A cross-linguistic study of sound symbolism: The case of Voicing

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Introduction: Sound symbolism and its bodily basis

Sound-meaning relationships are not necessarily arbitrary:
- High, closed vowels are “smaller” than low, open vowels (Sapir 1929).
- Voiceless stops are associated with sharp, angular objects, whereas sonorants are associated with soft and round objects (Köhler 1929).

Bodily (articulatory) basis of sound symbolism
- The size image correlates with the openness of the mouth (Berliner 2006; Paget 1930).
- Voiceless stops are associated with sharp, angular objects, whereas sonorants are associated with soft and round objects (Köhler 1929).
- If the dirty image associated with voiced obstruents have an articulatory basis, then we can hypothesize that the “dirtiness” image has an articulatory basis.

Voiced obstruents in Japanese are considered to be “dirty”
- Voiceless obstruents (\(\text{b}, \text{d}, \text{g}, \text{z}\)) are called “nasal sounds”.
- Onomatopoeic words (e.g. toko, koro) are associated with soft and round objects.
- A rating experiment shows that the universe of nonce-words (Kawahara, Shinohara, & Uchimoto 2008).

We can hypothesize that the “dirtiness” image has an articulatory basis.
- Vocalizing obstruents is articularly challenging, because speakers have to keep sending air to their close mouth (Ohala 1983). Speakers therefore have to make complex articulatory adjustments (e.g. advancing tongue root, larynx lowering) to make voiced obstruents (Ohala & Bormand 1979).
- In fact, many languages disprefer voiced obstruents (e.g. Hawaiian: Hayes & Steriade 2004).
- The articulatory challenge may be responsible for the dirtiness image.

If the dirty image associated with voiced obstruents have an articulatory basis, then we predict that voicing in obstruents cause dirty images in other languages.

Experiment 1: Rating experiment

Method:
- Stimuli: 20 disyllabic words with voiced obstruents (e.g. \(\text{ka}\)) vs. 20 disyllabic words with voiceless obstruents (e.g. \(\text{ka}\)).
- Task: Rate dirtiness in 1-4 scale.
- Participants: 31 Chinese speakers, 31 English speakers.

Results:
- English speakers (current experiment):
  - 1. Dish: 86%
  - 2. Sponge: 68%
  - 3. Glove: 91%
  - 4. Screen: 91%
  - 5. Sink: 64%
  - 6. Pad: 91%
- Japanese speakers (Kawahara et al. 2008):
  - 1. Dish: 96%
  - 2. Sponge: 76%
  - 3. Glove: 96%
  - 4. Screen: 92%
  - 5. Sink: 94%
  - 6. Pad: 100%

Discussion:
- 1. Chinese and English speakers do associate voiced obstruents with dirty images.
- 2. It is interesting that speakers do not consciously realize this association (unlike in Japanese), but nevertheless show a statistically significant correlation.

Experiment 2: Picture naming experiment

Method (inspired by Köhler 1929):
- Rationale: Do speakers match objects with “appropriate names”?
- Stimuli: 6 pairs of “minimal pair” pictures (the same objects, different states).

Analysis by picture pair:
- Chinese vs. English:
  - Dish: 86%
  - Sponge: 68%
  - Glove: 91%
  - Screen: 91%
  - Sink: 64%
  - Pad: 91%
- English vs. Japanese:
  - Dish: 96%
  - Sponge: 76%
  - Glove: 96%
  - Screen: 92%
  - Sink: 94%
  - Pad: 100%

Conclusion:
- Speakers from all three languages associated dirty pictures with names with voiced obstruents at a more than chance frequency.

Conclusions

Both the rating and picture-naming experiments reveal the association between voiced obstruents and dirty images in all three languages, Chinese, English, and Japanese.

This result is predicted if the sound symbolism has an articulatory basis i.e. speakers from all languages have access to the connection between voicing in obstruents and dirty images, whether consciously or not—the images have a bodily basis which is independent of individual phonology.

We hope that this project stimulates further cross-linguistic studies of sound symbolisms, and investigations on the bodily basis of sound symbolisms.

Further questions: (i) other images related to voicing? (Shinohara & Kawahara in progress), (ii) bodily bases of other sound symbolic patterns?

A larger question: to what extent sound symbolic patterns—and phonological patterns in general—have such articulatory bodily basis?

BIBLIOGRAPHY