Non-arbitrariness in spoken language

Sound symbolism
Do we have non-arbitrariness in our spoken language? Or maybe all in it is result of a chance?

By the year in traditional linguistics the arbitrary relationship between word and meaning in words has been considered as one of the biggest design feature of language.

And words that imitate sounds (onomatopoeias) has been considered to be a marginal phenomenon in language.
For the average user of language, which is not an expert on the origins of language, symbolic associations between words and meaning are not visible at first sight.

The only evidence for an average man may be a special grammatically defined class of symbolic words in some language - in these classes the relationship between word and meaning are easily perceptible to native speakers or sometimes even for people do not speak that language.
Although for most languages the mapping between word and meaning may seem arbitrary. In fact, words based on sound symbolism take up far more part than one would expect.
Sound symbolism - what is that?

Jacobson describe sound symbolism as: „The partial representation of the sense of a word by its sound (as in bang, fizz and slide)‟

Sound symbolic word – those that have an inherit connection between sound and meaning.

Sound symbolism like a form of iconity:
„Perniss & Vigliocco define iconicity as resemblance between properties of a linguistic form and the sensori-motor and/or affective properties of referents. At least some types of sound symbolism show clear resemblance between properties of speech sounds and properties of their referents.”

„Sound symbolism may arise from the sense of similarity between speech sounds and other types of information through naturally occurring cross-modal mapping.”
Supportive evidence confirming that sound symbolism exists

- As we mentioned at the beginning the first evidence is that many languages have a grammatically defined class of sound symbolic word in which iconic relation between sounds and meaning is apparently felt.

- Sound symbolism also exist in conventionalized words. We can note sound symbolism in words that are not considered as „specialized sound symbolic word”

example 1. names of polish birds: left: bullfinch - ‘gil’ and right: hawk - ‘jastrzqb’

We can note that bullfinch is round and hawk is sharp. This polish words ‘gil’ include soft and nasal phones which connote roundness and softness features; ‘jastrzqb’ has hard consonants like [rz], [s], [t] good for sharp shape.
• **Systematic sound symbolism** in language like English without special class of sound symbolic words:

In words which have very similar meanings some parts of this words have the same sounds:

- light - glitter - glare

This phones [gl] point that this words have similar meaning.

• **Sound shape symbolism**

We can see some sound shape symbolism correspondence

Imai and Kita shows what Köhler noted in his study:

„certain sound–shape correspondences were judged to be a good match: when novel words ‘maluma’ and ‘takete’ are presented as labels for a rounded versus a spikey object, speakers of different languages judged ‘maluma’, to be more appropriate for the rounded object and ‘takete’ for the spikey object”
• **Sound size symbolism**

Also we may note that some words fit better to small object and other for big.

For example in german words: groß and klein we can see some sound symbolism.

Sapir in Imai and Kita note that:

‘mil’ is judged to be more appropriate for the small object and ‘mal’ for the large object

• **Subtle sound symbolism**, which people do not consciously detect

Imai and Kita present Monaghan’s observations:

„Monaghan et al. demonstrated that sound–meaning mappings in the English lexicon are more systematic than would be expected by chance. That is, subtle sound symbolism, which people do not consciously detect, may exist throughout the conventional (i.e. non-mimetic) lexicon”
Now we'll show how sound symbolism helps in language acquisition.
In everyday situation children receive visual information that is very rich as unsegmented. They don't know what is referent of word which they hear.

Sound symbolism help them to make associations between word and meaning and let child the invariance and learn what is referent of novel name.

There is argue that sound symbolism helps children learn the meaning of words different stages of early lexical development. In paritcular especially, this sound symbolism, due to a biologically endowed ability to map and integrate multi-modal input. Young children are sensitive to a wider range of possible sound symbolic correspondences than adults, but this sensitivity gets pruned and reorganized as they learn more words in their native language.
Sound symbolism scaffold acquisition of word meaning:

a) establishing word-referent associations

- In study, when 14 month-old Japanese-speaking infants were presented word-shape pairs ('kipi' for a spiky shape and 'mama' for a round shape) in two versions (matched and mismatched, infants looked at the shape that had been associated with the word during habituation faster and longer in the sound-symbolically matching condition than in the mismatch condition.

b) helping children find the invariance for generalization

- For children, to be able to use a word in new situations, they need to extract invariance across referents (i.e. to create a word meaning representation). This is extremely difficult to achieve from a single or a limited number of exposures, because what the child sees is very rich and contains a great deal of information that is not part of the meaning of the word.
This problem is particularly serious for verb learning as compared with noun learning.
Unlike objects, actions are ephemeral and individuate, so it is not obvious when the action referred to by a given word starts and when it ends.
To be able to use the verb in different situations, children further need to understand which specific aspect of the action is invariant for the verb and which aspects can vary across different situations in which the verb is used.

To summarize, regardless of the language they were acquiring, sound symbolism helped the children to find the relevant invariance in the scene for the verbs.
Sound symbolism is more available for infants and young children than adults.

- There were many studies with children in different stages of age (e.g. studies with new words).
- Research have shown that sound symbolism take part in language development process, especially in early stages of development.
- Cross-linguistically recognized sound symbolism may have an especially natural correspondence between sounds and meanings, so that is why people are most sensitive to sound symbolism in infant period.
Sound symbolism is universal to certain moment, after that sound symbolism is specialized to the first language. (for children it is universal and later specialized within their language in which to raise)

Some aspects of sound symbolism are universal, while others are language-specific.

Children are sensitive to universal sound symbolism and react to sound symbolic words from different languages (adults have a few of these capabilities universal).

In any case, result of studies with children in different ages implies that language-specific sound symbolism exists and that is cross-linguistically shared; and language-specific parts of sound symbolism are intricately intertwined within each language.
Owing to dense connectivity across different sensory brain regions, infants may spontaneously map perceptual experiences across different modalities onto speech sounds. Human infants can already map information in different modalities in the same way as adults.

For example, they can map size and numerosity, or acoustic properties of speech and non-sounds onto properties of visually presented objects.
In a different study, when adult participants were presented with real words and non-words in isolation, **real words elicited strong EEG coherence in the b-band in the left hemisphere**, in comparison to the resting state, but nonwords did not do so. The stronger inter-regional communication in the left hemisphere may indicate that the sound-shape pairings were processed in the language-processing network (in the left hemisphere) in 11 month-old infants.

Taken together, the results from ERP and phase synchronization analyses suggests that **11 month-olds could clearly detect Kohler's shape sound symbolism**, and further suggests that sound symbolic associations fosters multi-sensory integration and semantic processing.
Another evidence in support of the importance of sound symbolism is symbolic speech sound in the direction of the children uttered by their caregivers.

Caregivers often use sound symbolic words - talk to young children in a way that is appropriate for the children’s language comprehension ability (appropriate for their understanding).

- Fernald & Morikawa: Their studies showed that Japanese mothers used sound symbolic words such as onomatopoeia/mimetics frequently when talking to Japanese infants.

Less frequently they used them turning to slightly older children, and most rarely speaking to adults (in this case they used only conventional words).

The caretakers also adjusted the way they used the mimetics according to their child’s comprehension ability.
Previous studies demonstrated that parents use various devices to help children connect the word and the referent - they often point to the object.

Moreover, children tend to learn the name better when the referent object was pointed at in the past.

But it may not necessarily help them use the word in a different context.

Sound symbolism, in contrast, can directly link the word form and the word meaning, and thus it can help children extract invariance of the word meaning, which is crucial for using the word in new situations.
Sound symbolism is important for the evolution of language.

Researchers have often discussed the possibility that the process of language development in modern-day children mirrors how language was started by our distant ancestors and evolved through history.

Some have even speculated that sound symbolism in a modern-day language may be a vestige of protolanguage that was mostly sound symbolic (sound symbolism helped our ancestors to create a vocabulary).
1. The motor system played a key role.

   It has been argued that a critical foundation for language evolution was humans’ ability to mimic the external world. In the course of evolution, sound symbolism may have arisen as mimicking of events and object properties in the external world with movements of lips and the tongue.

2. Trans-modal matching is the key to sound symbolism

   Cross-modal mapping between audition and other modalities is the key to sound symbolism.
These accounts of sound symbolism do not have to be mutually exclusive.

They could be thought of reflecting different forms of iconicity. Be it motor-based or audition-based, sound symbolism may have set the foundation for using speech sound to systematically refer to concepts.

No matter on what grounds the sound symbolism was created, it could lay the foundations for a systematic reference to objects.
Nonarbitrariness over the years

One of the first to write about sound symbolism was Plato in his *Cratylus* (400 BC) – a dialog between Cratylus and Hermogenes. Cratylus says that word’s sound-form is somehow ‘naturally’ connected to its meaning. He presents examples of how certain sounds are better suited for certain meanings, since the movements of the tongue and mouth ‘imitate’ or resemble what the word means. (E.g. [r] - rapidness, [o] - roundness).
Next, one of the first semioticians of XIX century – Ferdinand de Saussure, said about linguistic sign that it involves “not a link between a thing and a name, but between a concept and a sound pattern”. He claimed that “primordial principle” of the linguistic sign is its arbitrariness. A sound pattern and a concept have no “natural connection” that motivates them to be linked together in a linguistic sign. (E.g. Horse in English, Cheval in French, Kůň in Czech; there's no connection). “Because the sign is arbitrary, it follows no law other than that of tradition, and because it is based on tradition, it is arbitrary”. But does cultural transmission (‘tradition’) necessarily imply arbitrariness?

Saussure on onomatopoeia - “such words are never organic elements of a linguistic system. [...] Moreover, they are far fewer than is generally believed”
Another genious semiotician - Charles Sanders Peirce divided signs into three so called “ideal types”:

• **Iconic sign** - the ground is that of similarity, or more precisely when the representamen and object are found to share certain similar qualities independently of each other. (E.g. a picture and its visual similarity to that which it depicts).
• **Indexical sign** - the ground is not based on similarity, but on contiguity in time and space.
• **Symbolic sign** - it's based only on convention, for example, using $ as a sign for ‘US dollar’.

Main methodology used in XIX century was **comparative linguistics**, although it wasn’t too effective.
Sonesson introduced an important distinction between iconic signs:

- **Primary iconic signs** - the iconic ground is sufficient for establishing the sign, and any possible conventional ground plays a secondary role. (E.g. drawing: while stylistic conventions of drawing differ enormously, knowledge of them is not required in order to recognize that a particular drawing depicts, say, a human face).

- **Secondary iconic sign** - the sign is established by other means — by convention, by pointing to a referent while uttering its name (its representamen) or by simply telling the interpreter what “something means” — and any possible iconic ground is found by the interpreter only later (if at all).
Bouba and kiki experiment- primary or secondary iconicity?

**Bouba and kiki experiment:** Both adults and children (without autism) are given two fictive words like bouba and kiki and asked to decide which one denotes a roundish and which a pointy figure, they agree up to 95% that bouba suits best the roundish one.
Ahlner & Zlatev propose that it is not one or the other, and not something “in between”, but rather a combination of the two, as follows:

Interpreter is told that a combination of sign relations exists between the pairs of representamina R1 and R2 and perceptual objects O1 and O2. Knowledge of the existence of sign relationships, “is one of the reasons for the perception of aniconic ground”, that is, conforming to the definition of secondary iconicity.

Once this analogous ground is perceived, it serves as the basis for positing specific sign relations between representamens and objects. That is Sonesson’s definition of primary iconicity: “the perception of an iconic ground obtaining between two things is one of the reasons for positing the existence of a sign function joining two things together as expression and content”.

To prove the existence of non-arbitrariness in language, we conducted an experiment, consisting of two parts. 25 persons participated in it. In the first part, we placed two pairs of images. The person had to intuitively match pictures to one of two answers. Words have been chosen from Hawaiian and Icelandic languages, unknown for respondents.
Pair no. 1

Option 1: Image A: "ino" - Image B: "lealea"
Option 2: Image A: "lealea" - Image B: "ino"

The correct option was option B. Most of the participants answered correctly, here is the chart:
The correct option was option A. As before, most of participants answered correctly. Chart:
Pair no. 2

Image A

Image B

Example 2

- Image A: "blíður", Image B: "sterkur"
- Image A: "sterkur", Image B: "blíður"
In the next section, we presented 4 images, every image with 4 options to choose. The images show respectively: star shape, ball shape, picture of mountains and a picture of mouse. Options contain 4 words in finnish language, one with correct meaning, and rest with meaning as most opposite to correct as possible.

Every image - except the first one - were guessed correctly by participants.
1. pyörre
2. aurinko
3. tähti
4. levy

- pyörre: 9%, 36%
- aurinko: 7%, 28%
- tähti: 7%, 28%
- levy: 2%, 8%
1. vuoret  
2. lintu  
3. lapsi  
4. silmä
1. jättiläinen
2. hevonen
3. linna
4. hiiri
Non-arbitrariness in spoken language is more important than was originally believed.

Sound symbolic relations between words and meaning exist not only in grammatically defined special class of sound symbolic words but also in conventionalized words which people did not consciously detect.

Sound symbolism plays an important role in children's lexical development – it bootstraps this process.

It helps to find associations between word and referent and detect the invariance in situations observed by children so it is important to learn the verbs.

Thus, iconicity plays a core role for philogenesis and ontogenesis of language.


sources of photos: Internet

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