Sound Symbolism Observed Through Leipzig-Jakarta Lists of 66 Languages

Ian Joo

National Chiao Tung University

il.y.en.a@outlook.com

Abstract

In order to demonstrate that lexical items in spoken languages favor or disfavor particular sounds for certain meanings, I have gathered and analyzed morphemes from 66 genealogically unrelated languages, representing 100 meanings that are least likely to be represented by loanwords. The results demonstrate that some meanings tend to be represented with certain sounds, including 'small' (sibilants), 'hard' (coronal stops), and 'to blow' (labial stops and rounded vowels). This study is another step towards recognizing that the lexicons of spoken languages, like those of sign languages, are not fully arbitrary connections between form and meaning.

Introduction

Previous studies have shown that some lexical meanings tend to be represented with certain sounds in spoken languages. Words for 'lips' tend to have labial sounds and those for 'nose' nasal sounds (Urban, 2011); Proximal deictic terms tend to have higher vowels than distal deictic terms (Johansson & Zlatev, 2013; Tanz, 1971; Woodworth, 1991); and 1st and 2nd person pronouns prefer nasal sounds (Gordon, 1995; Nichols & Peterson, 1996).

Recently, Blasi *et al.* (2016) have investigated phonosemantic correlations of 100 lexical terms of the Swadesh List (Swadesh, 1971 [2017]). Among the Swadesh List items collected in their database, 40 were represented by 6,447 word lists (representing 4,298 languages), and the remaining 60 by 328 word lists. Based on their results, we see that 30 out of 100 lexical terms show positive or negative correlations with certain phonemes: for example, rounded body parts ('breast' and 'knee') show preference for rounded vowels, which is supported by previous experimental studies that have shown cross-modal correspondence between rounded vowels and roundness (Ozturk *et al*. 2012).

In this study, I extend the findings of Blasi *et al*. (2016) with a different word list: the Leipzig-Jakarta List (Tadmor, 2009). This list contains 100 basic lexical terms, 62 of them overlapping with the Swadesh List items. Unlike the Swadesh List, which Swadesh created based on his intuition, the Leipzig-Jakarta list consists of basic lexical terms that were empirically selected out of a sample of 41 languages based on several factors, one of them being resistance to borrowability (unlikelihood to be represented by loanwords). Using this list has thus three advantages: first, it minimizes the influence of cognates. Secondly, the 62 items shared by the two lists allow us to cross-check and further support Blasi *et al*.'s results. Lastly, the remaining 38 items not present in the Swadesh List provide us new data on lexical iconicity.

Methodology

The Leipzig-Jakarta list minimises the influence of loanwords, but it is also necessary to control for the influence of cognates in related languages. To do so, I selected the largest language (based on the number of native speakers) from a list of the 66 largest language families (based on the number of speakers from Ethonologue (Simons & Fennig, 2017)), excluding pidgins, creoles, mixed languages, unclassified languages, sign languages, and the constructed language Esperanto. Language isolates were treated as a language family with a single language member. An example of the selection procedure is shown below:

(1) Indo-European (the largest language family) → Spanish (the largest Indo-European language)

Sino-Tibetan (the 2nd largest language family)→ Mandarin (the largest Sino-Tibetan language)

The areal distribution of the sample languages is shown below.

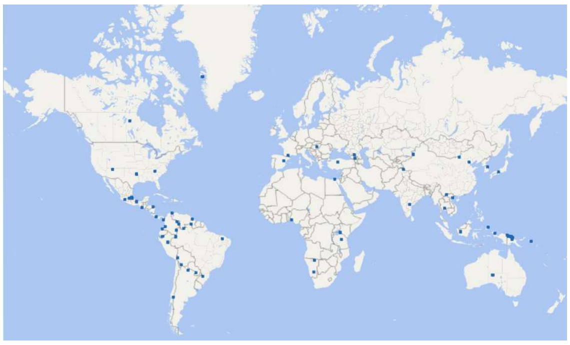

Figure 1. Distribution map of sample languages. Longitude and latitude of each language were retrieved from Glottolog 3.0 (Hammarström et al.*, 2017). Map created with Microsoft Excel 2016.*

I have only listed morphemes, excluding grammatical affixes, and have not listed polymorphemic words. If a language has no corresponding morpheme for a meaning, the slot was left empty. In some cases, a language has more than one morpheme to express one meaning (synonymy). I have listed up to three morphemes for each meaning per language.

I classified the sounds into featural categories rather than into specific phonemes (as Blasi *et al*. 2016 have done). A “sound” refers to any one of the following ten categories:

(2) a. Labial stops

b. Coronal stops

c. Dorsal stops

d. Nasals (consonants and ◌̃)

e. Sibilants

f. Liquids

g. Rounded vowels and glides

h. *i* (/i j ɪ/)

i. *a* (/a ɶ ɑ ɒ æ ɐ/)

j. Front high vowels and high tone (/i j y ɥ ɪ ʏ H/)

For (2a-c), the “stop part” of an affricate is also counted as a stop (e. g. /t/ in the affricate /ts/).

The classification was designed in a way that all (or most of) the 66 languages have at least one phone that belongs to each of the ten categories. For example, all 66 languages have at least one coronal stop as a phone.

The proportion of sound S in morphemes for given meaning in a given language is calculated as follows:

$$\frac{\sum_{j=1}^{|\mu|} \frac{|S\ in\ \mu_j|}{|Segments\ of\ \mu_j|}}{|\mu|}$$

where μ = Morpheme that stands for the meaning.

This calculation method is effective because it controls for morpheme length and the number of morphemes each language has, and also reflects the number of sounds within a morpheme. The longer a morpheme is, the more likely that it contains a given sound by chance, so a longer morpheme should be given less credit for containing that sound. Similarly, a language can have more than one morpheme that expresses a given meaning, whereas another language has only one, which could lead to a disproportionately large influence of the language with more morphemes if we do not control for the number of morphemes. Moreover, we can also give more credit to morphemes which contain more than one instance of a given sound, which arguably reflects the degree of iconicity better than a binary distinction between those that have a given sound and those don’t.

With the proportions, I conducted a Z-test ($p < 0.002$) for every S, the sample being the proportions of a sound for a given meaning, and the population being all the proportions of a sound for all 100 meanings.

As an illustration, suppose that 0.1 is the average proportion of nasals in all the existing morphemes for 100 meanings, and 0.05 the standard deviation. And suppose that 65 out of 66 languages have a morpheme for ‘nose’, and the average proportion of nasals in all 65 morphemes for ‘nose’ is 0.15. In this case, the Z-test for nasals in ‘nose’ is calculated as follows:

$$z = \frac{0.15 - 0.1}{\frac{0.05}{\sqrt{65}}} \approx 8.06$$

z is higher than 2.88, the threshold for $p < 0.002$, so the proportion of nasals in morphemes for ‘nose’ is significantly high (It would have been significant low if it was under -2.88).

Results

The results below are based on data that is approximately 98% complete.

Table 1. Results. "Positively correlated" terms are terms that have significantly high proportions of the sound on the left, and "negatively correlated" terms are terms that have significantly low proportions.

Sounds	Positively correlated	Negatively correlated
Labial stops	to blow navel thigh wing	–
Coronal stops	hard to hit/beat stone/rock to suck	sand
Dorsal stops	to bite to hide	–
Sibilants	salt small to suck	in
Nasals	breast to eat I in nose not this you (sg.)	to blow leaf skin/hide
Rounded	to blow breast navel neck	this
Liquids	to run star	I this
i	fire	–
a	not	breast knee navel to suck
High front vowels and high tone	–	–

Discussion

Some iconic correlations discovered in the present study are discussed below (cf. Joo (to appear) for full analysis).

First, I found a number of correlations between linguistic articulations and oral actions. 'To blow' is positively correlated with labial stops and rounded vowels, perhaps because we protrude our lips and open them when we blow out air. 'To suck' tends to have sibilants, perhaps because sucking things causes oral friction, which happens when producing sibilants. 'Nose' is related to nasals, arguably because we vibrate our nasal cavity when articulating nasal sounds.

Coronal stops seem to be associated with hardness, presumably because when articulating a coronal stop, the tongue tip touches the hard palate, the alveolar ridge, or the teeth, which all share hard texture. They are positively correlated with 'hard,' 'stone/rock,' and 'to hit/beat' (when we hit something, it results in a hard contact with our body and the object). Blasi *et al*. have also found that /t/ is a positive symbol for 'stone.' On the other hand, 'sand,' a smooth substance, is negatively correlated with coronal stops.

Rounded vowels appear frequently in morphemes that refer to round body parts, be it circular ('navel'), spherical ('breast'), or cylindrical ('neck'). Blasi *et al*. also discover /o, u/ to be positive symbols for 'knee' and /u/ for 'breast.' They did not find any positive or negative symbol for 'neck,' however.

Moreover, some correspondences found seem to match with our everyday gestures. 'Not' may be positively correlated with nasals because we commonly use nasal sounds to respond to yes-no questions (*mm* for *yes*, *m-m!* for *no*). The reason why 'to eat' also prefers nasals might be found in the fact that the vocal expressions of pleasant eating are remarkably similar cross-linguistically, sharing nasal sounds: English *yum yum,* Korean *nyam-nyam*, French *miam-miam,* Spanish *ñam ñam*, Italian *gnam gnam*, Russian *nyam nyam,* Vietnamese *măm măm*, Thai *màm màm*, Indonesian *yumyum*, Swedish *namnam*, Finnish *nam-nam*, and so on.

Lastly, results from previous experimental studies on sound symbolism of size (also known as "magnitude symbolism") seem to be absent in my results. Experiments have shown that small size is correlated with high front vowels (Shinohara & Kawahara, 2010) and high tones (Lapolla, 1995), but we see no significantly high or low proportions of the category of high front vowels and high tones in this study. On the other hand, this concurs with Bauer (1996), which confirms that vowel-size correspondence is not significantly reflected in evaluative morphology (diminutives and augmentatives).

Conclusion

I have shown, in line with previous findings, that, crosslinguistically, certain meanings tend to be represented (or not represented) by certain sounds. Although my sample of 66 languages is smaller than that reported by Blasi *et al*. (2016), I find support for a number of their findings. My approach provides further support to the use of this type of methodology to a range of new meanings, and by using a featural analysis for sounds (rather than the atomic ASJP notation used by Blasi *et al*.), I have demonstrated a number of associations that are obscured by their analyses. Although my statistical correction for multiple comparisons is not as rigorous as Blasi *et al*., the data presented here further support the proposal that the lexicons of the world's languages are not entirely arbitrary connections between form and meaning.

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