

Language Symposium

ICCS 7@CNCC, Beijing

1:30-3:20pm

08/18/2010

Universality and Language-Specificity of Sound Symbolism

The Interplay of *Multimodality*, *Embodiment*, and *Iconicity*

Sachiko Hirata

Mamiko Arata

Yoko Suzuki

Kimi Akita

<http://www2.kobe-u.ac.jp/~07311061/mimeticclub.html>

Language Section

- Part I (1:30-3:15):
Symposium on Sound Symbolism
- Part II (3:20-3:40):
Individual talk by Dr. D. Lee

5-min
break

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Universality and Language-Specificity of Sound Symbolism

The Interplay
of
Multimodality, Embodiment, and Iconicity

Introduction

- Purpose:
To have a better understanding of the basic characteristics of sound symbolism.
- Speakers: **FRESH & YOUNG!!**
2 cognitive psychologists (Mamiko + Sachiko)
+ 2 cognitive linguists (Yoko + Kimi)

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Agenda

- | | | |
|----------------|--------|-------|
| • Introduction | 10 | 1:30 |
| • Talks | 4 × 15 | 1:40 |
| Break | 5 | 2:40 |
| • Summary | 10 | 2:45 |
| • Discussion | 20 | 2:55 |
| total: 105 min | | ~3:15 |

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Background

- Linguistic signs = arbitrary (de Saussure 1916)

e.g., tree, Baum, arbre, ki, mù, namu, etc.



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Background (cont.)

- Sound symbolism:

- mal > mil (Sapir 1929)

- maluma vs. takete (Köhler 1929/47)



- -ash, sl-, gl- (phonesthemes; Firth 1930)

(see also Plato's *Cratylus*; Jespersen 1922; Nuckolls 1999) ⁵

Background (cont.)

- **Mimetics** (ideophones, sound-symbolic words):

A formally marked word class with distinct vividness and SS.

e.g., **bowwow** (cry), **ticktack** (noise) → **onomatopoeia**
zigzag (shape), zarari 'rough' (touch),
wakuwaku 'excited' (emotion)

- Rich in Basque, Cantonese, Japanese, Korean, Semai, Zulu, etc.
(Hinton et al. 1994; Voeltz & Kilian-Hatz 2001)

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Background (cont.)

- Recent revival:

- boubā vs. kiki (Ramachandran & Hubbard 2001)
- SS in language evolution (M. Imai, etc.)
- Ideophones & Sound Symbolism@Max Planck
- Iconicity in Language & Literature@UAMS/Zurich
- SS workshop@Emory U (2010)
- Applied to sports, medical science, naming, etc.
- This symposium + workshop@JCSS 27 (Sept 2010)

Background (cont.)

- Problem:

{ SS → psychology, etc.
Mim → linguistics, etc.

- Our symposium:

Interaction b/w linguistics & psychology

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Key concepts

- **Multimodality/crossmodality:**
Involvement of more than one sensory modality
(e.g., audition-vision-touch)
- **Embodiment:**
Bodily/experiential basis
- **Iconicity:**
Non-arbitrary, motivated form-meaning relationship
(e.g., sound)

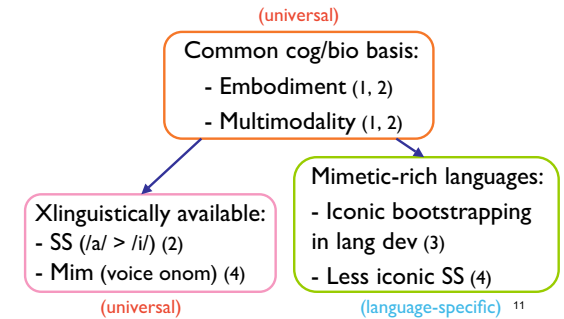
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Talks

- 1 (Sachiko): Cognitive basis of SS
- 2 (Mamiko): SS of touch/vision + its bio basis
- 3 (Yoko): SS/mim in LI acquisition
- 4 (Kimi): Lexical status of SS/mim

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Conclusions to be reached




Let's get started!

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References

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- Firth, J. R. 1930. *Speech*. London: Benn's Sixpenny Library.
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- Nuckolls, J. B. 1999. The case for sound symbolism. *Annual Review of Anthropology* 28: 225-252.
- Ramachandran, V. S. & E. M. Hubbard. 2001. Synaesthesia: A window into perception, thought and language. *J Consciousness Studies* 8, 12: 3-34.
- Sapir, E. 1929. A study of phonetic symbolism. *J Experimental Psychology* 12: 225-239.
- Voeltz, F. K. E. & C. Kilian-Hatz. 2001. *Ideophones*. Amsterdam/Philadelphia: John Benjamins.

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Parallel relationship between sound symbolism and cross-modal correspondence

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Contents

- Sound symbolism
- Cross-modal correspondence
- Similarity between sound symbolism and cross-modal correspondence
- Experiment
- Conclusion


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Sound Symbolism

- non-arbitrary relationships between phonetic features and some images



maluma



takete

(Köhler, 1929/1947)

- bouba-kiki effect (Ramachandran & Hubbard, 2001)

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Sound symbolism in Japanese

- Amemiya & Mizutani (2006) with questionnaire

Voiced consonants

/b/ /d/ /g/ /z/

➡ darkness

Voiceless consonants

/p/ /t/ /k/ /s/


➡ brightness

- mechanism of sound symbolism?

4


Cross-modal Correspondence


- correspondent relationships among the stimuli belong to the different sensory modalities



&

Match!





&

- Be able to test with experimental paradigm called Garner's speeded classification

5

Similarity between sound symbolism & cross-modal correspondence

- Sound symbolism

Phonetic features

/p/ /z/ /r/ /g/
/b/ /s/ /t/ /k/
/m/

&

Stimuli belong to other modalities

- Cross-modal correspondence

Auditory stimuli

High pitch tone
Low pitch tone

&

Stimuli belong to other modalities

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Experiment :method

- discrimination task
- brightness discrimination (black / white)
- letter discrimination (voiced / voiceless consonants)

congruent pairs

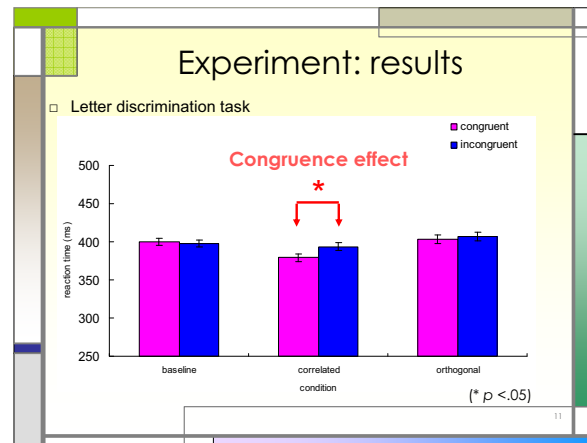
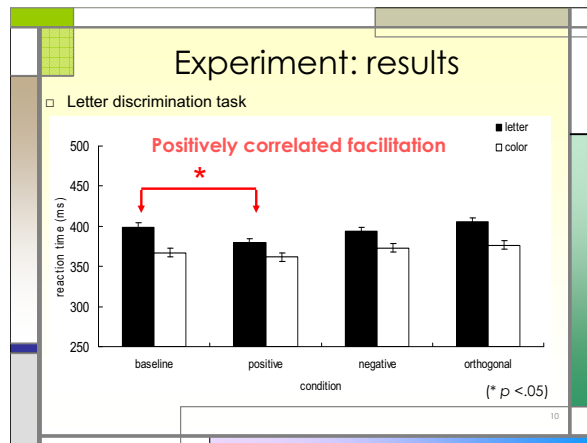
incongruent pairs

Experiment: conditions

- baseline - only task relevant feature changes randomly
- correlated variation - congruent or incongruent pairs
- orthogonal variation - all features changes randomly

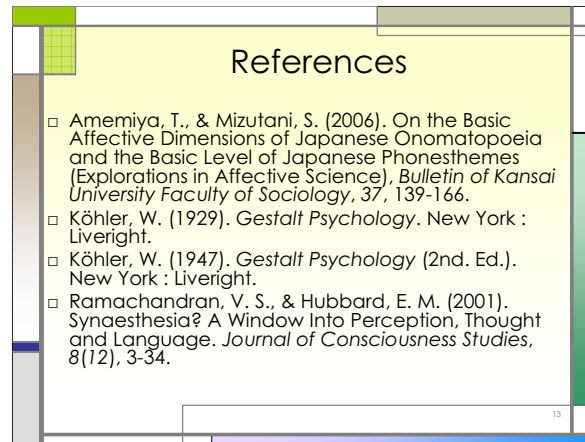
Experiment : indicators

- Congruence effect
- Positively correlated facilitation
- Negatively correlated interference



Conclusion

- Results: there are cross-modal correspondences between two types of consonants and brightness.
- Sound symbolism as a part of cross-modal correspondence? **-embodied aspect of sound symbolism?**



References

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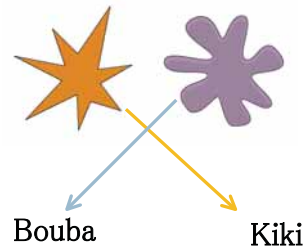
Sound Symbolism on Touch(+α)

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Shape-Sound Correspondence

- Ramachandran & Hubbard (2001), Maurer et al(2006)



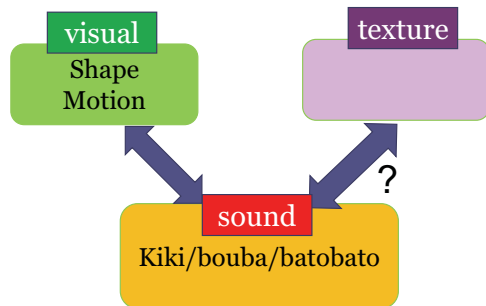
Motion-Sound Correspondence

- Imai et al (2008), Kita et al(in press)



Bato-Bato
(novel mimetic word)

Meaning-Sound Correspondence



Research Question

Is there also texture-sound correspondence?

Participants

- 5 groups
- Japanese speaking adults (n=20, Female=10, Male=10, mean=22.1years, range=19-27years)
- Japanese speaking 2 years old (n=20, Female=10, Male=10, mean=26.1month, range=24-29month)
- Japanese speaking 3 years old (n=22, Female=13, Male=9, mean=42.4month, range=36-47month)
- Japanese speaking 5 years old (n=24, Female=14, Male=10, mean=65month, range=60-71month)
- English speaking adults (n= 19, Female=10, Male=9, mean=19years, range=18-21years)

Stimuli

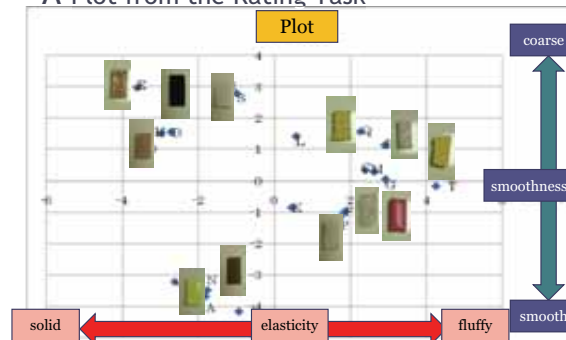
<The Rating Task>

- Rating the texture of each material about 7 items (hardness/smoothness/lightness/regularity/elasticity/intensity/distastefulness) with a scale from 1 to 7.



Stimuli

A Plot from the Rating Task



Stimuli

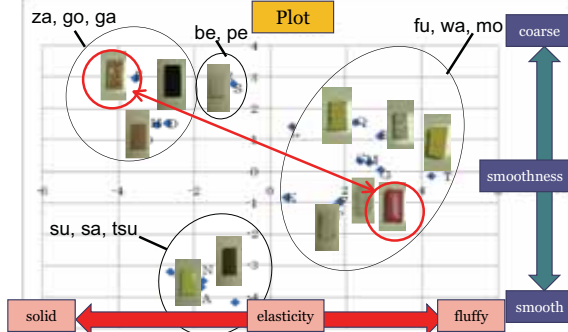
<The Production Task>

- Producing conventional Japanese mimetic words which participants think effectual to the texture of each material.



Stimuli

A Plot from the Rating and Production Task



Stimuli

The names of stimuli are composed of CVCV.

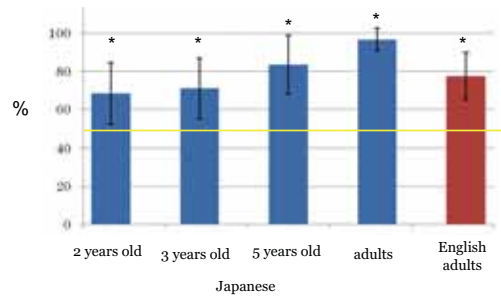


Procedure

- Participants touched two blocks and were presented a novel word. Then, they were asked to choose the one that was labeled by the word.
 - e.g. "Which one is TUPI?"



Result



Summary

- Even 2-year-olds (mean; 26.1 month) and English speaking adults sense texture-sound matching in the same way.

⇒ There is a common sensitivity to sound symbolism not only visual domain, but also **touch domain**

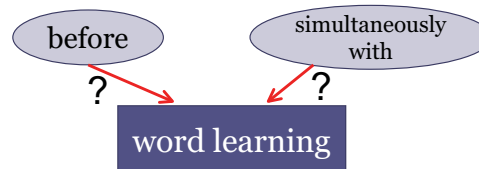
- When do children start to sense sound symbolism?

Previous Studies

- The Sensitivity to Sound Symbolism
 - Imai et al(2008), Sound-motion, 25month
 - Maurer et al(2006), Sound-shape, 29month
 - Tactile study (2010), Sound-tactile, 26month
 - Word Learning
 - Imai et al(2008)
 - Sound symbolism promotes novel word learning for 3 year olds children.
- ⇒ 3 years olds use sound symbolism as the key for word learning.

Research Question

- Do they have already sensed sound symbolism, or learn sound symbolism simultaneously with the word learning?







Participants/System/Stimuli

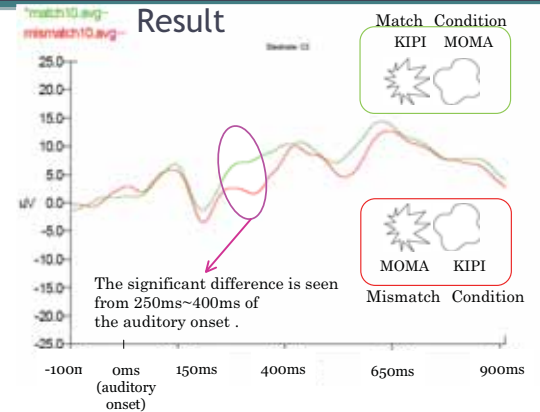
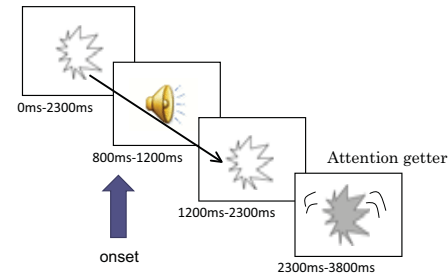
- Subjects:** Japanese-speaking infants (N=10, range=11-12 month, mean month=11.7)
- System:** Electrode arrangement (based on the 10-20 system, 13 electrodes)
- Stimuli:** 20 spiky figures / 20 round figures / "KIPI"/"MOMA"



Condition

| match | mismatch | match | mismatch |
|---|---|---|---|
|  |  |  |  |
| KIPI | MOMA | MOMA | KIPI |
| 4otrials | 4otrials | 4otrials | 4otrials |

Procedure



Summary

- 12 month pre-semantic infants perceptually distinguish sound symbolically match and mismatch of shape-sound correspondence.
- They've already sensed sound symbolism **before word learning**.

Sensitivity to Sound Symbolism

- Sensitivity to sound symbolism is
 - found in multiple sensory domain (shape/motion/tactile)
- ⇒**Multi-modal?**
 - biologically based
- ⇒**Universal?**
- Sensitivity to sound symbolism
- ⇒innate capacity?

Collaborators

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(Department of Engineering, Tamagawa University)

Guillaume Thierry
(School of Psychology, Bangor University)

Mutsumi Imai
(Faculty of Environment and Information Studies, Keio University)

Thank you!

Mimetics and verb learning: A discourse analysis of verbs introduced with mimetic verbs

Yoko SUZUKI
University of Tokyo, JSPS

1. Introduction (1/3)

- Sound symbolism in Japanese L1 acquisition
- How do caregivers introduce mimetic verbs to their children?
- In what kind of linguistic context are mimetic verbs available to children?
 - child-parent discourse, interaction
 - CDS (child-directed speech)/ motherese/ baby talk

1. Introduction (2/3)

- Japanese children love mimetic words!
 - Mimetic nouns and verbs are widely and frequently found in Japanese CDS (Murase,1998; Murata, 1960).
 - (e.g., *wanwan* for 'dog';
poi (mim) -*suru* (do) for 'throw (something) away')
 - Children's first verbs include many of such mimetic verbs (Yamashita, 1995).

1. Introduction (3/3)

- Why are mimetic verbs easily learned?

| | Mimetic verbs (e.g., <i>pyonpyon-suru</i> 'jump') | General verbs (e.g., <i>tobu</i> 'jump') |
|----------------------------------|--|---|
| Phonology | repetitive patterns auditory preference | no such patterns |
| Form – Meaning correspondence | not arbitrary (iconic) | arbitrary |
| Inflectional morphology | simple | complex |
| Distribution in CDS | more frequent | less frequent |

2. Previous studies (1/2)

- Imai, Kita, Nagumo & Okada (2008)
 - Novel mimetic verbs are better learned than novel verbs with no sound symbolic properties.
 - Young children are sensitive to sound symbolism in the domain of motion and use it for the inference of novel verb meanings.

2. Previous studies (2/2)

- This supports
Sound Symbolism Bootstrapping Hypothesis;
sound symbolism helps children learn action words
- Then,
- In what linguistic context are mimetic verbs introduced by caregivers?
 - Lack of study on actual discourse and interaction

3. Data

- Ishii data (Ishii, 1999);
longitudinal data of spontaneous speech available on CHILDES (MacWhinney, 2000)
 - Target child: A boy named Jun (0;08.00 – 3;08.16)
 - Length: 40.25 hours (recorded twice a month)
 - Only data equipped with audio and video
 - Target words: Caregivers' use of mimetic verbs (mimetics + generic verb *suru* 'do')

4. Results (1/7)

- Paraphrasing
 - Caregivers replace general verbs with mimetic verbs when children don't seem to understand the meaning of the general verbs.
 - Caregivers also replace mimetic verbs with general verbs.

4. Results (2/7)

- *jabujabu-suru* and *oyogu* for 'swim'
- (1) Ishii 2;02.20
- *FAT: Junkun mo oyogu ka ? 1
- *CHI: n ? 2
- *FAT: Junkun mo jabujabu suru ka ? 3

4. Results (3/7)

- *biibii-suru* and *yaburu* for 'tear (something)'

(2) Ishii 2;00.23

→*FAT: hora xxx mata biibii shita naa . 1
 →*FAT: yabutta naa . 2

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4. Results (4/7)

- Characteristics of paraphrasing
 - Mimetic verbs are paraphrased
 - (i) in the immediate contexts
 - (ii) in the same construction (verb form)

How often are mimetic verbs paraphrased (within five utterances) in the discourse?

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4. Results (5/7)

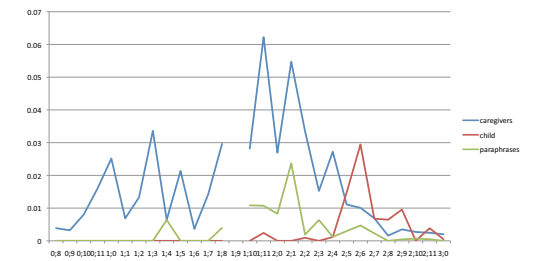


Fig.1. The number of mimetic verbs and paraphrases

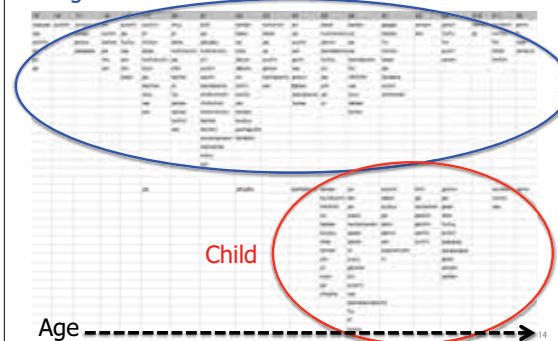
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4. Results (6/7)

- Most of the mimetic verbs the child produced are previously used by his caregivers.

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Caregivers 4. Results (7/7)



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5. Discussion (1/2)

- General verbs are regularly paraphrased by mimetic verbs in the discourse.
- These paraphrases might make it easier for the child to infer the verb meanings and facilitate early verb learning.

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5. Discussion (2/2)

- Children's utterances of mimetic verbs are based on the mimetic verbs frequently used in the CDS.

→ importance of interaction and input

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Thank you!

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References

Imai, M., Kita, S., Nagumo, M., & Okada, H. (2008). Sound symbolism facilitates early verb learning. *Cognition*, 109, 54-65.

Ishii, T. (1999). The JUN Corpus, unpublished.

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The Cognitive Semantics of Onomatopoeia

A Crosslinguistic Perspective
on the Lexical Integration
of Sound Symbolism

Kimi Akita
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I. Introduction (1/1)

- Focus:
Referential possibilities of Onomatopoeic Forms in
Japanese, Korean, Mandarin Chinese, English

→ How is SS integrated into language?

{ *Universal*
Language-specific

1

2. Previous studies

2

2. PSs (1/4)

- J/K: “Many OFs have non-sound meanings, too”
→ Crossmodal extension (Lu 2006; Mikami 2006; Akita 2010ab)
- (1) J:
a. ita-o *baribari* yabur- ‘break a board with a crunch’
b. *baribari* hatarak- ‘work actively’
- (2) K:
a. mul-ul *ttokttok* twutuli- ‘hit tap-tap on a door’
b. *ttokttok* ha- ‘be clever’

3

2. PSs (2/4)

- E: “Many OFs extend to manner-of-speech Vs”
→ Intramodal extension (Inoue 2010)
- (3) a. A wolf *howled* in the woods.
b. The neighbors *howled* “Futz.” (Zwicky 1971: 226)
- C: “Referentially flexible” (Takeda 2001; Lu 2006)
- (4) *dida*:
horse’s trot, human’s tramp, drip, ticktack,
pounding heart, blink, etc.

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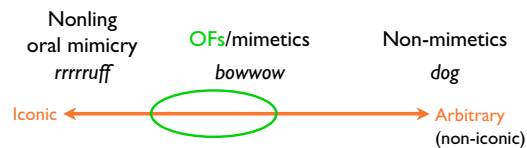
2. PSs (3/4)

- Problem:
Absence of crosslinguistic comparison.
- This study:
An integrated account of these phenomena.

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2. PSs (4/4)

Iconicity Hierarchy:



(Hamano 1998; Akita 2009; cf. Kita 2001) 6

3. Method

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3. M0d (1/3)

- Targets:
OFs for 30 kinds of sounds from the 4 lgs

exx.

- 15: voice { 8: +hum *scream*
 7: -hum *bowwow*

- 15: noise *bang*

(cf. Takeda 2001; Inoue 2010)

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3. M0d (2/3)

• How many $\left\{ \begin{array}{l} \text{Sounds} \\ \text{Non-sounds} \end{array} \right\}$ can they refer to?

Flexibility ↑
Extendability ↓

3. M0d (3/3)

- **Data sources:**
 - J: Kakehi et al. (1996) + introspection
 - K: Aoyama (1991)/HANA (2009) + native consultants
 - C: Noguchi (1995) + native consultant
 - E: OALD (2005) + native consultant
- **Reliability:**
 - Semantic classification by another cog linguist (concordance: 91.7%)₁₀

4. Results

4. Res (1/6)

| | J | K | C | E |
|-------------|---------------------|----------------------|---------------------|---------------------|
| | #Sounds #Non-sounds | #Sounds #Non-sounds | #Sounds #Non-sounds | #Sounds #Non-sounds |
| Voice (hum) | | | | |
| doydoya | 1 0 | swifergwiferg | 1 0 | n/a n/a |
| kerakera | 1 0 | klaklak | 1 0 | haha 1 0 |
| hochoho | 1 0 | sookoksookok | 1 0 | xixi 2 1 |
| gabogabo | 1 0 | wewek | 1 0 | waka 1 0 |
| gongogoyo | 1 0 | wumuwumwul | 1 1 | ijigulu 2 0 |
| gagaya | 1 0 | kokyokoy | 1 0 | asa 1 0 |
| burberi | 1 1 | walawaku | 1 1 | n/a n/a |
| poroporo | 2 0 | cayalcayal | 1 0 | ijihaha 2 0 |
| waswan | 3 0 | merangang | 1 0 | wangwang |
| hahin | 1 0 | hiring | 1 0 | husehuse |
| kaaka | 1 0 | klaklak | 1 0 | yaya 1 0 |
| nyanya | 1 0 | yoangwang | 1 0 | mao 1 0 |
| nyanyan | 1 0 | czyiczzyk | 2 0 | ijihaha 2 0 |
| nyanya | 2 0 | calack | 1 0 | iji 1 0 |
| gaga | 2 0 | kwawakwaw | 2 0 | iji 2 0 |
| Noise | | | | |
| berberi | 1 0 | cawakawak | 1 1 | cia 1 0 |
| dobodobo | 1 0 | chempangchempang | 1 0 | patang 2 0 |
| gongogoyo | 1 0 | nakalnakalnak | 3 0 | pa 2 0 |
| klaklako | 1 0 | suksuksuksuak | 2 0 | cia 1 0 |
| potopota | 1 0 | toletok | 2 1 | dda 2 0 |
| nyanyan | 1 0 | cayiglutacayiglutang | 1 0 | dangdang 2 0 |
| dikoboko | 1 1 | kwangkwang | 1 0 | papapas 1 0 |
| bokoboko | 1 2 | pwukpwukul | 2 1 | gugu 3 0 |
| zykazyka | 1 1 | kwangkwang | 3 0 | dangdang 2 0 |
| popopopo | 1 1 | calangang | 0 0 | pa 2 0 |
| rapurapu | 1 1 | chollong | 1 1 | porongporong 3 0 |
| karikan | 1 2 | stuzakstuzak | 2 1 | kuchukuchi 1 1 |
| salakala | 1 2 | sangang | 1 1 | haha 2 0 |
| burberi | 1 2 | pacipacipak | 2 2 | piasa 2 0 |
| poroporo | 2 4 | swulu | 2 3 | puhulu 3 0 |

4. Res (2/6)

Typical examples:

- (5) Duck's cry (voice):
- | | | | | | |
|---|-------------|---------|--------------------|-------------|---|
| J | gaagaa | #Sounds | 2 (machine) | #Non-sounds | 0 |
| K | kkwaykkwayk | | 2 (shout) | | 0 |
| C | gaga | | 2 (chatter) | | 0 |
| E | quack | | 3 (chatter, radio) | | 0 |

4. Res (3/6)

- (6) Boiling (noise):
- | | | | | |
|---|--------------|-------------------|-------------|--------------------|
| J | bokoboko | 1 | #Non-sounds | 2 (beating, holes) |
| K | pwukulpwukul | 2 (stomach) | | 1 (foam) |
| C | gugu | 3 (hunger, dove) | | 0 |
| E | burble | 3 (chatter, dove) | | 0 |

4. Res (4/6)

- **Flexibility:**
#Sounds = 2+

| | Voice OFs | Noise OFs | Total |
|---|-----------|-----------|----------|
| J | 4 (27%) | 1 (7%) | 5 (17%) |
| K | 2 (13%) | 8 (53%) | 10 (33%) |
| C | 5 (38%) | 11 (73%) | 16 (57%) |
| E | 11 (73%) | 11 (73%) | 22 (73%) |

$\chi^2(3) = 12.65^{**}$ $\chi^2(3) = 17.82^{**}$

4. Res (5/6)

- **Extendability:**

#Non-sounds = 1+

| | Voice OFs | Noise OFs | Total |
|---|-----------|-----------|----------|
| J | 1 (7%) | 9 (60%) | 10 (33%) |
| K | 2 (13%) | 8 (53%) | 10 (33%) |
| C | 1 (8%) | 1 (7%) | 2 (7%) |
| E | 2 (13%) | 3 (20%) | 5 (17%) |

(more) univ $\chi^2(3) = .61, n.s.$ $\chi^2(3) = 13.11^{**}$

4. Res (6/6)

- **Summary:**

| | Voice OFs | | Noise OFs | |
|------|-----------|----|-----------|----|
| | EC | KJ | EC | KJ |
| Flex | ○? | ✖? | ○ | ✖? |
| Ext | ✖ | ✖ | ✖? | ○ |

univ lg-spec neg corre!

5. General discussion

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5. GD (1/3)

- Iconicity:

| | | | |
|------------|-----------|---|-----------|
| | Voice OFs | > | Noise OFs |
| Signifier: | voice | | voice |
| | | | # |
| Signified: | voice | | noise |

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5. GD (2/3)

- Summary on IH:

| | | | | |
|-----------------|--------------------------------------|---|--|--------------------|
| Oral mimicry... | Voice OFs | > | Noise OFs | ...Non-mimetics |
| | EC | | KJ | EC > KJ |
| Flex | ○? | | ✕? | ○ ?✕ |
| Ext | ✕ | | ✕ | ?✕ ○ |
| | quack gaga | | kkwayk gaagaa | burble gugu |
| | | | | pwukul bokaboko |
| | | | | dog |
| | ← Iconic | | → Arbitrary | |
| | Less integrated as "onomatopoeia" | | More integrated as "onomatopoeic words" | |

5. GD (3/3)

- Origin:

- Univ

< Common cog/bio basis (Sachiko + Mamiko)

- Lg-spec

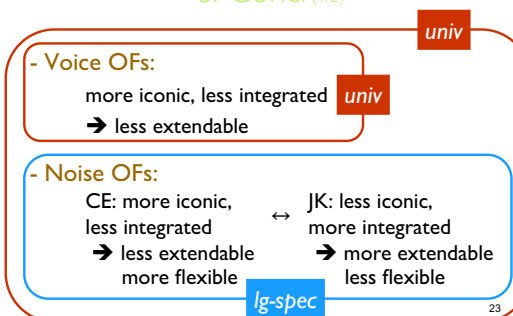
< Typological differences? (Talmy 2000; Akita 2009)
e.g., Richness of a mimetic vocabulary: JK >> CE

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6. Conclusion

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6. Concl (1/2)



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6. Concl (2/2)

- Future directions:

- Other languages

- Parts of speech: V, N > Adv ? (→ E vs. C)

- Acoustic similarity: E > C > K > J ?

(see Bladon 1977; Kato & Matsumoto 1990; Kotani et al. 1993)

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Thank you!

Esp: Iksoo Kwon, Qi Li, Min-Jung Sun, Kohei Suzuki

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Appendices

A

- Cross-animate extension (→Slide 14):

| | Voice OFs | Noise OFs | Total |
|---|-----------|-----------|-----------|
| J | 3 | 0 | 3 (20%) |
| K | 0 | 0 | 0 (0%) |
| C | 2 | 2 | 4 (31%) |
| E | 8 | 7 | 15 (100%) |

lg-spec

(cf. Akita 2010a) 29

B

- [\pm Hum] of Voice OFs (→Slide 16):

| | Flexible | | Extendable | |
|---|----------|---------|------------|--------|
| | +Hum | -Hum | +Hum | -Hum |
| J | 1 (13%) | 3 (43%) | 1 (13%) | 0 (0%) |
| K | 0 (0%) | 2 (29%) | 2 (25%) | 0 (0%) |
| C | 3 (50%) | 2 (29%) | 1 (17%) | 0 (0%) |
| E | 7 (88%) | 4 (57%) | 2 (25%) | 0 (0%) |

animal mimicry

univ

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C

- Correlation b/w #sounds and #non-sounds: (→Slide 17)

| | Voice OFs | | Noise OFs | |
|-----|-----------|-----|-----------|-----|
| | ρ | p | ρ | p |
| J | -.16 | .57 | .48 | .07 |
| K | -.15 | .58 | .11 | .70 |
| C | .37 | .22 | -.37 | .17 |
| E | -.08 | .79 | -.05 | .87 |
| All | -.02 | .90 | -.19 | .14 |

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D

- Syntactic integration (→Slide 20):

OFs are basically realized as adjuncts in J, K, & C, while

In E:

(i) Voice OFs:

▲ A dog {cried *bowwow*?/ *bowwowed*}. (periphery)

(ii) Noise OFs:

A chime {??rang *clang*/ *clanged*}. (core)

(Akita 2009, 2010a)³²

Closing Remark

Universality and Language-Specificity of Sound Symbolism

The Interplay
of
Multimodality, Embodiment, and Iconicity

1

Summary of the talks

1. Sachiko : Cognitive Basis of SS
2. Mamiko : SS of touch/vision + its bio basis
3. Yoko : SS/mim in LI acquisition
4. Kimi : Lexical status of SS/mim

2

Summary of the talks

| | Sachiko | Mamiko | Yoko | Kimi |
|------------------|----------|--------------|---------|----------|
| Field | Psych. | Psych. | Ling. | Ling. |
| Target | Phonemes | CVCV as noun | VN-suru | Mimetics |
| Acquisition | no | yes | yes | no |
| Crosslinguistics | no | yes | yes | yes |

3

Summary of the talks

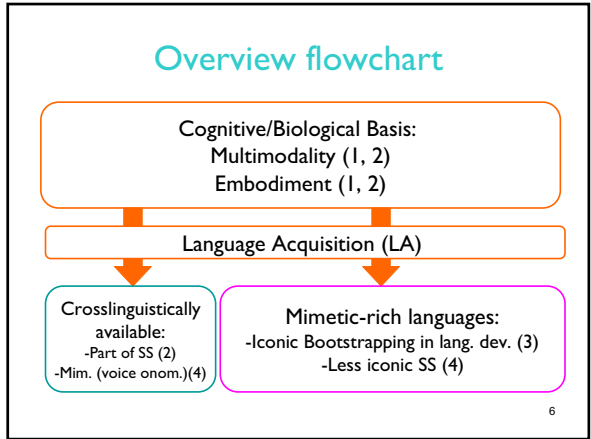
| | Sachiko | Mamiko | Yoko | Kimi |
|---------------|---------|--------|------|--------|
| Multimodality | yes | yes | no | yes/no |
| Embodiment | yes | yes | no | yes |
| Iconicity | no | no | yes | yes |

4

Summary of the talks

| | Sachiko | Mamiko | Yoko | Kimi |
|----------------------|---------------------|-----------------------------|-------------------------------------|------------------------------------|
| Participants | adults | adults/ infants | infants | adults |
| Possible universals | Cognitive basis | Biological basis + touch SS | Sensitivity to SS before lang. acq. | No no-sound meaning for voice mim. |
| Language-Specificity | Phonological system | Details of touch SS | Abundance of mimetics | Semantic extension of noise onom. |

5



Relationship b/w SS/mim and LA

- What language-specific features are relevant to SS?
 - Phonological systems
 - Lexical systems (Abundance of mimetics in each language)
 - mim. rich lang. -> high sensitivity to SS/Mim.
 - mim. poor lang. -> low sensitivity to SS/Mim.
(for its uselessness in such languages)
 - Grammatical systems

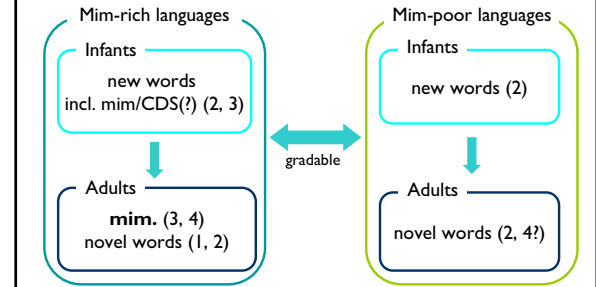
7

Relationship b/w SS/mim and LA

- Factors in activeness of SS in language
 - a. Richness of mimetics
 - b. Establishment of motherese
 - c. Novel word understanding

8

Prospect: sensitivity to SS



9

Discussion

Some suggested open questions

Our studies might or might not say something about the following...

1. Usefulness

- Actual language \neq
experimental,
nonsense,
single sound,
onomatopoeic
child-directed

→ Is SS still useful in language communication?

2. Language acquisition

- How effective is SS bootstrapping in lg acq?
- Does it make lifelong difference?
→ Maybe no.

3. Innateness

- Universal = innate?

4. Language evolution

- Dingdong Theory? (Max Müller)

5. Synesthesia

- SS = a mere subtype of synesthesia?

Thank you!