

The sound symbolic nature of Japanese maid names*

Kazuko Shinohara

k-shino@cc.tuat.ac.jp

Tokyo University of Agriculture and Technology

&

Shigeto Kawahara

kawahara@rci.rutgers.edu

Rutgers University

Abstract

This paper presents a case study of sound symbolism in personal names. Previous studies found that obstruents appear more often in male names than in female names in English (Cassidy et al., 1999; Kawahara, 2012; Slater and Feinman, 1985) and in Japanese (Uemura, 1965). We tested whether this sort of sound symbolism in personal names holds for the names of Japanese maids who are working at maid cafe (“maido kissa”) in Akihabara (Tokyo, Japan). Two experiments show that obstruents are associated with tsun-type maids, whereas sonorants are associated with moe-type maids. The results show that particular sounds in personal names can convey particular images of those people (Perfors, 2004). Moreover, the identified sound symbolic relationships exemplify cases of emergent sound symbolic relationships, not based on conventionalized rules, as the notion of “tsun” and “moe” are new notions.

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1 Introduction

1.1 Synopsis

This study is a confluence of two lines of our research in the past few years. One is a study of sound symbolism, relations between particular sounds and meanings (Hinton et al. 1994, among many others; Kawahara et al. 2008; Kawahara 2012; Kawahara and Shinohara 2012; Shinohara et al. 2007; Shinohara and Uno to appear; Shinohara and Kawahara to appear). The other (Kawahara, 2013) is a linguistic study of “maid culture” developing in and near Akihabara (Tokyo, Japan) (Takatora, 2012). Our intention here is to show that there is a sound symbolic relationship between particular sounds in maid names and particular types of maids. Two experiments reported in this paper show that the use of particular sounds can convey particular images of that person (Perfors 2004; see also Klink 2000; Yorkston and Menon 2004). Furthermore, as we claimed in some of our previous papers (Kawahara et al., 2008; Shinohara et al., 2007; Shinohara and Kawahara, to appear), sound symbolism may have a bodily—or at least phonetic—basis (Johnson, 1987; Lakoff and Johnson, 1980) in natural languages. In particular, the sound-meaning relationship we identify in this paper may be best understood as being modulated via projections of acoustical characteristics of sounds onto visual domains (Köhler, 1929/1947).

1.2 Background: Corpus studies of Japanese names

Our project started as a case study of sound symbolic patterns in personal names, which have been studied in a number of linguistic and psychological studies (Brown and Ford 1961; Cassidy et al. 1999; Cutler et al. 1990; Kawahara 2012; Slater and Feinman 1985; Tessier 2010; Whissell 2001; Wright and Hay 2002; Wright et al. 2005; see also Berlin 2006 for sound symbolic patterns in animal nomenclature). These studies have identified several phonological generalizations that are specific to male names and those that are specific to female names (although most or all of these generalizations are stochastic tendencies, rather than categorical restrictions).

Among those, we were particularly interested in one statistical tendency; namely, in English, obstruents (oral stops, affricates, fricatives) are more likely to appear in male names than in female names, and sonorants (nasals, liquids, glides) are more likely to appear in female names than in male names (e.g. *Eric* vs. *Erin*) (Cassidy et al., 1999; Slater and Feinman, 1985).¹ Kawahara (2012) confirmed the productivity of these associations in English with a judgement study using resynthesized CVCV nonce words as auditory stimuli. Uemura (1965) identified the same generalizations regarding Japanese per-

¹To briefly summarize other findings about English names: (i) male names are more likely to receive initial stress than female names; e.g. *Dániel* vs. *Daniélla* (95% initial stress for male names and 75% initial stress for female names in Cutler et al. 1990); (ii) male names are shorter (2.1 syllables for males v.s. 2.4 syllables for females in Wright et al. 2005), and less likely to be abbreviated; (iii) female names are more likely to contain long vowels and diphthongs; e.g. *Grace*, *Jane*; (iv) female names are more likely to have stressed [i]; e.g. *Nína*, *Tína* (about 15% for female names and 5% for male names in Cutler et al. 1990); (v) male names are less likely to end with a vowel (e.g. *Tina* vs. *Tim*; *Ted* vs. *Mel*).

sonal names. Finally, cross-linguistically, less sonorous consonants are more likely to appear initially in the word indicating a male parent (e.g. *father*) than in the word indicating a female parent (e.g. *mother*) (Murdock, 1959). Given these sound symbolic associations—one between sonorants and females and one between obstruents and male names—we started our project by confirming these generalizations in more recent Japanese names.

To this end, we first collected the top 50 most popular names provided online by Yasuda Seimei (accessed November 2011).² The result appears in Table 1, which shows that female names are more likely to contain sonorants (67%) than male names (36%). This difference between male names and female names is statistically significant ($\chi^2(1) = 20.00, p < .001$).

Table 1: Distributions of obstruents and sonorants in Japanese personal names, excluding moraic coda nasals.

Male			Female		
	n	%		n	%
Sonorant	37	35.6	Sonorant	72	67.3
Obstruent	67	64.4	Obstruent	35	32.7
Total	104		Total	107	

We next attempted to test this observation—the correlation between sonorants and female names—in a new domain; a new-developing culture in Japan, namely, *meido kissa* (or “maid cafe”). *Meido kissa* developed starting March 2001, mainly in Akihabara, Tokyo (for thorough documentation of its history and development, see Takatora 2012). In *meido kissa*, in the most prototypical cases, waitresses dress up as “maids” to serve their “masters” (referred to as “*goshujinsama*” for male customers and “*ojoosama*” for female customers). Our initial hypothesis regarding maid names was that since maids are more feminine than non-maid girls, their names—which are not always conventional names—should contain more sonorants than non-maid female names.³ We thus analyzed the list of maid names of @ *hoomu kafe*, retrieved from their website in November 2011.⁴ Excluding kanji-based names, whose readings cannot be unambiguously determined, we obtained 133 names. The analysis showed that 58% of the consonants were sonorants (171/295). The result was thus that maid names do not contain more sonorants than non-maid female names (58% vs. 67%). In fact, maid names were less likely to contain sonorants than non-maid names, although there was no statistical difference between the maid names and the standard

²http://www.meijiyasuda.co.jp/profile/etc/ranking/read_best50/. This database was used because of its accessibility. We hope that a future study will confirm the statistical tendencies found in this database using a larger pool of data of Japanese names. Another interesting project would be a diachronic study which tracks how these generalizations change over time (if they do at all.)

³What we were aiming for, in a sense, was to search for the effect of the emergence of the unmarked (TETU) (McCarthy and Prince, 1994) in novel names which are unaffected by the conventionalized naming rules in Japanese.

⁴<http://www.cafe-at-home.com/maids/>. This *meido kissa* was chosen for the analysis because it is one of the biggest ones, and makes the list of all maids publicly available.

female names ($\chi^2(1) = 2.48, n.s.$)

To understand why maid names did not show the expected patterns—more sonorants than standard names—we conducted fieldwork at several meido kissa places in Akihabara in December 2011. There we learned several interesting conventions regarding how maids choose their names. There are a couple of interesting stories. For example, a few waitresses informed us that it is common to choose maid names after their favorite foods, flowers, or even anime characters, while others come up with their own names. They also told us that the same name cannot be used by more than one maid within the same cafe, so that it is not necessarily the case that new maids can choose their maid name completely at their disposal. Given these restrictions, we decided that a judgment experiment using new nonce names would be a better way to explore possible sound symbolic patterns in maid names.

Among other observations that the informants shared with us, the most important information was that we were wrong in assuming “maids are more feminine than non-maids”. Not every maid intends to be more feminine than normal girls. Instead, roughly, there are two types of maids: “honwaka, moe” (=cute, soft, accessible) type and “tsun-tsun” (=sharp, inaccessible, blunt) type.⁵ We also found that the latter type may be associated with names with obstruents; e.g. *ginko*.

These considerations led us to revise our hypothesis: tsun maids are associated with names with obstruents, while moe maids are associated names with sonorants. The two experiments reported below tested this hypothesis, and the results confirmed that this hypothesis is (at least stochastically) correct.

2 Experiment I

In Experiment I, ten maids working at Akihabara were presented with pairs of non-existing names, one containing only obstruents and the other containing only sonorants. For each pair, they were asked to judge which name represents a moe maid and which name represents a tsun maid.

2.1 Method

The stimuli were ten pairs of trisyllabic CVCVCV non-existing maid names,⁶ each consisting of obstruents and sonorants. Voiced obstruents were not used as they are known to evoke specific types of negative meanings in Japanese (Kawahara et al., 2008; Kubozono, 1999; Tamori, 1991), and voiced obstruents rarely appear in Japanese female names. Vowels were controlled within each pair; e.g. *sataka* vs. *wamana*. The entire stimuli are listed in Table 2.

The task was 2 alternative forced choice (2AFC); for example, given *sataka* and *wamana*, the participants were asked which one represents a tsun name and which one represents a moe name. The test

⁵The definition of moe is very complex. See the wiki article at [http://en.wikipedia.org/wiki/Moe_\(slang\)](http://en.wikipedia.org/wiki/Moe_(slang)).

⁶They were “non-existing” to the best of our knowledge when we designed the experiment. New maid names are created constantly, and we do not deny the possibility that some of our stimuli became or will become real existing maid names.

Table 2: The list of the stimuli.

Obstruent	Sonorant
sataka	wamana
setaka	meyana
sateka	ramena
sotaka	yomana
setoka	reyona
tesoka	meyona
tasoka	wamona
tesuka	reyuna
tosoka	yomona
teseka	merena

was distributed via SurveyMonkey.⁷ In the instructions, they were asked to try not to use an analogy with existing names, but instead use their auditory impression to answer the questions. The main session was preceded by a practice session in which the participants went through two practice questions. The order of the stimuli in the main session was randomized per participant, and the order between the two choices was also randomized. All the stimuli were presented in the *hiragana* orthography. The participants were 10 maids working at Félicie at Akihabara.⁸ They were paid 500 Japanese yen for their time.

2.2 Results and discussion

To analyze the results, for each participant, we calculated $p(c)$, the probability of the obstruent names associated with tsun and the sonorant names associated with moe, for which the chance level is 0.5. The actual mean $p(c)$ is 0.74, which is significantly different from the chance level ($p < .01$, by a Wilcoxon test). Moreover, every one of the maid participants had $p(c)$ higher than 0.5.

We also calculated d' for an 2AFC design,⁹ whose average is 1.15, which is again significantly different from the chance level ($p < .01$ by a Wilcoxon test). Based on these results, we conclude that Japanese maids associate names with obstruents with tsun maids, and names with sonorants with moe maids.

After the experiment, one maid reported to us that [s] sounds tsun, and that [r] sounds moe to her; another one suggested that [s] and [t] sound tsun, whereas [r] sounds moe to her. Some maids thus seem

⁷<http://jp.surveymonkey.com/>

⁸<http://www.felicie-web.com/>

⁹The formula that we used was (Macmillan and Creelman 2005: 167-170):

$$d' = \frac{z(\text{Hit}) - z(\text{FA})}{\sqrt{2}} \quad (1)$$

where *Hit* is the probability of saying tsun-moe to a obstruent-sonorant pair and *FA* (for False Alarm) is the probability of saying tsun-more to a sonorant-obstruent pair. If $d'=0$, it means that the participants were responding randomly.

to have explicit awareness of the sound symbolic relations identified in this experiment.

3 Experiment II

3.1 Method

In a follow-up experiment, we addressed the question of whether non-maids have the same sound symbolic associations. The method was almost identical to that of Experiment I, except that the participants were 87 speakers of Japanese (mainly university students in Japan) who were familiar with the Akihabara culture but nevertheless were not working as maids. The test was distributed online via SurveyMonkey. The participants voluntarily participated in this experiment without any compensation.

3.2 Results and discussion

The result was that the average $p(c)$ is 0.69 ($p < .001$), and the average d' is 0.75 ($p < .001$) (both by a Wilcoxon test). We conclude that even non-maids, as long as they were familiar with the two concepts (tsun and moe), can make proper associations, at least at a level higher than chance.

In general, the two experiments show that sounds in personal names can convey particular images of the people (cf. Perfors 2004 who showed that their names can affect attractiveness of the people; see also Klink 2000 and Yorkston and Menon 2004 who showed that brand names can affect the images of products).

4 General discussion and conclusion

From the two experiments reported above, it seems safe to conclude that obstruents are associated with tsun maids, and sonorants are associated with moe maids. The results first of all add yet another case of sound symbolism to the body of literature on the relationships between sounds and meanings.¹⁰ Moreover, the current example instantiates a case of productive association between sounds and meanings, not based on “conventionalized rules”, as the notions of “tsun” and “moe” are new, emergent notions in the last ten years or so.

Second, we would like to make a few remarks about the phonetic grounding of the sound-symbolic associations identified in the paper. The associations may be related to a well-established sound symbolic relationship between sounds and shapes (Berlin 2006; Köhler 1929/1947; Kawahara and Shinohara 2012; see also Ramachandran and Hubbard 2001) in which obstruents are associated with angular shapes, whereas sonorants are associated with round shapes. Given the two figures in Figure 1 and given two

¹⁰See <https://sites.google.com/site/akitambo/Home/biblio> for rather comprehensive lists of bibliographies on sound symbolism.

nonce words like *maluma* and *takete*, the former word is more likely to be associated with the round shape and the latter word is more likely to be associated with the angular shape (Köhler 1929/1947 *et seq.*).

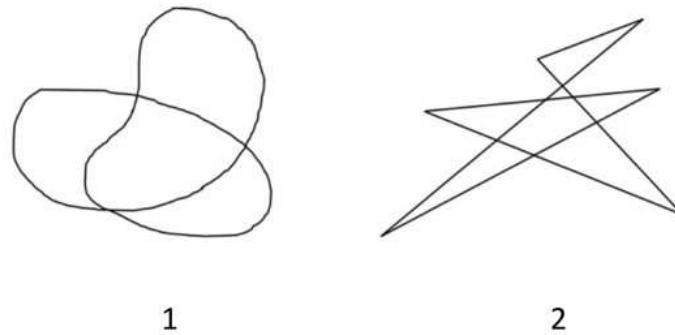


Figure 1: Figures used in Köhler's experiment (1929/1947), reproduced by us in Kawahara and Shinohara (2012). The left figure is usually associated with *maluma*, and the right figure is associated with *takete*.

It then does not come as a surprise that sonorants, which are associated with round shapes, are also associated with *moe*, as *moe* implies “softness” and “accessibility”. It is not surprising either that obstruents are associated with *tsun*, because *tsun* implies, among others, “sharpness” and “inaccessibility”—“*tsun-tsun*” can indeed mean “sharp” and “angular” in Japanese.

We finally note that these associations make acoustic sense. As shown in Figures 2 and 3 (taken from Kawahara and Shinohara 2012), obstruents are characterized by abrupt amplitude changes, whereas sonorants are characterized by gradient amplitude changes. On the waveforms, which track amplitude changes over time, obstruents thus look spiky and angular, whereas sonorants look roundish. These acoustic characteristics may be projected onto angular shapes and round shapes, respectively, which can also in turn be mapped to the notion of *tsun* and the notion of *moe*. If this hypothesis is on the right track, then our study adds to a body of studies suggesting that (at least some) sound symbolic associations are based on acoustics rather than on articulation (Kawahara and Shinohara 2012; Ohala 1983, 1994; see also Berlin 2006; Jakobson 1978; Jespersen 1922/1933 among others). (We do not deny the possibility that there can be an articulatory grounding for the relationship between obstruents and angularity—we are simply unaware of articulatory characteristics of obstruents that can lead to the images of angularity.)

Finally, this idea of acoustically-based sound symbolism reminds us of Jakobson's statement (1978) that acute sounds—those sounds with high frequency energy concentration—are associated with angular shapes and grave sounds—those with low frequency energy concentration—are associated with round shapes (p. 112-113). If this hypothesis is on the right track, then our results predict that front or acute vowels like [i, e] are associated with *tsun* maids and back or grave vowels like [a, o, u] are associated with *moe* maids. This prediction is to be tested in a future study.

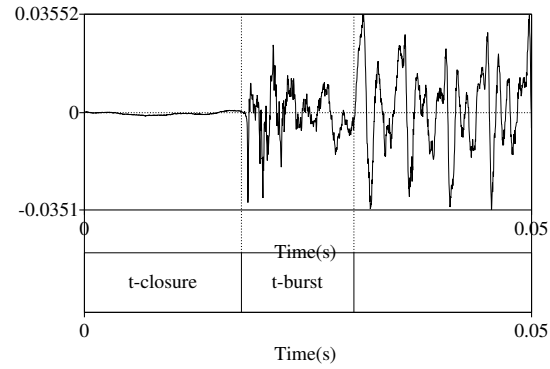


Figure 2: A waveform illustrating a closure phase and a burst of [t]. It shows amplitude changes within a 0.05 sec interval centering around a stop burst, which involves abrupt amplitude changes. The waveform pictures are created using Praat (Boersma and Weenink, 1999–2012). Reproduced from Kawahara and Shinohara (2012).

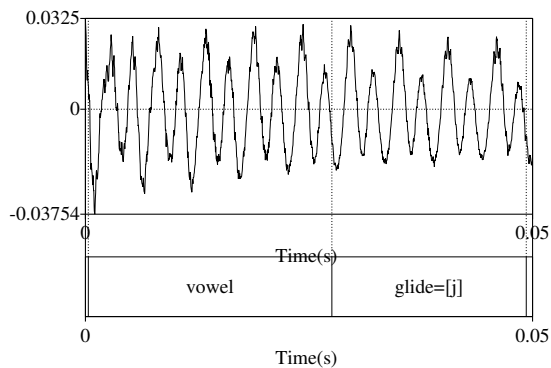
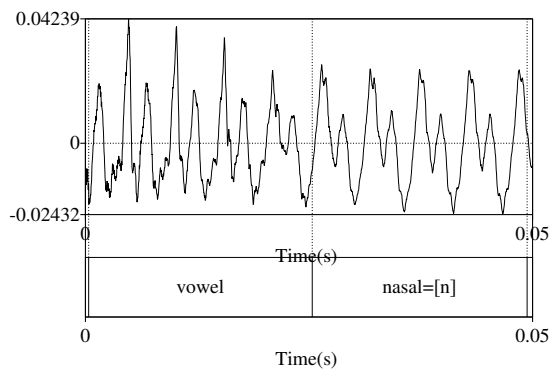


Figure 3: Wave forms of [n] and [j], illustrating 0.05 sec intervals including transitions from the preceding vowels to the sonorants. The consonants themselves involve energies with gradual change. Reproduced from Kawahara and Shinohara (2012).

References

- Berlin, Brent. 2006. The first congress of ethonozoological nomenclature. *Journal of Royal Anthropological Institution* 12: 23–44.
- Boersma, Paul, and David Weenink. 1999–2012. Praat: Doing phonetics by computer. Software.
- Brown, R., and M. Ford. 1961. Address in American English. *Journal of Abnormal and Social Psychology* 62: 375–385.
- Cassidy, Kimberly Wright, Michael H. Kelly, and Lee'at J. Sharoni. 1999. Inferring gender from name phonology. *Journal of Experimental Psychology: General* 128: 362–381.
- Cutler, Anne, James McQueen, and Ken Robinson. 1990. Elizabeth and John: Sound patterns of men's and women's names. *Journal of Linguistics* 26: 471–482.
- Hinton, Leane, Johanna Nichols, and John Ohala. 1994. *Sound symbolism*. Cambridge: Cambridge University Press.
- Jakobson, Roman. 1978. *Six lectures on sound and meaning*. Cambridge: MIT Press.
- Jespersen, Otto. 1922/1933. Symbolic value of the vowel i. In *Phonologica. Selected papers in English, French and German*, Vol. 1, 283–30. Copenhagen: Levin and Munksgaard.
- Johnson, Mark. 1987. *The body in the mind: The bodily basis of meaning, imagination, and reason*. Chicago: University of Chicago Press.
- Kawahara, Shigeto. 2012. Abrupt amplitude changes imply male names: A case of acoustic-based sound symbolism. Ms. Rutgers University (Talk presented at PhonoFesta 7, Shiga).
- Kawahara, Shigeto. 2013. The phonetics of Japanese maid voice I: A preliminary study. *On-in Kenkyuu [Phonological Studies]* 16.
- Kawahara, Shigeto, and Kazuko Shinohara. 2012. A tripartite trans-module relationship between sounds, shapes and emotions: A case of abrupt modulation. In *Proceedings of the 34th annual meeting of the Cognitive Science Society*, eds. Naomi Miyake, David Peebles, and Richard P. Cooper, 569–574. Austin, TX: Cognitive Science Society.
- Kawahara, Shigeto, Kazuko Shinohara, and Yumi Uchimoto. 2008. A positional effect in sound symbolism: An experimental study. In *Proceedings of the Japan Cognitive Linguistics Association* 8, 417–427. Tokyo: JCLA.
- Klink, Richard R. 2000. Creating brand names with meaning: The use of sound symbolism. *Marketing Letters* 11 (1): 5–20.
- Köhler, W. 1929/1947. *Gestalt psychology*. New York: Liveright.
- Kubozono, Haruo. 1999. *Nihongo-no onsei: Gendai gengogaku nyuumon 2 [Japanese phonetics: An introduction to modern linguistics 2]*. Tokyo: Iwanami.
- Lakoff, George, and Mark Johnson. 1980. *Metaphors we live by*. Chicago: Chicago University Press.
- Macmillan, Neil, and Douglas Creelman. 2005. *Detection theory: A user's guide. 2nd edition*. Mahwah: Lawrence Erlbaum Associates Publishers.
- McCarthy, John J., and Alan Prince. 1994. The emergence of the unmarked: Optimality in prosodic morphology. In *Proceedings of the North East Linguistic Society* 24, ed. Merce Gonzalez, 333–379. Amherst, Mass.: GLSA Publications.
- Murdock, George P. 1959. Cross-language parallels in parental kin terms. *Anthropological Linguistics* 1: 1–5.
- Ohala, John J. 1983. The phonological end justifies any means. In *Proceedings of the 13th International Congress of Linguists*, eds. S. Hattori and K. Inoue, 232–243. Tokyo: Sanseido.
- Ohala, John J. 1994. The frequency code underlies the sound symbolic use of voice pitch. In *Sound*

- symbolism*, eds. Leane Hinton, Johanna Nichols, and John J. Ohala, 325–347. Cambridge: Cambridge University Press.
- Perfors, Amy. 2004. What's in a name?: The effect of sound symbolism on perception of facial attractiveness. *Proceedings of CogSci 2004*.
- Ramachandran, V. S., and E. M. Hubbard. 2001. Synesthesia—a window into perception, thought, and language. *Journal of Consciousness Studies* 8 (12): 3–34.
- Shinohara, Kazuko, and Shigeto Kawahara. to appear. A cross-linguistic study of sound symbolism: The images of size. In *Proceedings of Berkeley Linguistic Society 36*. Berkeley: Berkeley Linguistics Society.
- Shinohara, Kazuko, and Ryoko Uno, eds. to appear. *Chikazuku oto-to imi: Onomatope kenkyuu-no shatei*. Tokyo: Hitsuji Shobo.
- Shinohara, Kazuko, Shigeto Kawahara, Akira Nakayama, and Yoshihiro Matsunaka. 2007. Onshoochoo to sintaisei [Sound symbolism and embodiment]. In *Kotoba to ningen [Languages and human]: Journal of human linguistic circle 6*, ed. Y. Fujii, 1–12.
- Slater, Anne Saxon, and Saul Feinman. 1985. Gender and the phonology of North American first names. *Sex Roles* 13: 429–440.
- Takatora. 2012. Meido Kissa-no Deeta Bukku vol. 0.
- Tamori, Ikuhiro. 1991. *Nihongo onomatope-no kenkyuu [A research on Japanese onomatopoetic words]*. Kobe: Kobe Shoka Daigaku Keizai Kenkyuujo.
- Tessier, Anne-Michelle. 2010. Short, but not sweet: Markedness preferences and reversals in English hypocoristics. A talk presented at ACL-CLA.
- Uemura, Yukio. 1965. Onsei-no hyoushousei-ni tsuite [On the symbolic aspects of sounds]. In *Gengo seikatsu*, 66–70. Tokyo: Honami Shuppan.
- Whissell, Cynthia. 2001. Cues to referent gender in randomly constructed names. *Perceptual and Motor Skills* 93: 856–858.
- Wright, Sandra, and Jennifer Hay. 2002. Fred and Trema: A phonological conspiracy. In *Gendered practices in language*, eds. Sarah Benor, Mary Rose, Devyani Sharma, Julie Sweetland, and Qing Zhang, 175–191. CSLI Publications.
- Wright, Sandra, Jennifer Hay, and Bent Tessa. 2005. Ladies first? phonology, frequency, and the naming conspiracy. *Linguistics* 43 (3): 531–561.
- Yorkston, Eric, and Geeta Menon. 2004. A sound idea: Phonetic effects of brand names on consumer judgments. *Journal of Consumer Research* 31: 43–51.

<要旨>

日本語のメイド名にみられる音象徴

篠原和子（東京農工大学）・川原繁人（ラトガーズ大学）

本研究は、人の名前にみられる音象徴現象のケーススタディーである。これまでの音象徴研究では、子音のうち阻害音は「硬い・尖った・直線的」なイメージを喚起し、共鳴音は「柔らかい・丸い・曲線的」なイメージを喚起すると言われてきた。また、英語においても日本語においても、阻害音は男性の名前に多く見られ、共鳴音は女性の名前に多くみられる、という報告がされている。本研究はこれらの知見をふまえ、阻害音・共鳴音の違いが、人のパーソナリティについても特定の異なるイメージを喚起するかどうかを調べた。具体的には、2001年以来東京の秋葉原に出現した「メイド喫茶」で働く女性メイドの名前を取り上げ、「ツン系」（ストレート、機嫌が悪そう、近づきにくい）と「萌え系」（可愛い、優しそう、近づきやすい）というイメージに関して、上記のような音象徴現象がみられるかどうかを、2つの実験を通して検証した。実験1では、実際にメイド喫茶で働く女性を被験者とし、無意味語のメイド名10組（子音が阻害音のみの名前と共鳴音のみの名前のペア、母音は共通とした）について、どちらが「ツン系」、「萌え系」のメイド名に聞こえるかを、強制選択形式の設問により回答してもらった。実験2では、都内の大学生で秋葉原のメイド文化を知っている日本語話者を被験者として同様の実験を行った。2つの実験ともに、阻害音からなる名前は「ツン系」、共鳴音からなる名前は「萌え系」とする回答が有意に多かった。この結果から、阻害音・共鳴音が喚起する音象徴的イメージは、五感に基づく知覚的イメージに留まらず、人のパーソナリティについても生じることが示された。さらに、このような音象徴的イメージ喚起がどのような動機づけによるものか、という点について、本研究は音響音声学的側面から説明が可能であることを論じた。