions: Noisy and Many-People.

4-2-3. Effects of Vowels

In contrast to the mimetic words for laughing, few effects of vowels were observed, indicating that the sound-meaning relationships are not as robust for these primarily visual manner mimetic words. Among English speakers, the effects of different vowels were found only for Big-Stride. English speakers regarded mimetic words containing /u/ as higher on the Big-Stride scale than /a/ (average rating for /u/=.36, /a/=−1.04; subjects F(2, 22)=3.504, p=.048, items F(2, 23)=4.067, p=.031), a result that contrasted with the generally claimed sound symbolism of /a/ signifying largeness. Interestingly, there were no such effects observed among Japanese speakers.

Among Japanese speakers, different vowels had significant effects for two semantic dimensions: Graceful (subjects F(2, 22)=4.111, p=.030, items F(2, 23)=3.426, p=.050) and High-Self-Image (subjects F(2, 22)=3.984, p=.033, items F(2, 23)=4.153, p=.029). Japanese speakers rated words containing /a/ significantly higher than words containing /o/ on Graceful (/a/=.19; /o/=−1.45) and High-Self-Image (/a/=.56; /o/=−1.76) dimensions.

4-2-4. Voiced vs. Voiceless Consonants

The mean ratings of words beginning with voiceless consonants (N=12) and those with voiced consonants (N=7) for each semantic dimension were compared by t-test. For only one semantic dimension (Big-Person), was there a tendency toward a comparable similar effect of voiced/voiceless contrasts across languages: speakers of both languages rated words starting with voiced consonants as referring to

Table 5 Average ratings for dimensions of walking by Japanese speakers for words beginning with voiced vs. unvoiced consonants, for which voiced and unvoiced are significantly different.

Dimension	Voiced onset	Voiceless onset
Big-Stride	1.20	−1.16
Even-Paced	0.35	1.25
Feminine	−1.33	0.81
Formal	−2.05	−0.30
Good	−1.55	−0.07
Graceful	−1.38	−0.11
High-Self-Image	−2.19	−0.13
Noisy	1.89	−.38

the walking of a Big-Person than words starting with voiceless consonants (for English, voiced=.25, unvoiced=−.75; for Japanese, voiced=1.28, unvoiced=−.76), but this comparison failed to reach significance in the analysis of English subjects (English subjects $t(11)=1.957$, $p=.076$; items $t(17)=2.491$, $p=.023$; Japanese subjects $t(11)=5.400$, $p<.001$; items $t(17)=4.619$, $p<.001$).

For Japanese speakers, voiced/voiceless consonants also had a significant effect on 10 additional dimensions as illustrated in Table 5. On one hand, Japanese speakers rated words starting with voiced consonants as significantly more Big-Stride (subjects $t(11)=4.751$, $p<.001$, items $t(17)=4.619$, $p<.001$), and Noisy (subjects $t(11)=3.903$, $p=.003$, items $t(17)=3.114$, $p=.006$). On the other hand, they rated words starting with voiceless consonants as more Even-Paced (subjects $t(11)=3.171$, $p=.009$, items $t(17)=2.744$, $p=.014$), Feminine (subjects $t(11)=2.835$, $p=.016$, items $t(17)=4.887$, $p<.001$), Formal (subjects $t(11)=2.601$, $p=.025$, items $t(17)=2.925$, $p=.009$), Good (subjects $t(11)=2.272$, $p=.044$, items $t(17)=4.076$, $p=.001$), Graceful (subjects $t(11)=3.222$, $p=.008$, items $t(17)=2.867$, $p=.011$), and High-Self-Image (subjects $t(11)=2.660$, $p=.022$, items $t(17)=2.963$, $p=.009$).

4-2-5. -$V_1C_2V_2$ sequence -ura

The mean ratings for *hura-hura* and for *bura-bura* for Japanese speakers were −1.42 and −2.83, respectively, for Steady and were −1.17 and −2.58, respectively, for Even-Paced. One-sample t-test by subjects showed these were significantly less than zero (Steady: $t(11)=6.403$, $p<.001$, Even-Paced $t(11)=4.727$, $p<.001$). This contrasts sharply with English speakers' ratings of 0.71 and 0.00 for Steady and 0.57 and 0.29 for Even-Paced which did not differ from zero (Steady: $t(11)=1.518$, $p=.157$; Even-Paced: $|t|<1$). Japanese speakers clearly felt that the words referred to unsteady, uneven-paced walking

while English speakers did not have such a construal. Unlike *-era* in mimetic words for laughing, the meaning of *-ura* in mimetic words for walking seems largely language-specific.

5. Discussion

As expected, English speakers with no prior knowledge of Japanese related the sounds of Japanese mimetic words to their meanings in a manner similar to native Japanese speakers to a greater extent for mimetic words for laughing than they did for mimetic words for walking. This confirms the more iconic status of the sound/voice mimetic words, supporting Iwasaki et al.'s (2005) findings that English and Japanese speakers' responses to sound mimetic words correlated for a number of words and semantic dimensions, and with Frei's (1970) findings that French speakers' responses yielded higher correct responses for auditory mimetic words. At the same time, there were a number of sound-meaning associations that only Japanese speakers clearly demonstrated. The former findings indicate the universality or at least some commonalities of sound symbolism to which both English and Japanese speakers are sensitive, and that mimetic words for laughing are more iconic than mimetic words for walking. The latter indicates language-specific sound symbolism in the Japanese language that may be due to language and cultural experience.

In the correlation analyses of English and Japanese speakers' ratings of semantic dimensions for respective words for laughing, we found that CV-based words did not always result in higher agreement between English and Japanese speakers than CVCV-based words. Although some trends were consistent with the more iconic status of CV-words suggested by Hamano (1998) (e.g., a slightly higher correlation for CV-words for laughing than for CVCV-words, and slightly more dimensions where correlations were significant), the findings were not conclusive.

English speakers attributed similar meanings to mimetic words for laughing with regard to a number of semantic dimensions which were strongly correlated between the two languages. However, there were also two semantic dimensions for which English and Japanese speakers' sense was opposite: Beautiful-Voice and Graceful. These findings reflect Iwasaki et al.'s (2005) observation concerning sound mimetic words: English and Japanese speakers' ratings were correlated for many semantic dimensions, but not for evaluative dimensions such as beauty or pleasantness. It appears that the beauty of linguistic sounds is different in different linguistic communities.

In particular, the Japanese speakers' association between the vowel /e/ and vulgar laughing (tending toward low ratings on a substantial number of scales like Beautiful-Voice, Feminine, Formal Good, Graceful, Nice and Pleasant) appears to be specific to Japanese language and culture. This is in appar-

ent contradiction to the claim by Tamori and Schourup（1999）that /e/ is also related to vulgar and negative referents in English, because such a clear pattern was not observed for ratings by English speakers who tended instead to give lower ratings to words including /u/. Likewise, Japanese speakers ' association of the vowel /u/ to Beautiful-Voice, Graceful and Formal laughter also appears to be language-specific. Other language-specific associations for mimetic words of laughing found in the current study were found in the effect of /Q/ and presence/absence of such consonants as /h/ and /k/ at the beginning of words. Only Japanese speakers associated words that contained /Q/ as less Continuous and words that started with vowels as more Beautiful-Voice, Feminine and Formal. However, it should be underscored that there are also overwhelming commonalities in English and Japanese speakers ' associations of /a/ to many other semantic dimensions（Amused, Cheerful, Energetic, Excited, Good, Loud, Nice, Pleasant-Voice, Resonant-Voice and Mouth-Wide-Open）.

With regard to mimetic words for walking, there was hardly any sound symbolism in common across English and Japanese speakers. Only for two semantic dimensions, Hard-Sole and Wet-Surface, were similar ratings observed between English and Japanese speakers. English and Japanese speakers ' ratings for *-ura* also differed greatly. Despite the lack of common sound symbolism across the two groups, data for Japanese speakers show that there exist robust language-specific sound-meaning associations in Japanese speakers ' minds regarding both different vowels and voiced/voiceless contrasts of consonants. Japanese speakers rated words containing /a/ as the most Graceful and High-Self-Image and words containing /o/ as the least Graceful and High-Self-Image. They associated voiced/voiceless contrasts of consonants with a number of semantic dimensions, by attributing Big-Stride and Noisy to voiced consonants and Even-Paced, Feminine, Formal, Good, Graceful and High-Self-Image to voiceless consonants.

6. Conclusions and pedagogical implications

The current study confirmed the existence of sound symbolism in Japanese mimetic words to which both English and Japanese speakers are sensitive, and that such sound symbolism is far more evident for mimetic words for laughing that primarily mimic the human voice than for mimetic words for walking that primarily mimic the（visual）manners of walking. This study also revealed aspects of sound symbolism common across English and Japanese speakers and aspects that are specific to Japanese. The greatest commonalities were found in vowel-meaning associations among the mimetic words for laughing except for an important difference regarding /e/, whose association to vulgarity is believed to be specific to the Japanese language. English speakers learning JSL must learn the meaning associated with /e/ to develop reading and listening comprehension of the nuances of different types of mimetic words

for laughter.

Commonalities were not found in associations of voiced/voiceless contrasts of consonants to meanings among the mimetic words for walking. This is another area where JSL learners (whose first language is English) may benefit greatly from formal instruction; however, the exact nature of effective instruction needs to be clarified in future research focusing on JSL learners' acquisition of mimetic words. Such questions as to how JSL learners of different proficiency levels and from different first language backgrounds comprehend the meaning of mimetic words or produce Japanese mimetic words need to be investigated in the future.

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Appendix A

Definitions of mimetic words of laughing from Kakehi et al. (1996)

1	*ahaha*	The **sound** of loud laughter.
2	*hahaha*	The **sound** of cheerful laughter.
3	*haQhaQ*	The **sound** of short burst of laughter, often indicating confidence or pride.
4	*ehehe*	The **sound** of soft laughter (usually embarrassed or lascivious laughter).
5	*hehehe*	The **sound** of subdued laughter, often made to cover embarrassment, an error, etc.
6	*heQheQheQ*	The **sound** of subdued laughter connoting lewd or obscene thoughts.
7	*hihihi*	The **sound** of weird, uncanny laughter.
8	*waQhaQha*	The **sound** of loud, unrestrained laughter.
9	*kera-kera*	The **sound** of high-pitched, unrestrained laughter.
10	*gera-gera*	The **sound** of noisy laughter.
11	*keta-keta*	The **sound** of loud, unrestrained laughter.
12	*keQkeQke*	The **sound** of peculiar laughter.
13	*geta-geta*	The **sound** of loud, uncouth and unrestrained laughter.
14	*kyaQkyaQ*	The **sound** of repeated short screaming or excited, high-pitched laughing **sound**s, such as those made by young children.
15	*ohohoho*	The **sound** of suppressed laughter.
16	*uhuhu*	The **sound** of laughing, or chuckling to oneself softly.
17	*huhuQ*	The **sound** of light laughter.
18	*puQ*	The **sound** made when air escapes suddenly from between the lips, as when stifling laughter.
19	*huhuhu*	The **sound** of light laughter.
20	*uhuQ*	The **sound** of laughing, or chuckling to oneself briefly and softly.
21	*kusu-kusu*	The **manner** of laughing to oneself.
22	*kusuQ*	The **manner** of laughing once in embarrassment.
23	*kara-kara*	The **manner** of laughing loudly but without malice.
24	*koro-koro*	The merry laughter of a child or young girl.

Notes: The Romanization adopted in Appendix A and B follows Hamano (1998) and thus is different from Kakehi et al. (1996). Bold face indicates a greater association with either sound or manner.

Appendix B

Definitions of mimetic words for walking from Kakehi et al.（1996）

1	*syanari-syanari*	The **manner** of walking with an affected gait.
2	*suta-suta*	The **manner** of walking briskly and purposefully.
3	*taQtaQ*（*to*）	The **manner** of walking or running with quick steps.
4	*tuka-tuka*	The **manner** of walking towards someone briskly and with determination.
5	*toko-toko*	The **manner** of walking, trotting, etc., with quick, short steps.
6	*tobo-tobo*	The **manner** of walking wearily.
7	*teku-teku*	The **manner** of walking steadily for a considerable distance.
8	*yoro-yoro*	The **manner** of walking or moving unsteadily
9	*yota-yota*	The **manner** of walking with heavy, faltering steps.
10	*noQsi-noQsi*	The **manner** of walking heavily.
11	*Bura-bura*	The **manner** of walking around leisurely.
12	*tyoko-tyoko*	The **manner** of moving about with short, rapid, movements. This form sometimes connotes restlessness and nervousness.
13	*Noso-noso*	The **manner** of moving slowing and lethargically.
14	*urotyoro*	The **manner** of moving about restlessly and without aim, and often as bothersome.
15	*uro-uro*	The **manner** of moving about aimlessly.
16	*hura-hura*	The **manner** of swaying gently or moving from side to side unsteadily or rising into the sky without much propulsive force.
17	*hyoko-hyoko*	The **manner** of doing something with short and irregular or unsteady movements, often implying a sense of precariousness or danger.
18	*yoti-yoti*	The **manner** of moving with unsteady, often short, steps（especially of children）.
19	*sorori-sorori*	The **manner** of moving slowly.
20	*zoro-zoro*	The **manner** in which a number of（usually living）things follow one after another or gather together.
21	*dosi-dosi*	A **sound** of a large person or animal walking or stamping heavily; the sound made when a think, heavy, and relatively soft object strikes or is struck by something.
22	*dosin-dosin*	Loud, resonant **sound**s as of a very large person or animal walking or stamping heavily.
23	*bata-bata*	The pattering **sound** of quick footsteps.
24	*katu-katu*	The **sound** of heels striking a hard floor.
25	*kotu-kotu*	A repeated rapping or tapping **sound**, such as that made by hard-soled shoes.
26	*dosun-dosun*	A loud resonant **sound** made by a heavy object repeatedly falling or striking something with great force.
27	*dota-bata*	A noisy **sound** made by someone coming, going, or moving about boisterously and quickly.
28	*peta-peta*	A light pattering, often wet **sound** made when two flat surfaces come in contact.