

# THE ICONICITY SEMINAR 2023

## BOOK OF ABSTRACTS

Convener: Ian Joo  
[ianjoo.github.io/icosem/2023](https://ianjoo.github.io/icosem/2023)

Held online on 25 November 2023

# Contents

<b>Sound symbolism through the ages</b> C. H. Ngai and Z. Tian	3
<b>Iconicity through the lens of information theory</b> Alexander Kilpatrick	6
<b>What ratings and corpus data reveal about the vividness of Mandarin ABB words</b> Thomas Van Hoey, Xiayu Yu, Tung-Le Pan & Youngah Do	8
<b>Plenary talk: Multimodality, iconicity, and visual lexicons</b> Neil Cohn	10
<b>Correspondences between vowel intrinsic duration and the length of musical notes</b> Gertraud Fenk-Oczlon	11
<b>Phonetic exploration of sound symbolism in Moroccan Arabic</b> Yassine Zouri	13
<b>In sound symbolic effects, visual dimensions interact</b> Dominic Schmitz, Defne Cicek, Anh Kim Nguyen & Daniel Rotleb	15
<b>The iconicity of cross-linguistic phonesthetics</b> Niklas Erben Johansson	17
<b>Lexical vs semiotic, full vs partial</b> François Nemo	19
<b>Iconicity of quantity in comics</b> Ana Krajinović, Irmak Hacımusaoglu & Neil Cohn	21
<b>Vocal and visual symbolism</b> S. Madureira, J. Andreassa, E. Brisola, A. Crochiquia, M. Fontes, M. Pires & R. Scarpelly	23
<b>Visual-motor iconicity in the spatial language of deaf traditional Negev Arabic speakers</b> Letizia Cerqueglini	26
<b>Etymology of imitative words</b> Maria Flaksman	28

<b>Product names as diagrammatic-iconic compositions</b>	
<b>Alexander Dübbert</b>	<b>30</b>
<b>Is /tʃ/ a phonaestheme in Mexican Spanish?</b>	
<b>Carlos de Jesús Wagner Oviedo</b>	<b>32</b>

## Sound symbolism through the ages: A longitudinal analysis of vowel and tonal Patterns in Chinese names across generations

### Introduction

With renewed interest in the sound symbolism of names, a growing number of studies could be found examining systematic sound-meaning mapping in various languages (e.g., English (Pitcher et al., 2013), French (Suire et al., 2019), and Mandarin Chinese (Ngai & Kilpatrick, 2023), and many more). Systematically, these studies have found that male names are more likely to contain low/back vowels, while female names tend to incorporate high/front vowels. However, except Suire et al. (2019), most existing work has mostly focused on synchronic analysis, providing little insight into how naming patterns may evolve diachronically. If such sound-meaning mappings are truly rooted in sexual selection (Pitcher et al., 2013; Suire et al., 2019) or the Frequency codes hypothesis<sup>1</sup> (Ohala, 1984, 1994), such patterns should persist across generations of speakers. To address this issue, this study analyses whether sound-gender patterns previously found in Mandarin (low/back vowel and tone 3 in male names; high/front vowels in female names (Ngai & Kilpatrick, 2023)) persist across time while accounting for regional differences.

### Methods and Materials

This study examines the sound-gender mapping in Mandarin Chinese names using an online name database from the Shanghai police<sup>2</sup>. Names were first transcribed phonemically and filtered by year of birth (1947-2016) to ensure sizeable samples across years. Table 1 illustrates the number of male and female names per year in the current dataset. Names that could not be transcribed into IPA and Pinyin were also discarded. The final dataset consisted of a total of 200,392 names (106,436 male and 93,956 female, or 1,520 male and 1342 female per year). Vowel (height and frontness) and tonal features (tones 1 and 3) were extracted from transcriptions.

Following Suire et al. (2019), linear mixed effect models built with each phonetic feature (e.g., height, frontness, tone 1, and tone 3) as the outcome, and year of birth, gender, and their interactions as fixed predictors, including random intercepts for the provinces of birth. Model comparison via ANOVA was conducted to determine if gender and birth year interaction significantly improved fit, indicating divergent or convergent patterns along gender and temporal lines.

### Results

Only coefficients relating to the interaction between gender and birth year are discussed below. The results of linear mixed effect models demonstrated significant changes in the frequency of front vowels ([i], [y], and [a]) and tone 3 frequencies over time that differ between male and female names. Results from the front vowel model found a highly significant interaction between genders and birth year ( $\beta = 0.186$ ,  $SE = 0.032$ ,  $t = 5.881$ ,  $p < .001$ ), suggesting a widening gap in front vowels adaptation between genders over time. No significant interaction between gender and birth year was observed for vowel height. As for tones, only results from tone 3 discovered a significant interaction between gender and birth year ( $\beta = 0.368$ ,  $SE = 0.021$ ,  $t = 17.299$ ,  $p < .001$ ), indicating a narrowing in the frequency of tone 3 between male and female names as time progresses.

<sup>1</sup> The Frequency Codes Hypothesis posits that the observed sound-gender associations in naming practices stem from sound-to-size mappings, whereby female names exhibit a preference for phonemes with acoustically higher frequencies (associated with smallness), while male names favor phonemes with acoustically lower frequencies (associated with largeness).

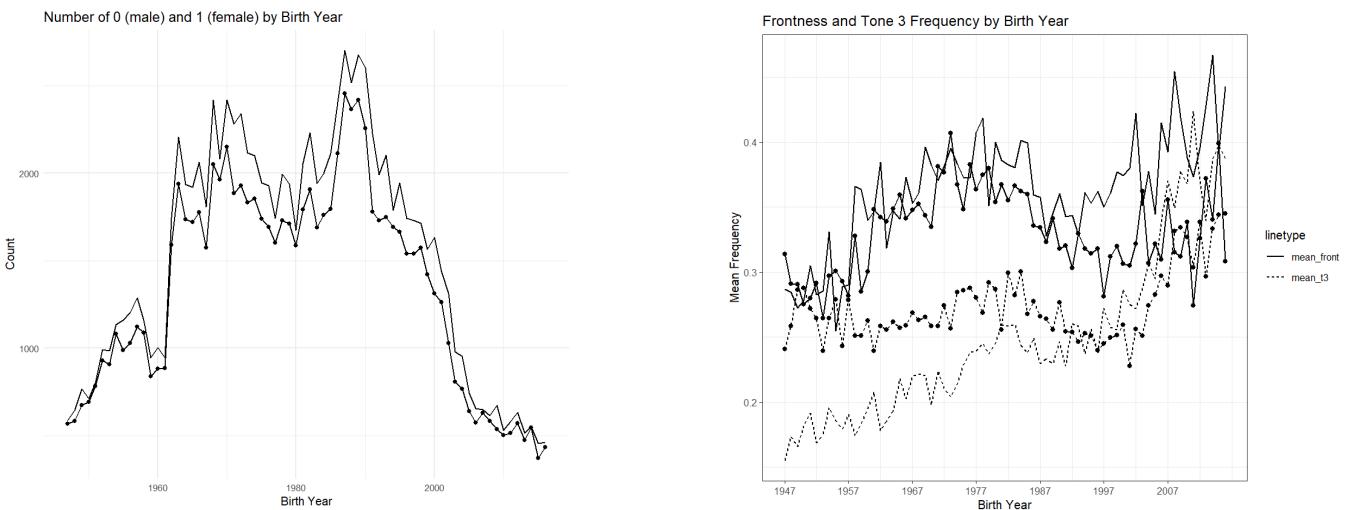
<sup>2</sup> <https://breached.to/Thread-2022-SHGA-SHanghai-Gov-National-Police-750K-Sample>

## Discussion

The current study provided insights into the diachronic changes in sound-gender mappings in Mandarin Chinese names. Specifically, our analysis revealed a significant interaction between gender and birth year in front vowels and tone 3 frequencies, indicating evolving sound-gender association over time. Interestingly, patterns observed for front vowels differ from those in tone 3 frequencies (see Table 2). While the gap in front vowels between genders widens, a narrowing difference between genders was observed in tone 3. Results pertaining to front vowels demonstrated that mappings found in synchronic studies (e.g., Ngai & Kilpatrick, 2023) could also be found in a diachronic study. It is worth noting that our study incorporated regional differences by including random intercepts for the provinces of birth. This approach accounts for potential influence from varying first languages, ensuring the robustness of our analysis. Combined, these results demonstrated both persistence and evolution in sound symbolic sound-meaning mappings, highlighting the sound symbolism sound meaning could also be influenced by culture.

**Table 1. (left)** Number of male (dotted) and female (line) names in the database.

**Table 2. (right)** Frequency of front vowels and tone 3 in male (dotted) and female (line) names overtime.



## References

- Ngai, C. H., & Kilpatrick, A. (2023). Deriving gender from phonemes: Evidence from Mandarin names using the Random Forest algorithm. *45th DGfS AG15: Ideophones and Lexicalized Iconicity in Language*.
- Ohala, J. (1984). An ethological perspective on common cross-language utilization of F<sub>0</sub> of voice. *Phonetica*, 41(1), 1–16.
- Ohala, J. (1994). The frequency codes underlies the sound symbolic use of voice pitch. In *Sound Symbolism* (pp. 325–347). Cambridge University Press.
- Pitcher, B. J., Mesoudi, A., & McElligott, A. G. (2013). Sex-biased sound symbolism in English-language first names. *PLoS ONE*, 8(6), e64825.
- Suire, A., Mesa, A. B., Raymond, M., & Barkat-Defradas, M. (2019). Sex-biased sound symbolism in French first names. *Evolutionary Human Sciences*, 1(e7), 1–17.

## Iconicity Through the Lens of Information Theory

### Introduction

In both functional-cognitive linguistics and semiotics, the concept of iconicity revolves around the perceived similarity or analogy between the form of a linguistic sign and its associated meaning, standing in contrast to the principle of arbitrariness. Harnessing insights from information theory, our study seeks to unravel how transitional probabilities contribute to the evocativeness of English words and influence the iconicity ratings assigned to them. Through this information-theoretic lens, we aim to illuminate the cognitive mechanisms at play in the intricate relationship between language and iconicity, presenting new perspectives on the profound interplay between linguistic form and conceptual meaning.

In the development of information theory (Shannon, 1948), two fundamental concepts, surprisal and entropy, emerged as essential measures in quantifying uncertainty and information content within a communication system. Surprisal refers to the amount of surprise or unexpectedness associated with the occurrence of an event. Mathematically, surprisal ( $S$ ) is defined as the negative logarithm of the probability ( $P$ ) of the event square, and it can be expressed as:  $S = -\log_2(P)$ . Entropy, on the other hand, is a measure of the average information content or uncertainty within a set of events. It represents the average surprisal associated with all possible outcomes, reflecting the level of disorder or randomness in the system. Mathematically, entropy ( $H$ ) is calculated as the sum of the surprisal of each event ( $S$ ) multiplied by its probability ( $P$ ):  $H = \sum(P_i * -\log_2(P_i))$ .

Surprisal and entropy have been shown to influence speech production (Cohen Priva, 2015; Hume & Mailhot, 2013) and perception (Kilpatrick et al., 2021; Whang, 2021). These studies have suggested that there are limitations on how much information is expressed over time in human languages. Pellegrino et al., (2011) conducted a cross-linguistic analysis of 17 languages to investigate the information rate of speech. They measured the average information density in speech, expressed in bits per second, and found a remarkable convergence in the average information rate (approx. 39 bit/sec). They propose that this convergence is potentially due to universal cognitive and perceptual limitations of humans.

Building on this finding, we hypothesize that words carrying more transitional probability information may carry less iconicity information and vice versa. In the present study, this might manifest in one of two ways:

- H1) Words with lower average surprisal will have higher iconicity ratings.
- H2) Words with higher average entropy will have higher iconicity ratings.

### Method

Data and scripts can be found at the following OSF repository: <https://osf.io/qh8vs/>

Data were taken from a corpus of 14,000 English words with iconicity ratings given by American English speakers (Winter et al., 2023). Words were transcribed into American English using the CMU pronouncing dictionary (Weide, 2015). Any word in the corpus that did not find a match in the CMU pronouncing dictionary was discarded resulting in 13,888 words. Word length was calculated by totaling the number of phonemes in each word. Bigram surprisal and entropy were calculated for each word. Average surprisal was calculated by totaling the surprisal values for each bigram in each word and dividing it by the number of phonemes less one (total/N-1). Average entropy was calculated by totaling the entropy scores for each phoneme in the word and dividing it by the number of phonemes (total/N).

## **Results**

Two simple linear regression models were employed to investigate the relationship between surprisal, entropy, and iconicity ratings of words. The results from the initial models indicated statistically significant associations. The surprisal model showed a significant negative association ( $F(1, 13880) = 117.8, p < 0.001$ ), while the entropy model demonstrated a significant positive association ( $F(1, 13886) = 138.3, p < 0.001$ ). These findings suggest that words with higher iconicity ratings carry less transitional probability information (surprisal) and are more predictable (entropy). Additional simple linear regression models were used to examine the relationship of word length with all other variables. These showed a significant positive correlation between length and entropy ( $p < 0.001$ ) and significant negative correlations with both surprisal ( $p < 0.001$ ) and iconicity ratings ( $p < 0.001$ ); i.e., longer words carry less iconicity information and are more transitionally predictable.

Subsequently, a more comprehensive analysis was conducted by introducing word length as an additional independent variable in multiple linear regression models. These models revealed the interactive effects of average entropy and average surprisal with word length on the dependent variable, iconicity ratings. The interactions were assessed through the inclusion of interaction terms (average surprisal/length and average entropy/length) in the models. The interaction between average surprisal and length on rating was significant ( $t = 5.345, p < 0.001$ ) as was the interaction between average entropy and length on rating ( $t = -2.799, p = 0.005$ ); i.e., the effects of surprisal and entropy on ratings vary depending on word length.

## **Discussion**

Although this is only a preliminary study, the findings suggest that words with higher iconicity ratings tend to carry less transitional probability information, particularly when considering the interaction with word length. The results emphasize the complexity of the relationship between iconicity and transitional probability, warranting further investigation into the mechanisms underlying this association. As shown by Pellegrino et al. (2011), languages are limited in how much transitional probability information they can express per second, likely due to cognitive limitations in language users. These results suggest that incorporating iconicity information in language processing may also impose cognitive burdens on language users, potentially influencing language production, comprehension, and change. Given the intriguing interplay between iconicity and transitional probability, future research could explore the cognitive mechanisms and trade-offs involved, thereby contributing to a more comprehensive understanding of language structure and processing.

## **References**

- Cohen Priva, U. (2015). Informativity affects consonant duration and deletion rates. *Laboratory phonology*, 6(2), 243-278.
- Hume, E., & Mailhot, F. (2013). The role of entropy and surprisal in phonologization and language change. In A. C. L. Yu (Ed.), *Origins of sound change: Approaches to phonologization* (pp. 29–47). Oxford University Press.
- Kilpatrick, A., Kawahara, S., Bundgaard-Nielsen, R., Baker, B., & Fletcher, J. (2021). Japanese perceptual epenthesis is modulated by transitional probability. *Language and Speech*, 64(1), 203-223.
- Shannon, C. E. (1948). A mathematical theory of communication. *The Bell system technical journal*, 27(3), 379-423.
- Weide, R. L. (1998). The Carnegie Mellon pronouncing dictionary. [Computer software]. Retrieved from <http://www.speech.cs.cmu.edu/cgi-bin/cmudict>
- Whang, J. (2021). Multiple sources of surprisal affect illusory vowel epenthesis. *Frontiers in Psychology*, 12, 677571.
- Winter, B., Lupyan, G., Perry, L. K., Dingemanse, M., & Perlman, M. (2023). Iconicity ratings for 14,000+ English words. *Behavior research methods*, 1-16.

## What ratings and corpus data reveal about the vividness of Mandarin ABB words

**Keywords:** ABB, Chinese, ideophones, norming studies

The well-studied Mandarin ABB construction (T'sou 1978; Cáo 1995; Wang 2014) consists of a content word followed by a reduplicated syllable that makes the whole more vivid (Huang, Jin & Shi 2016), e.g., wù-mángmáng 雾茫茫 ‘fog-unclear.unclear’ “extremely foggy”. Because of this vivid quality, ABB constructions have been argued to consist of ideophones (BB) preceded by prosaic collocates (A) (Zhào 2021; Van Hoey 2023).

Reviewing the traditional literature on ABB words, it is clear that they display prototypicality effects from a definitional point of view: there are clear clusters that share family resemblances and the identification of necessary and sufficient conditions for ABB words is not easy. However, it is unclear whether ABB words also show prototypicality effects from the perspective of exemplars, which requires an investigation beyond traditional study of dictionaries and lists in dedicated studies.

To remedy this gap, we combined data from behavioral ratings and corpus work. We collected subjective ratings for familiarity, valence, imagery, concreteness, sensory experience ratings (SER), iconicity and arousal (e.g., see Yao et al. 2016). Participants consisted of native speakers of Mandarin Chinese ( $n = 519$  in total, on average  $n = 74$  per variable). Each stimulus was rated at least 30 times. Imagery, concreteness, SER and familiarity are highly correlated with each other ( $r > 0.85$ ). As expected, familiarity also highly correlates with token frequency ( $r = 0.59$ ). However, we found strong inverted correlations between the token frequency and dispersion across genre ( $r = -0.67$ ), highlighting the lexical specificity of sensory phrases like ABB, i.e., they will be used quite frequently, but only in limited contexts.

Next, we augmented a previous corpus study on collocate-ideophone constructions (Van Hoey 2023) and obtained lexicostatistical measures about ABB words in written corpora, a social media corpus (van Esch 2012), and in dictionaries and lists; their frequency and dispersion across these data sets; and cue validity on a structural level between the components of A and BB. Here we find higher positive correlations between ( $r > 0.5$ ) between the different measures, except for the ones involving cue validity ( $r = 0.1$ ), indicating that this may operate on a different plane than the rest.

In the converging step, we combined rating data and corpus data through principal components analysis (PCA), to explore the different ways in which exemplars of ABB words display prototypicality effects. They indeed do not form a homogeneous group but have clear differences in membership salience and different degrees of typicality. We identify three main clusters to which ABB words can belong: (1) core prototypical (most familiar to people, highly used), (2) average typical (most items are well-known but not necessarily used), (3) novel (new ABB forms, sporadic usage, false positives etc.).

Finally, we use the rating data to probe the differences between vivid ABB words and “normal” prosaic words. Here, a PCA shows that ABB words differ from prosaic words mostly in terms of high imageability and also in lower than average arousal. The high imageability is related to the quality of vividness that is often ascribed to them. The low arousal values may indicate that a decontextualised rating task does not bring about arousing quality—because ABB words (a form of collocate-ideophone expressions, see Van Hoey 2023) rely on a grounding context to let their arousing qualities shine through.

This research provides a comprehensive investigation into the prototypicality effects of Mandarin ABB words. By combining subjective ratings and corpus data, we explore prototypicality effects of exemplars, rather than limiting ourselves to definitional effects, which are based on lists and dictionary material. We thus advocate for an augmentation of such material with actual usage (corpus) or distributed understanding (ratings).

## Key references

- Cáo, Ruìfāng 曹瑞芳. 1995. Pǔtōnghuà ABB shì xíngróngcí de dìngliàng fēnxī 普通话 ABB 式形容词的定量分析 [Quantitative analysis of Mandarin Chinese ABB adjectives]. *Yǔwén yánjiū 语文学研究* 3. 22–25.
- Esch, Daan van. 2012. Leiden Weibo Corpus. Database. <http://lwc.daanvanesch.nl/index.php>. (26 June, 2016).
- Huang, Shi-Zhe, Jing Jin & Dingxu Shi. 2016. Adjectives and adjective phrases. In Chu-Ren Huang & Dingxu Shi (eds.), *A reference grammar of Chinese*, 276–296. Cambridge: Cambridge University Press.
- T’sou, Benjamin K. 1978. Sound symbolism and some socio- and historical linguistic implications of linguistic diversity in Sino-Tibetan languages. *Cahiers de linguistique - Asie orientale* 3(1). 67–76. <https://doi.org/10.3406/clao.1978.1039>.
- Van Hoey, Thomas. 2023. ABB, a salient prototype of collocate-ideophone constructions in Mandarin Chinese. *Cognitive Linguistics* 34(1). 133–163. <https://doi.org/10.1515/cog-2022-0031>.
- Wang, Zhijun. 2014. The head of the Chinese adjectives and ABB reduplication. *US-China Foreign Language* 12(5). 349–359.
- Yao, Zhao, Jia Wu, Yanyan Zhang & Zhenhong Wang. 2016. Norms of valence, arousal, concreteness, familiarity, imageability, and context availability for 1,100 Chinese words. *Behavior Research Methods* 49(4). 1374–1385. <https://doi.org/10.3758/s13428-016-0793-2>.
- Zhào, Qīngqīng 赵青青. 2021. Tōnggǎn yǐnyù shìjiǎo de Xiàndài Hànyǔ ABB shì zhuàngtài xíngróngcí 通感隐喻视角的现代汉语 ABB 式状态形容词 (ABB-pattern state adjectives in Mandarin: A study from the perspective of synaesthetic metaphor). *Shijiè Hànyǔ jiāoxué 世界汉语教学* 35(2). 206–219. <https://doi.org/10.13724/j.cnki.ctiw.2021.02.005>.

## **Plenary talk: Multimodality, iconicity, and visual lexicons**

Neil Cohn (Tilburg University)

The traditional view has held that language is an amodal and arbitrary system that is mutable across different modalities. Yet, recent work on expressions in the bodily and graphic modalities have complicated this view, especially in light of multimodal communication. Here, I present a model of a multimodal language faculty which intrinsically maintains components for the vocal, bodily, and graphic modalities. This model inherently allows for conventionalization of all types of signification, including iconicity. I will illustrate this further by showing the extensive standardized visual lexicons using linguistic structures in purely graphic systems across the world. Altogether, this heralds a re-understanding of what language is.

## **Correspondences between vowel intrinsic duration and the length of musical notes: implications for the *mil/mal effect***

Gertraud Fenk-Oczlon, University of Klagenfurt, Austria

Vowels are the main drivers in ‘size-sound symbolism’ or ‘magnitude sound symbolism’, i.e., the association between size (large/small) and sound. In a classic study, Sapir (1929) demonstrated that subjects associate meaningless words containing low and back vowels like /a/ (e.g., as in *mal*) with large concepts and meaningless words containing high and front vowels like /i/ (e.g., as in *mil*) with small concepts. This *mil/mal effect* (Sidhu & Pexman, 2018) could be replicated in numerous experimental studies showing the postulated association between vowel quality and size (e.g., Shinohara and Kawahara, 2016). Likewise, statistical studies in typologically diverse languages found associations between the high front vowel /i/ and the concept of ‘small’ and between the low back vowel /a/ and the concept of ‘large’ (e.g. Ultan 1978; Blasi et al. 2016). Several explanations have been suggested for these associations (for an overview see Sidhu & Pexman, 2018). Explanations include articulatory aspects such as a small/large space in the mouth depending on vowel articulation, as well as acoustic aspects such as Ohala’s (1984) “frequency code” hypothesis, according to which size-symbolism mirrors the size of the vocalizers producing either lower or higher frequencies, or vowel intrinsic pitch and vowel intrinsic duration.

Here, I present the results of a recent study (Fenk-Oczlon, 2022) which suggest that vowel *intrinsic duration* might play a decisive role in size-sound symbolism. It is generally assumed that low vowels like [a ɔ o] have a higher intrinsic duration than high vowels like [i u y], and that there is a positive correlation between the first formant F1 and duration, i.e., the lower the vowel, the higher F1, and the higher the intrinsic duration of the vowel (House and Fairbanks, 1953; Peterson and Lehiste, 1960).

**Hypothesis:** In songs containing meaningless syllables, syllables with low vowels like [a ɔ o] should be favored for long notes and syllables with high vowels like [i u y] for short notes.

**Method:** The assumption was tested based on traditional Alpine yodels in Pommer’s collection from 1906. All 20 yodels in the collection were analyzed. The total number of notes/syllables in the sample amounts to 1,836. I determined all relative note values in the sample: half notes (the longest note values in the sample), quarter notes, eighth notes, sixteenth notes, and thirty-second notes (the shortest notes in the sample).

The notes were assigned to the respective syllables containing either high vowels like [i u y] or low vowels like [a ɔ o]. Furthermore, all dotted notes—the dot increases the duration of the basic note by half of its original value—were identified and matched with the particular syllables.

**Results::** Eighth notes are more often aligned with high vowels (590x) than with low vowels (255x), ( $X^2 = 132.811, p < 0.0001$ ). Quarter notes are 405 times aligned with high vowels and 267 times with low vowels ( $X^2 = 28.339, p < 0.0001$ ). Sixteenth notes are associated with high vowels 45 times and with low vowels 50 times ( $X^2 = 0.263, \text{n.s.}$ ). Thirty-second notes are 28 times aligned with high vowels and 6 times with low vowels ( $X^2 = 14.235, p < 0.001$ ).

On the contrary half notes, the longest note values in the sample, are more often aligned with low vowels (135x) and less frequently associated with high vowels (55x), ( $X^2 = 33.684, p < 0.0001$ ). This also holds for dotted notes which are 265 times associated with low vowels and only 83 times with high vowels ( $X^2 = 95.184, p < 0.0001$ ).

**Discussion:** The analysis of 20 Alpine yodels demonstrates that short musical notes such as eighth notes, quarter notes and thirty-second notes tend to align with vowels with smaller

intrinsic duration, whereas relative long notes such as half notes or dotted notes are associated with vowels with longer intrinsic duration.

The iconic associations between vowel intrinsic duration and length of musical notes may shed light on size-sound symbolism in general. Although ‘duration’ of musical notes only metaphorically corresponds to ‘size’ of notes, our data are in line with results by Knoeferle et al. (2017) suggesting F1 in combination with F2 and vowel duration are decisive factors in size-sound symbolism; F0 does not seem to play a role in their experiments on visual size judgements. Similarly, Vainio (2021) reports that F0 or Ohala’s frequency code hypothesis did not show to be relevant in his study on magnitude sound symbolism.

Since our results demonstrate a direct match between vowel intrinsic duration and the ‘size’ of musical notes, there is no need to explain the ‘size’ of musical notes via Ohala’s “frequency code” hypothesis. Therefore, a possible answer to the question “What is, for example, so small about *mil* and large about *mal*? ” (Vainio 2021, p. 2) might be: Small about *mil*, is the small intrinsic duration of the vowel /i/, and large about *mal* is the large intrinsic duration of the vowel /a/.

#### References:

- Blasi, D. E., Wichmann, S., Hammarström, H., Stadler, P. F., and Christiansen, M. H. (2016). Sound-meaning association biases evidenced across thousands of languages. Proc. Natl. Acad. Sci. U.S.A. 113, 10818–10823. doi: 10.1073/pnas.1605782113
- Fenk-Oczlon, G. (2022). Iconic Associations Between Vowel Acoustics and Musical Patterns, and the Musical Protolanguage Hypothesis. Front. Commun. 7:887739. doi: [10.3389/fcomm.2022.887739](https://doi.org/10.3389/fcomm.2022.887739)
- House, A. S., and Fairbanks, G. (1953). The influence of consonant environment upon the secondary acoustical characteristics of vowels. J. Acoust. Soc. Am. 25,105–113. doi: 10.1121/1.1906982
- Knoeferle, K., Li, J., Maggioni, E., & Spence, C. (2017). What drives sound symbolism? Different acoustic cues underlie sound-size and sound-shape mappings. Scientific Reports, 7(1), 1–11
- Ohala, J. J. (1994). The frequency code underlies the sound-symbolic use of voice pitch. In L. Hinton, J. Nichols & J. Ohala (Eds.), Sound symbolism (pp. 325–347). Cambridge University Press
- Peterson, G. E., and Lehiste, I. (1960). Duration of syllable nuclei in English. J. Acoustical Soc. Am. 32, 693–703. doi: 10.1121/1.1908183
- Pommer, J. (1906). Zwanzig echte alte Jodler. Wien: Adolf Robitschek
- Shinohara, K., and Kawahara, S. (2016). “A cross-linguistic study of sound symbolism: the images of size,” in Proceedings of the Thirty-Sixth Annual Meeting of the Berkeley Linguistics Society. Berkeley. doi: 10.3765/bls.v36i1.3926
- Sidhu, D. M., & Pexman, P. M. (2018). Five mechanisms of sound symbolic association. Psychonomic Bulletin & Review, 25, 1619–1643
- Ultan, R. (1978). “Size-sound symbolism,” in Universals of Human Language: Phonology, eds J. Greenberg. Stanford, CA: Stanford University Press
- Vainio, L. (2021). Magnitude sound symbolism influences vowel production. J. Memory Lang. 118:104213. doi: 10.1016/j.jml.2020.104213

## Phonetic Exploration of Sound Symbolism in Moroccan Arabic: High Vowels and Size Perception

### Abstract

Empirical findings from experiments and cross-linguistic studies indicate that specific speech sounds are often associated with the concept of size. More specifically, high front vowels are frequently linked to the notion of "small," while low back vowels are generally associated with "large." It is in this context that our research explores how the addition of high vowels in pairs of Moroccan Arabic words can convey smallness, by examining phonetic characteristics. Our research hypotheses include the idea that the insertion of high vowels in words is likely to result in sharper sounds, shorter words, and a meaning related to smallness. We also assume that these phonetic modifications align with established patterns of sound symbolism, such as the correlation between high-pitched sounds and smallness. Furthermore, we investigate the variability of these patterns across languages and cultures.

Our methodology relies on building a corpus of word pairs that illustrate this linguistic construction, ensuring data cleanliness and case normalization. Subsequently, we conduct a meticulous phonetic analysis of the sound characteristics of words before and after the addition of the high vowel. To support our findings, we compare these data to established sound symbolism patterns, highlighting both similarities and differences.

We anticipate that the addition of the high vowel to words will result in an increase in the sharpness of sounds, a reduction in word length, and a meaning associated with smallness. We also hope to find evidence that corroborates the notion that these phonetic modifications reflect existing sound symbolism patterns, thus confirming the validity of the theory of sound symbolism. Finally, we expect to identify potential cultural or linguistic variations in these patterns, which could enrich our understanding of how languages use sound symbolism to express meaning. These findings will contribute to shedding light on the role of phonetics in the construction of linguistic meaning and deepening our knowledge of sound symbolism in linguistics.

**Keywords :** Sound symbolism, Phonetic features, Conceptual mapping.

### References

- Sapir, Edward. 1929. A study in phonetic symbolism. *Journal of Experimental Psychology* 12. 225–239.
- Ohala, John J., & Eukel, Brian W. 1987. Explaining the intrinsic pitch of vowels. In R. Channon & L. Shockey (Eds.). *In honour of Ilse Lehiste*. 207–215. Dordrecht : Foris.
- Tsur, Reuven. 2006. Size–sound symbolism revisited Reuven. *Journal of Pragmatics* 38.905–

924.

- Johansson, Niklas., & Zlatev, Jordan. 2013. Motivations for sound symbolism in spatial deixis : A typological study of 101 languages. *The Public Journal of Semiotics* 5. 3–20.
- Rabaglia, Cristina D., Maglio, Sam J., Krehm, Madelaine., Seok, Jin H., & Trope, Yaacov. 2016. The sound of distance. *Cognition* 152. 141–149. doi:10.1016/j.cognition.2016.04.001
- Tanz, Christine. 1971. Sound symbolism in words relating to proximity and distance. *Language and Speech* 14. 266–276. doi:10.1177/002383097101400307

## **In sound symbolic effects, visual dimensions interact: The case of vowel quality and cuteness**

*Dominic Schmitz, Defne Cicek, Anh Kim Nguyen, Daniel Rottlеб  
Heinrich Heine University Düsseldorf*

Sound symbolism describes the phenomenon that certain sounds become meaningful when combined with sensory information. Among the different types of sound symbolism, size sound symbolism is one of the most prominent ones. It describes that some speech sounds, e.g. /i/, are associated with smallness, while other speech sounds, e.g. /a/, are associated with bigness (Knoeferle et al. 2017). While size sound symbolism has been rather extensively researched during the last decades (Blasi et al. 2016), there is barely any research available connecting size to other visual dimensions. The present investigation aims to deliver results to fill this research gap by connecting size to one such dimension: cuteness.

Cuteness, as from its biological perspective comprised in the so-called “infant schema” (Lehmann, Huis in’t Veld & Vingerhoets 2013), is not only considered a fundamental feature of human perception that correlates with size (Kringelbach et al. 2016), but research on Japanese has shown that cuteness is also found as a factor for sound symbolism (Kumagai 2019).

Taking into account both size and cuteness, the present study aims at establishing a relation from “small” to “big” and from “not cute” to “cute” for long vowels of Standard German (i.e. /a:/, /ɛ:/, /e:/, /i:/, /o:/, /ø:/, /u:/, /y:/), providing further insight into the multimodal nature of sound symbolism and interactions therein.

Following a pilot study with 21 participants (Schmitz 2022), a full-sized study with 124 participants consisting of two online forced-choice tasks was conducted. As auditory stimuli, disyllabic pseudowords were used. Pseudowords were made use of to control for potentially confounding lexical (Caselli, Caselli & Cohen-Goldberg 2016) and contextual (Klatt 1976) effects. In either syllable of a stimulus, nuclei consisted of one of the vowels under investigation. The simplex onsets of the open syllables consisted of one consonant, i.e. /d, f, j, k/ or /r/. In total, 96 pseudowords were used. Images of phantasy creatures (van de Vijver & Baer-Henney 2014) were used as visual stimuli. In each trial of the first forced-choice task, a size judgement task, participants were shown five differently sized versions of a randomly chosen creature. The participants’ task was to decide which image version, i.e. which size, matched the audio stimulus of a trial best. As cuteness judgements likely differ by participants, in the second forced-choice task, a cuteness judgement task, participants were again shown all creature images to judge them for their cuteness on a five-point scale.

The size responses then entered three ordinal logistic regression analyses in generalised additive mixed models as dependent variable. Cuteness judgements, vowel quality, onset consonant types and phonological neighbourhood density were introduced as independent variables, while participant ID and age were included as random effects. Taking into account vowel quality as the sole predictor of interest for size, it was found that /a:/ is considered bigger than all other vowels, while /i:/, /y:/ are considered smallest. Testing cuteness as sole predictor of interest for size, it was found that higher cuteness ratings are associated with smaller size.

Coming to the interaction of interest, i.e. the interaction of vowel quality and cuteness, it was found that the size response of the open vowel /a:/ increased with cuteness, while the size response of the close vowels /i:/, /y:/ further decreased. That is, the vowel /a:/, which was already on its own associated with the biggest size, comes with an even bigger size when combined with very cute creatures. Contrarily, the vowels /i:/, /y:/, which were already on their own associated with the smallest size, come with an even smaller size when combined with very cute creatures.

The present findings demonstrate that cuteness amplifies the effect of size sound symbolism – a finding potentially related to the infant schema in human perception. The results indicate that sound symbolic effects manifest in intricate interactions when multiple visual dimensions are given, calling for the incorporation of multiple dimensions into analyses when applicable.

## References

- Blasi, Damián E., Søren Wichmann, Harald Hammarström, Peter F. Stadler & Morten H. Christiansen. 2016. Sound-meaning association biases evidenced across thousands of languages. *Proceedings of the National Academy of Sciences of the United States of America* 113(39). 10818–10823. <https://doi.org/10.1073/PNAS.1605782113>.
- Caselli, Naomi K., Michael K. Caselli & Ariel M. Cohen-Goldberg. 2016. Inflected words in production: Evidence for a morphologically rich lexicon. *Quarterly Journal of Experimental Psychology* 69(3). 432–454.  
<https://doi.org/10.1080/17470218.2015.1054847>.
- Klatt, Dennis H. 1976. Linguistic uses of segmental duration in English: Acoustic and perceptual evidence. *The Journal of the Acoustical Society of America* 59(5). 1208.  
<https://doi.org/10.1121/1.380986>.
- Knoeferle, Klemens, Jixing Li, Emanuela Maggioni & Charles Spence. 2017. What drives sound symbolism? Different acoustic cues underlie sound-size and sound-shape mappings. *Scientific Reports* 7(1). 5562. <https://doi.org/10.1038/s41598-017-05965-y>.
- Kringelbach, Morten L., Eloise A. Stark, Catherine Alexander, Marc H. Bornstein & Alan Stein. 2016. On cuteness: Unlocking the parental brain and beyond. *Trends in Cognitive Sciences* 20(7). 545–558. <https://doi.org/10.1016/j.tics.2016.05.003>.
- Kumagai, Gakuji. 2019. A sound-symbolic alternation to express cuteness and the orthographic Lyman's Law in Japanese. *Journal of Japanese Linguistics* 35(1). 39–74.  
<https://doi.org/10.1515/jjl-2019-2004>.
- Lehmann, Vicky, Elisabeth M.J. Huis in't Veld & Ad J.J.M. Vingerhoets. 2013. The human and animal baby schema effect: Correlates of individual differences. *Behavioural Processes* 94. 99–108. <https://doi.org/10.1016/j.beproc.2013.01.001>.
- Schmitz, Dominic. 2022. Cuteness modulates size sound symbolism at its extremes. *Iconicity Seminar 2022 (IcoSem2022)*, online. 14 November.
- Vijver, Ruben van de & Dinah Baer-Henney. 2014. Developing biases. *Frontiers in Psychology* 5. <https://doi.org/10.3389/fpsyg.2014.00634>.

### The iconicity of cross-linguistic phonesthetics

Speech sounds enable us to produce spoken language through double articulation, but they can also carry iconic associations to specific meanings intrinsically, thereby speeding up linguistic transmission. However, all language users also have preferences for the sounds they hear. These preferences can result from connotations to meanings that one might find unpleasant, as well as from the pure acoustics of the sounds. Famously, J. R. R. Tolkien's constructed language for the elves, *Quenya*, was designed to sound beautiful, whereas the language of the orcs, *Black Speech*, was designed to sound unpleasant. Similarly, the *Klingon* language in Star Trek was constructed to appear dissimilar to existing natural languages, in other words, strange.

In this study, we investigated whether there are universal phonesthetic judgments regarding the sound of languages. We collected 2,125 recordings of 228 languages from 43 language families, each consisting of 5 to 11 speakers. We then asked 820 native speakers of English, Chinese, or Semitic languages to rate how much they liked the sound of these languages. The results showed that recordings of languages perceived as familiar, even when misidentified, and breathy female voices were judged as more pleasant. Overall, there was little consensus among raters regarding which languages sounded more beautiful. However, there was some cross-cultural concordance in phonesthetic judgments among the English, Chinese, and Semitic raters at the group level. Regarding the tested phonetic features, the only preference was for non-tonal languages. Thus, it appears that some population-level phonesthetic preferences exist, but personal preferences and perceived resemblance to other culturally branded beautiful or ugly languages play a significant role in these judgments.

However, these subtle population-level patterns are analogous to iconic patterns on global and diachronic scales (Blasi et al., 2016; Erben Johansson et al., 2020; Joo, 2020; Wichmann et al., 2010) and enable iconicity to be used as a crucial strategy for meaning-making and word formation. Furthermore, associations between speech sounds and various semantic parameters, such as shape, size, and color, are considered iconic (Monaghan & Fletcher, 2019). However, should associations between sounds (or languages) and pleasantness be considered phonesthetic, iconic, or both? Studies have shown that specific speech sounds have been found to elicit higher affective arousal (Aryani et al., 2018, 2020), creating a possible bridge between phonesthetic and iconic associations. Thus, the results of the present study can also be discussed in an iconic context, exploring how phonesthetic associations can relate to iconic associations.

- Aryani, A., Conrad, M., Schmidtke, D., & Jacobs, A. (2018). Why “piss” is ruder than “pee”? The role of sound in affective meaning making. *PLOS ONE*, 13(6), e0198430. <https://doi.org/10.1371/journal.pone.0198430>
- Aryani, A., Isbilen, E. S., & Christiansen, M. H. (2020). Affective Arousal Links Sound to Meaning. *Psychological Science*, 31(8), 978–986. <https://doi.org/10.1177/0956797620927967>
- Blasi, D. E., Wichmann, S., Hammarström, H., Stadler, P. F., & Christiansen, M. H. (2016). Sound-meaning association biases evidenced across thousands of languages. *Proceedings of the National Academy of Sciences*, 113(39), 10818–10823. <https://doi.org/10.1073/pnas.1605782113>
- Erben Johansson, N., Anikin, A., Carling, G., & Holmer, A. (2020). The typology of sound symbolism: Defining macro-concepts via their semantic and phonetic features. *Linguistic Typology*, 24(2), 253–310. <https://doi.org/10.1515/lingty-2020-2034>
- Joo, I. (2020). Phonosemantic biases found in Leipzig-Jakarta lists of 66 languages. *Linguistic Typology*, 24(1), 1–12. <https://doi.org/10.1515/lingty-2019-0030>

- Monaghan, P., & Fletcher, M. (2019). Do sound symbolism effects for written words relate to individual phonemes or to phoneme features? *Language and Cognition*, 11(2), 235–255. <https://doi.org/10.1017/langcog.2019.20>
- Wichmann, S., Holman, E. W., & Brown, C. H. (2010). Sound Symbolism in Basic Vocabulary. *Entropy*, 12(4), Article 4. <https://doi.org/10.3390/e12040844>

### **Lexical vs semiotic, full vs partial: redefining iconicity in the study of lexicons.**

It has been most often assumed in the study of lexicons that it should follow from the semiotic existence of three types of signs, namely iconic, deictic and symbolic signs (Pierce, 2020), that:

- any lexical unit within lexicons should belong to one of these categories;
- any lexical unit that is not an icon nor a deictic must be a symbol;
- lexical units cannot be semiotically composite, and for instance cannot be partly iconic.
- because the form of symbols is defined as an arbitrary one, proximity between the forms of «underived» symbols should be assumed to be coincidental.

The aim of the communication will be to show that in the studies of lexicons, all such assumptions are problematic due to the widespread existence of lexical differentiation on the one hand, and because of the existence of partial iconicity on the other hand.

Lexical differentiation (LD) will be defined as a relation between two or more words/signs, which:

- i) are not derived from one another;
- ii) have partly distinct forms and partly distinct meanings;
- iii) share a large part of both their form and meaning.

It will be shown that because lexicons such as the French lexicon are extensively structured by LD-based relationships, the idea that grammatically-minimal words/lexemes - i.e. underived words such as the French noun *porte* (door) - should be considered as being symbols with arbitrary forms and the idea that what is not derived should be considered as simple (Hockett, 1954), should be dropped: the fact for sets of underived words to routinely have overlapping forms and meanings should be acknowledged as resulting from the existence of networks/webs of *lexical iconicity*, in contrast with classical *semiotic iconicity* as a property of individual signs.

Examples of lexical differentiation in French will be provided, ranging from simple pairs such as:

<i>porte</i>	\pɔʁt\	door	<i>porche</i>	\pɔʁʃ\	porch
<i>naviguer</i>	\navig\	to navigate	<i>navire</i>	\navir\	a ship
<i>poème</i>	\pœm\	poem	<i>poète</i>	\pœt\	poet
<i>futile</i>	\fytile\	futile	<i>utile</i>	\ytil\	useful

to extensive examples of morphosemantic overlaps within large lexical webs.

The consequences of that distinction will be drawn regarding classical issues such as sound symbolism and phonaesthemes. It will also be shown that lexical web iconicity often coexists with semiotic iconicity in onomatopoeia in French once prosody is considered. In other words, it will be shown that onomatopoeia as iconic signs in French are simultaneously part of lexical webs resulting from lexical differentiation - whose other members are not semiotically characterized as iconic when considered individually - and prosodically iconic.

Regarding partial iconicity, It will first be shown that because semiotic iconicity may only be a property of minimal *signs*, it cannot be transferred as such to non-minimal signs (e.g. words), even when it remains as a backgrounded layer in the meaning of such words.

It will for instance be shown that the form *cuckoo* as an iconic sign mimicking the sound produced by a bird, becomes only partly iconic when it metonymically becomes the name of a bird, mostly non-iconic when it refers to female cuckoos or when it is used as an hyperonym and rigid designator (Kripke, 1980) for a class of 144 species of cuckoos and its members, with only one species having males that are actually producing the cuckoo song (Nemo, 2023). In other words, it will be shown that many (non-minimal) signs may not be said to be semiotically iconic, even if they do presuppose some backgrounded and partial iconicity, and that this type of observation must be extended in reality to all non- minimal signs, in other words to most signs within any a lexicon, which may be proven to be semiotically composite, with either layers of iconicity associated with layers of indexicality or layers of arbitrariness associated with layers of indexicality (Cadiot, 1997) .

## References

- Baudouin de Courtenay, Jan Niecisław. 1895. *Versuch einer Theorie phonetischer Alternationen: Ein Kapitel aus der Psychophonetik*, Strassburg/Crakow.
- Cadiot, Pierre. 1997. Sur l'indexicalité des noms. In D. Dubois (ed.), *Catégorisation et cognition: de la perception au discours*, 243-269. Paris: Editions Kimé.
- Dingemanse, M., Blasi, D. E., Lupyan, G., Christiansen, M. H., & Monaghan, P. 2015. Arbitrariness, iconicity, and systematicity in language. *Trends in cognitive sciences*, 19(10), 603-615.
- Hockett, Charles Francis. 1954. "Two Models on Grammatical Description," in: Word, 10, 210-234. Readings in Linguistics, vol.1, 386-399.
- Kripke, Saul. 1980. *Naming and Necessity*. Cambridge: Harvard University Press.
- Nemo, F. 2019). "Arbitrariness of the Sign, Arbitrariness of the Word, Arbitrariness of the Morpheme". In *The Arbitrariness of the Sign in Question*. Jean-Yves Beziau, (editor). London: College Publications. 25-46;
- Nemo, F (2023, to appear) « Indexicality in the minimal/non-minimal (or less minimal) sign relationship ». In *Indexicality: The role of indexing in language structure and language change*. Peter Juluus Nielsen & María Sol Sansiñena Pascual(eds). Mouton de Gruyter.
- Peirce, Charles 2020. *Selected Writings on Semiotics 1894-1912*. Bellucci Francesco (ed.). Berlin/Boston: Mouton de Gruyter.

## Iconicity of quantity in comics: More motion lines means more speed

A well-known type of linguistic iconicity is the iconicity of quantity, where the quantity in form corresponds to quantity in meaning, such as reduplication used for plurality or intensity (Kiyomi, 1995). In this talk, we study the iconicity of quantity in the morphological marking of motion in the visual language of comics (Cohn, 2013) by focusing on lines trailing behind figures or objects (movers) to indicate motion. Experimental research on this topic has established that the higher quantity of motion lines in visual representation is perceived as indicating higher speed (Carell et al., 1986; Gillan & Sapp, 2005). In this paper, we test the conclusions of these studies further by conducting an experiment that expands the scope of previous approaches and we additionally analyze a corpus of 325 comics, which represent a naturalistic use of motion lines.

While Carell et al. (1986) found that running figures with lines were perceived by children as faster than without lines, they did not take into account that running figures encode speed information by default which might modulate the effect of motion lines alone on speed. In our subjective speed rating experiment, we tested moving objects without any postural information, in order to avoid its potential influence on participants' speed ratings when motion lines are present. We compared the presence of regular motion lines and several motion lines against the baseline of zero lines (object-only condition), as shown in Figure 1. Our results indicate that the presence of lines led to higher speed ratings than object-only condition and several motion lines were rated as conveying more speed than regular motion lines, see Figure 1. These results indicate that the quantity of lines in form facilitated the conveyed meaning of higher speed.

One possible shortcoming of experimental approaches is that they cannot tell us if the observed trends are valid for figures occurring in a naturalistic way in comics. We addressed this by conducting a corpus study of running and walking figures in 325 comics. The comics were annotated with the Multimodal Annotation Software Tool (MAST) (Cardoso & Cohn, 2022). We annotated the manner of movement of every character instance, including walking and running, as well as whether they have motion lines. We found that runners have more lines on average (8,2%) than walkers (1,1%), see Figure 2. This difference is highly significant ( $p < 0.05$ , 95% C.L.) and confirms our hypothesis that more formal marking of motion, or more lines in this case, corresponds to more perceived motion, that is the higher speed of the moving figure.

The results of our experiment and our corpus study show that the higher quantity of motion lines as formal marking in comics leads to the meaning of higher speed. Thus, parallel to spoken language, the iconicity of quantity also plays a role in the visual language of comics.

### References

- Cardoso, Bruno & Cohn, Neil. 2022. The Multimodal Annotation Software Tool (MAST). In *Proceedings of the Thirteenth Language Resources and Evaluation Conference*. 6822–6828.  
Carell, Claudia & Rosenblum, Lawrence & Grososky, Alexis. 1986. Static Depiction of Movement. *Perception* 15(1). 41–58. <https://doi.org/10.1088/p150041>.

- Cohn, Neil. 2013. *The Visual Language of Comics: Introduction to the Structure and Cognition of Sequential Images*. London: Bloomsbury.
- Gillan, Douglas J. & Sapp, Merrill V. 2005. Static Representation of Object Motion. *Proceedings of the Human Factors and Ergonomics Society Annual Meeting* 49(17). 1588–1592. <https://doi.org/10.1177/154193120504901719>.
- Kiyomi, Setsuko. 1995. A new approach to reduplication: a semantic study of noun and verb reduplication in the Malayo-Polynesian languages. *Linguistics* 33(6). 1145–1168. <https://doi.org/10.1515/ling.1995.33.6.1145>.

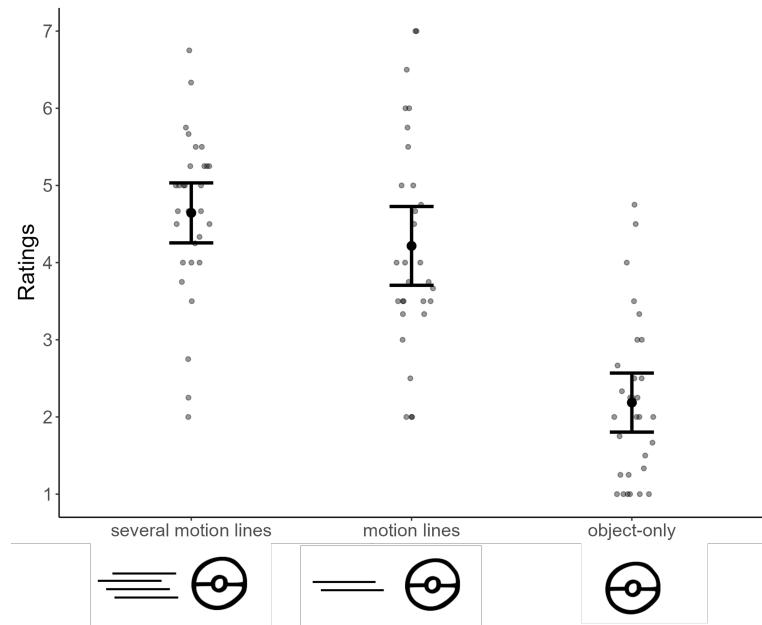


Figure 1: Subjective speed ratings given from a scale of 1 (extremely slow) to 7 (extremely fast) to three conditions (several motion lines, regular motion lines and object-only without any cue).

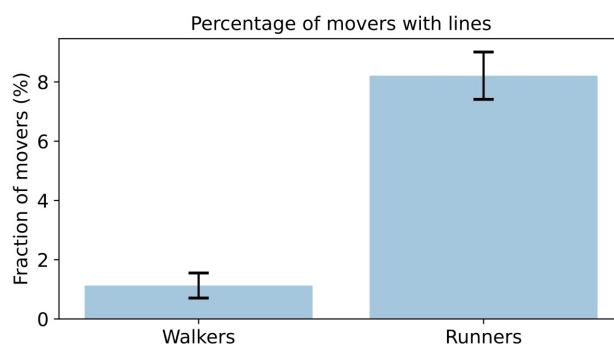


Figure 2: Percentage of walking and running figures with motion lines in our corpus (walkers N=2127, runners N=889)

Madureira, S.; Andreassa, J.; Brisola, E.; Crochiquia, A.; Fontes, M.; Pires, M.;

Scarpelly, R. (2023)

Pontifical Catholic University of São Paulo

Corresponding author e-mail address: [sandra.madureira.liaac@gmail.com](mailto:sandra.madureira.liaac@gmail.com)

### Vocal and Visual Symbolism

Vocal and facial gestures are associated to express meanings in speech productions. These two non-verbal aspects are key factors in spoken communication to reinforce the semantic content, contradict the semantic content, or adding extra information. Their integration can be interpreted as originating from the same embodied mechanisms (Vainio and Vainio, 2021).

This paper maps and comments on the theoretical and methodological bases of the research works which are developed by our research group on vocal, facial, and meaning relations underlying speech expressiveness. These research works comprise the investigation of settings of voice quality to build animation characters and uses of vocal prosody in dubbing (Crochiquia et al, 2020; Crochiquia et al 2022), impressionistic judgments of voice qualities based on semantic descriptor assignments (Scarpelly, Passetti and Madureira, 2022), characteristics of charismatic speech, vocal characteristics of emotional speech (Fontes and Madureira, 2015) and vocal and visual prosodic characteristics of speech, reciting and singing styles (Lomba, Fontes and Madureira, 2017; Madureira, 2018).

In our research group, experimental investigations on how meanings are expressed by speakers and perceived by listeners are carried out with a diversity of methodological tools and methods and a unified gesture-centered theoretical analysis within a metaphorical framework based on the frequency, production, effort and siren sound symbolism codes, perceived duration, and crossmodal and synesthetic interactions that language entails (Nobile, 2019).

From the methodological point of view, perceptual analysis of segmental and vocal prosodic elements, perceptual analysis based on semantic descriptor evaluation, acoustic analysis, automatic analysis of facial gestures is applied, and their results correlated by means of Exploratory Multivariate statistical analysis (Husson Pagés and Lê, 2009). Multivariate statistical analysis comprises several methods: PCA, MCA and MFA, FAMD. The latter two are used to correlate quantitative and qualitative variables. The Voice Profile Analysis system (Laver and Mackenzie Beck, 2007) is applied to perform perceptual analysis of voice quality and prosodic elements. Speech segments are analyzed according to their articulatory and acoustic criteria and their characteristics are interpreted in relation to symbolic, iconic and metaphorical sound meaning relations Hinton, Nichols, and Ohala (1994). Another kind of perceptual analysis involve the use of semantic descriptors in perceptual tests applied to get knowledge on the way listeners attribute meanings based on vocal and visual features.

For the acoustic analysis the Prosody Descriptor Extractor script for Praat (Barbosa, 2021) is used. The script computes 30 prosodic parameters related to melodic, rhythmic and voice quality features, generating statistical descriptors and acoustic measures of F0, intensity, long-term spectrum, harmonic to noise ratio, duration of vowels and silence.

Automatic analysis of facial expressions uses the FACS system (Ekman, Friesen, and Hager, 2002) and associates the facial movements described by its analytic unit, the

Action Unity, to emotion expressions. In computer-based facial expression analysis, emotions are detected by computer algorithms that record facial expressions via webcam. Action Unities describe the movements of both the upper and the lower part of the face. Head movements are also described in the FACS system.

For the sake of demonstrating the kind of framework analyzed, a small experiment consisting of producing the same utterance with labial, mandibular and tongue tip/blade settings of voice quality is presented. These settings were chosen because of their visual and vocal features. These settings are seen and heard, and their productions involve contrastive spatial and directional movements (spreading and rounding; opening and closing; fronting and backing). The effects of these contrastive voice quality settings and facial movements on meaning expression are considered from a crossmodal sound-symbolic perspective.

## References

- Barbosa, P. (2021) Prosody Descriptor Extractor” [Praat script]. Available: <https://github.com/pabarbosa/prosodyscripts/tree/master/ProsodyDescriptorExtractor>.
- Crochiquia, A., Eriksson, A., Fontes, M. A, Madureira, S. (2020). Um estudo fonético das vozes de personagens do filme Zootopia na dublagem em português brasileiro: o papel dos estereótipos. DELTA. 36, 311. doi: 10.1590/1678-460x2020360311.
- Crochiquia, A., Eriksson, A., Madureira, S., Barbosa, P. (2022). A perceptual and acoustic study of dubbed voices in an animated film. In: Proceedings of Speech Prosody 2022. Lisboa: ISCA, 2022. v. 1. p. 565-569.
- Ekman, P., Friesen, W. V., and Hager, J. C. (2002). Facial Action Coding System (2nd ed.). Salt Lake City, UT: Research Nexus eBook.
- Fontes, M., Madureira, S. (2015) Gestural prosody and the expression of emotions: a perceptual and acoustic experiment. In: Proceedings of the 18th International Congress of Phonetic Sciences. Glasgow: University of Glasgow, v. 1. p. 1-5.
- Gussenhoven, C. (2002). “Intonation and interpretation: Phonetics and phonology,” in Proceedings of the 1st International Conference on Speech Prosody (Aix-en-Provence), 47–57.
- Gussenhoven, C. (2004). The Phonology of Tone and Intonation. Cambridge: Cambridge University Press. doi: 10.1017/CBO9780511616983.
- Gussenhoven, C. (2016). Foundations of intonation meaning anatomical and physiological factors. Topics Cogn. Sci. 8, 425–434. doi: 10.1111/tops.12197.
- Hinton, L., Nichols, J., and Ohala, J. (1994). Sound Symbolism. Cambridge: Cambridge University Press.
- Husson, F., Lê, S., and Pagès, J. (2009). Exploratory Multivariate Analysis by Example Using R. London: Chapman and Hall.
- Laver, J., Mackenzie-Beck, J. (2007). Vocal Profile Analysis Scheme -VPAS [handout]. Edinburgh: Queen Margareth University College, Research Centre.
- Lomba, J. A.; Fontes, M. A. S.; Madureira, S. (2017) As Palavras Cantada, Falada e Declamada: Um Estudo Sobre a Relação Entre Canto, Fala e Declamação e seus Efeitos Impressivos. In: Sandra Madureira. (Org.). Sonoridades: a expressividade da fala, no canto e na declamação. 1ed. São Paulo.
- Madureira, S. (2018) Brazilian Portuguese rhotics in poem reciting. In: Mark Gibson; Juana Gil. (Org.). Romance Phonetics and Phonology. 1ed. Oxford: Oxford University Press, v. 1, p. 191-215.
- Nobile, L. (2019). Introduction: Sound symbolism in the age of digital orality. A perspective on language beyond nature and culture. Significances (Signifying), 3, XXXVI–LXVIII. doi: 10.18145/significances.v3i1.248.

- Ohala, J. J. (1994). “The frequency codes underlies the sound symbolic use of voice pitch,” in Sound symbolism, eds. L. Hinton, J. Nichols, and J. J. Ohala (Cambridge: Cambridge University Press) 325–347. doi: 10.1017/CBO9780511751806.022.
- Scarpelly, R., Passetti, R., Madureira, S. Avaliação impressionística e fonético-descritiva de qualidades de voz: convergências, divergências e contextos de aplicação forense. In: Proceedings of the II Brazilian Conference on Prosody, 2022, Belo Horizonte online. 1. p. 120-133.
- Vainio L, Vainio M. Sound-Action Symbolism. *Front Psychol*. 2021 Sep 14;12:718700. doi: 10.3389/fpsyg.2021.718700. PMID: 34594278; PMCID: PMC8476841.

### Visual-Motor Iconicity in the Spatial Language of Deaf Traditional Negev Arabic Speakers

Sign languages—including those of deaf people—are vivid expressions of visual linguistic iconicity (Gimeno-Martínez & Baus 2022; Novogrodsky & Meir 2020; Ostling et al. 2018; Taub 2010). Until now, the study of space in relation to sign languages has focused mainly on the semantic values of the signing space, i.e., the positions and spatial regions in which the signs are produced (Barberà Altimira 2015; Bauer 2014), while representations of spatial relations have received less attention. The present research aimed to compare the representations of spatial, static, projective relations on the horizontal plane—i.e., the frames of reference (FoRs) and related prepositions—of Traditional Negev Arabic hearing speakers (TNA) and speakers of the same language with profound, prelingual, neurosensory deafness (DTNA). FoRs are coordinate systems projected onto spatial arrays to locate any object (Figure, F) in relation to another object (Ground, G). FoRs can be object-centered, based on inherent facets of G; ego-centered, based on the coordinates projected by the speaker; or geocentric, based on external coordinates such as cardinal directions (Bohnemeyer 2011). TNA is a cluster of closely related tribal dialects of North-West Bedouin Hijāzi Arabic spoken in the Negev region (southern Israel) by women and men over age 75 without formal education. In childhood, DTNA speakers received domestic training in Negev Bedouin sign language (NBSL) and lip reading. NBSL is a tribal sign language that spontaneously developed among the Negev Bedouin due to the high prevalence of congenital deafness in their communities. Today, NBSL is used outside the Negev due to the modern relocation of Negev Bedouin tribes to other regions of Israel. The well-documented Al-Sayyid sign language (Sandler et al. 2005) can be considered an NBSL village variety. Four of the ten DTNA informants tested in this study had received basic training in Israeli Sign Language (ISL, a German-based sign creole) in adolescence. It is important to remember that, except for a few common elements, TNA spatial gesture and deixis differ from those of DTNA spatial sign language and are outside the scope of the present inquiry. I compared TNA/ DTNA linguistic FoRs and related prepositions. I tested whether and how the use of a sign language—based on the iconic, visual-motor channel— influences DTNA spatial semantic conceptualization compared to TNA. TNA is of particular relevance in disambiguating the role of language vs. sensory/motor experience in semantic conceptualization because its spatial linguistic representations display an extraordinary degree of cultural elaboration encoded in a culture-specific ontology of objects in space—based on the interplay of culture-based parameters, routine affordances, and axial constraints—all reflected in a complex spatial grammar (Cerqueglini 2022). The TNA front/back axis is treated according to semantic properties culturally attributed to Gs (e.g., familiarity) and axial constraints (whether or not F and G are aligned with the observer's visual field). With familiar, asymmetric Gs, the object-centered FoR is selected. With familiar, symmetric Gs, the ego-centered FoR using the translation strategy is selected with F-G-O(observer) aligned, and the geocentric FoR is selected with F-G-O not aligned. With unfamiliar Gs, the geocentric FoR is preferred. The lateral axis is processed geocentrically with all Gs, while 'right' and 'left' only distinguish between hands. Ten TNA (five women/men) and ten DTNA (five women/men) were recruited for an individual linguistic test based on Levinson et al. (1992). Stimuli consisted of twenty spatial arrays of two toy objects (FG). F was a ping-pong ball. Ten Gs were selected according to a set of different functional and geometric properties. FG arrays were arranged one after the other on a table in front of the informants. Two arrays were tested for each G. Informants were asked in their language, 'Where is the ball in relation to G?' for each array, where G was the noun of the G-object. The maximum response time was five seconds. While TNA results confirm Cerqueglini (2022), DTNA results show some important differences. Consistently with TNA, the preposition 'in front' is used only

in association with familiar, asymmetric Gs that prime the selection of the object-centered FoR. Two different signs are used for ‘behind,’ one involving the upper body region, with familiar, asymmetric Gs—corresponding to the TNA object-centered FoR—and one signed at hip height when G is familiar and symmetric with FGO aligned—corresponding to the TNA ego-centered FoR, while TNA uses the word *wara* ‘behind’ in both cases. With familiar, asymmetric Gs such as knife and coffeepot, the right/left opposition is grammaticalized egocentrically ('right' is signed to the right of the speaker, 'left' to the left of the speaker), especially if the preposition to be used corresponds to the informant's dominant hand. When FG have a functional link (G-dog/man, F-ball) the scenes are often described with verbs of interactions and routine movements. Consistently with TNA, with familiar, symmetric Gs (stone, tree) and F-G-O aligned, ‘in front’ is avoided, substituted with the ego-centered expression ‘F is on the farther side of G in relation to O.’ Interestingly ‘away from’ is signed as the motion verb ‘to leave’ and the exact sign compulsorily encodes the cardinal direction, e.g., ‘F leaves G eastward (from O),’ producing a simultaneously ego-centered and geocentric representation. Regarding the geocentric FoR, in both TNA and DTNA, it is represented by four cardinal directions approximately corresponding to English ‘east,’ ‘west,’ ‘north,’ and ‘south.’ Unlike European and Native American sign languages (La Mont 1960), DTNA has no abstract way to sign cardinal directions—such as ‘up’ for ‘north’ and right for ‘east’—other than pointing toward them. This data is consistent with TNA absolute pointing. Results show that despite strong similarities between TNA and DTNA, the dominant iconic, visual-motor channel used for signing affects the spatial conceptualization of DTNA speakers, leading to the development of an ego-centered right/left distinction in describing routine, daily scenes due to the use of hands for both interaction and iconic representation and a pervasive codification of directionality and motion even in static spatial scenes.

- Barberà Altimira, G. 2015. *The meaning of space in sign language*. Berlin: de Gruyter.
- Bauer, A. 2014. *The use of signing space in a shared signing language of Australia*. Berlin: De Gruyter.
- Bohnemeyer, J. 2011. Spatial Frames of Reference in Yucatec: Referential Promiscuity and Task Specificity. C. O'Meara & G. Pérez Báez (eds.) *Frames of reference in Mesoamerican languages. Language Science* 33/6: 892–914.
- Cerqueglini, L. 2022. *Space and time in as-Sāni 'Arabic. A cross-generational study*. Leiden: Brill.
- Gimeno-Martínez, M., Baus, C. 2022. Iconicity in sign language production: Task matters. *Neuropsychologia* 167: 1–9.
- La Mont, W. 1960. *The sign language. An analysis*. PhD Dissertation, Indian University.
- Levinson, S., et al. 1992. *Man and tree & space games*. S. Levinson (ed.) *Space stimuli kit 1.2: November 1992*, pp. 7–14. Nijmegen: Max Planck Institute for Psycholinguistics.
- Novogrodsky, R., Meir, N. 2020. Age, frequency, and iconicity in early sign language acquisition. *Applied Psycholinguistics* 41: 817–845.
- Ostling, R., Börstell, C., Courtaux, S. 2018. Visual iconicity across sign languages: Large-scale automated video analysis of iconic articulators and locations. *Frontiers in Psychology* 9: 1–17.
- Sandler, W., Meir, I., Padden, C., Aronoff, M. 2005. The emergence of grammar: Systematic structure in a new language. *Proceedings of the National Academy of Science* 102/7: 2661–2665.
- Taub, S. 2010. *Language from the body: Iconicity and metaphor in American sign language*. Cambridge: Cambridge University Press.

## ETYMOLOGY OF IMITATIVE WORDS: HOMONYMY VS POLYSEMY

Imitative words (onomatopoeic words, ideophones) are notorious for their atypical diachronic behavior: they are known to withstand regular sound changes (Hock 1991: 50; Durkin 2009: 127; Malkiel 1990; Brodovich 2008; Martilla 2011: 17), for expressive ablaut, gemination and vowel lengthening (Voeltz et al. 2001, Hinton et al. 1994, Voronin 2006, Lühr 1988, Georgescu 2017), as well as for general lack of reliable etymologies. On the other hand, knowledge of peculiarities of imitative words as well as of sound-meaning correspondences in a particular language yields positive results in establishing the original iconic nature of words with obscure histories (Liberman 1995; 2008; 2010; Koleva-Zlateva 2008; Klimova 1986).

### *Problem statement*

The present talk will focus on the problem of distinguishing homonymous imitative words from polysemous ones in the English language. Thus, under *boo* OED unites *boo* (1555) ‘to low or bellow as a cow does’ and *boo* (1833) ‘to express disdain for or dissatisfaction with (a person or thing) by making a sound resembling ‘boo’; to jeer at’. Thus, *boo*, according to OED is a polysemic word; and one of its meanings is derived from another by metaphor.

I argue, however, that these are two independent words as they have different *motifs of nomination*. *Boo* ‘to low’ is an onomatopoeic word. It has an iconic sound-meaning correspondence ‘a low-pitched continuous natural sound : a low-pitched vowel’ (cf. *moo, low* < OE *hlowan*). *Boo* ‘to jeer at’, on the other hand, is a mimetic word with an additional, onomatopoeic component. Mimetic words (after Voronin 2006, see also Flaksman 2017) are articulatory copies and it is place of articulation which plays the most important role by such type of iconic imitation. In our case, there is an iconic correlation between lip movements (pejorative mimics of disgust) and a labial cluster /bu:/ (a bilabial consonant plus a rounded vowel). The role of labials (labial clusters in particular) by conveying negative, pejorative meanings was discussed in Shamina (1989).

### *Research material and methods*

The research is based on a 1244-word corpus of English words imitative by origin. This corpus was comprised by continuous sampling from the *Oxford English Dictionary* (OED) with addition of words from *Written Sound* (WS), an online dictionary of onomatopoeia. The methods of analysis are historical-comparative method and the method of phonosemantic analysis (Voronin, 2006; 1990).

### *Research questions*

The problems discussed in this talk are: (1) disambiguation of homonymy and polysemy by iconic coinage, (2) methods of establishing imitative origin of words, (3) nomination motifs and classes of imitative words, (4) limits of etymological research on onomatopoeia.

Thus, a balanced approach to diachronic research on imitative words reveals patterns of iconic word coinage which help solving difficult cases of establishing their origin and etymology.

### References

- Brodovich, O. I. 2008. Zvukoizobrazitelnost i zvukovie zakony [Iconicity and sound changes]. In *Yazik-Soznanie-Kultura-Sozium*. Saratov: Nauka, 485–489.

- Durkin, Ph. 2009. *The Oxford Guide to Etymology*. Oxford: Oxford University Press.
- Flaksman, M. 2017. Iconic treadmill hypothesis. the reasons behind continuous onomatopoeic coinage. In M. Bauer, A. Zirker, O. Fischer & Ch. Ljungberg (Eds.), *Dimensions of Iconicity* [Iconicity in Language and Literature 15] (pp. 15–38) Amsterdam: John Benjamins.
- Georgescu, S. 2017. \*Mut-, \*muc-, \*tuc-, \*čuc-: variaciones fonéticas del latín vulgar. In A. García Leal, C. E. & Prieto Entrialgo. (Eds.), *Latin Vulgaire, Latin Tardif XI* [Congreso internacional sobre el Latín Vulgar y Tardío] (pp. 207–220). Hildesheim / Zürich / New York: Olms Weidmann.
- Hinton, L., Nichols, J., & Ohala J. J. (Eds.). 1994. *Sound symbolism*. Cambridge: Cambridge University Press.
- Hock, H.H. 1991. *Principles of Historical Linguistics*. Berlin: Mouton de Gruyter.
- Klimova, S. V. 1986. Glagoly ‘nejasnogo proiskhodenija v sokraschennom oxfordskom slovare: elementy etimologicheskoi fonosemantiki’ [Verbs of ‘uncertain origin’ in the concise oxford English dictionary: elements of etymological phonosemantics]. PhD diss., Leningrad: University of Leningrad.
- Koleva-Zlateva, Zh. 2008. *Slavianskaya leksika zvukosimvolocheskogo proiskhozhdeniya* [Slavonic words of phonoiconic origin]. *Studia Slavica Hungarica*, 53/2, 381–395.
- Lberman, A. 1995. Etymological studies VII. A small animal farm. *General Linguistics*, 35, 1–4.
- Lberman, A. 2008. The sound symbolic phoneme /dʒ/ and some Entgleisungen. In *Problems of General, Germanic and Slavic Linguistics. Papers for 70th Anniversary of professor V. Levickij*. (pp. 13–17). Chernovtsi: Knigi-XXI.
- Lberman, A. 2010. Iconicity and Etymology. In C. J. Conradie, R. J.M. Beukes, O. Fischer, & Ch. Ljungberg (Eds.), *Synergy* [Iconicity in Language and Literature 9] (pp. 243–258). Amsterdam: John Benjamins.
- Lühr, R. 1988. *Expressivität und Lautgesetz im Germanischen*. Heidelberg: Karl Winter Universitätsverlag.
- Malkiel, Ya. 1990. *Diachronic Problems in Phonosymbolism*. Amsterdam-Philadelphia: John Benjamins.
- Martilla, A. A. 2011. *Cross-linguistic study of lexical iconicity and its manifestation in bird names*. München: Lincom Europa.
- OED — *The Oxford English Dictionary* (3d edition). URL: <http://www.oed.com> (accessed September 11, 2023).
- Shamina, E. A. (1989). *Distribucija labial'nyh v fonetičeskem i fonosemantičeskem otnošenii (statistiko-èksperimental'noe issledovanie na materiale anglijskogo i russkogo jazykov)* [Distribution of labial phonemes: phonosemantic aspect (an experimental study of English and Russian languages)]. PhD diss., Leningrad.
- Voeltz, E. F. K. & Kilian-Hatz. Ch. (Eds.). 2001. *Ideophones* [Typological Studies in Language 44]. Amsterdam-Philadelphia: John Benjamins.
- Voronin, S. V. 1990. O metode fonosemanticskogo analiza [Concerning the method of phonosemantic analysis]. In *Lingvometodicheskie aspekty semantiki i pragmatiki teksta* [Linguistic Aspects of Text Semantics and Pragmatics]. (pp. 98–100) .Kursk: Kursk UP.
- Voronin, S. V. 2006 [1982]. *Osnovy Phonosemantiki* [The fundamentals of phonosemantics]. Moscow: Lenand.
- WS — *Written Sound*: an Electronic Dictionary of Onomatopoeia. URL: <http://www.writtensound.com/index.php> (accessed 02.02.2021).

## Product names as diagrammatic-iconic compositions

### On the Grammatical Relevance of Typography Based on the Example of Product Names on Food Packaging in Germany

By means of product names, manufacturers refer clearly and at the same time in an advertising manner (cf. Nübling et al. 2015: 268) to a product, an article, a good or a service – for example, with the product name *GUT & GÜNSTIG Knäckebrot Sesam* to the product contained in a package with the respective lettering (see Fig. 1). This basically distinguishes product names from brand names, which can be used to make a clear and advertising reference to brands protected by trademarks, e.g. *GUT & GÜNSTIG*. Sometimes the product name and brand name correspond to each other, e.g. *Mars* or *Rama*.



Figure 1: *GUT & GÜNSTIG Knäckebrot Sesam*

As already indicated by the example of *GUT & GÜNSTIG Knäckebrot Sesam*, brand names nevertheless form an important component of product names to mark them against competing products, such as *wasa Sesam*. Beyond that, product names often contain further linguistic additions, above all different kinds of specifications respectively attributes, such as *Sesam*. Accordingly, product names constitute extensive compositions with a controversial status as a name (cf. Nübling et al. 2015: 269–270), whose composition turns out to be extremely diverse (cf. Nübling et al. 2015: 270). However, a systematic analysis of how the diverse compositions of product names were put together is still pending (cf. Nübling et al. 2015: 270) and is therefore a desideratum.

To contribute to the systematization of product name compositions is the aim of this talk. Using a cognitive-grammar approach (cf. Langacker 1987, 1991, 2005, 2008), results of a

quantitatively supported qualitative analysis are presented with the help of a pattern-oriented adaptation of collection analysis (cf. Schegloff 1997) based on a corpus of 1,317 photographs of food packaging taken between 2019 and 2021. This reveals that in order to clarify the types of composition of product names, the pattern-like typographic design (cf. Stöckl 2004; Spitzmüller 2013) of product names on food packaging, as used by manufacturers, is essential. The reason is that the structural relations of the components of product name compositions are typically mirrored in the typographic design. This means the concept of diagrammatic iconicity (cf. Peirce 1978, 1983) is at work. Overall, the talk identifies several superordinate types with multiple subtypes with regard to product names on food packaging in Germany, so that product names qualify as multimodal constructions with constitutive typographic design (cf. Dübbert 2021).

## References

- Dübbert, Alexander (2021): Brand names as multimodal constructions. On the role of typography as an additional indicator of onymisation. In: *Linguistics Vanguard* 7(1), 1–11.
- Langacker, Ronald W. (1987): Foundations of Cognitive Grammar. Volume I: Theoretical Prerequisites. Stanford: Stanford University Press.
- Langacker, Ronald W. (1991): Foundations of Cognitive Grammar. Volume II: Descriptive Application. Stanford: Stanford University Press.
- Langacker, Ronald W. (2005): Construction Grammar: cognitive, radical, and less so. In: Ibáñez, Francisco J. Ruiz de Mendoza/Cervel, M. Sandra Peña (Eds.): *Cognitive Linguistics. Internal Dynamics and Interdisciplinary Interaction*. Berlin/New York: de Gruyter, 101–159.
- Langacker, Ronald W. (2008): Cognitive Grammar. A basic introduction. Oxford: University Press.
- Nübling, Damaris/Fahlbusch, Fabian/Heuser, Rita (2015 [2012]): Namen. Eine Einführung in die Onomastik. 2., überarbeitete und erweiterte Auflage. Tübingen: Narr.
- Peirce, Charles Sanders (1978 [1931]): Collected Papers of Charles Sanders Peirce. Volume 1: Principles of Philosophy and Volume 2: Elements of Logic. Edited by Charles Hartshorne and Paul Weiss. Fourth Printing. Cambridge/Massachusetts: Belknap Press of Harvard University Press.
- Peirce, Charles S. (1983): Phänomen und Logik der Zeichen. Herausgegeben und übersetzt von Helmut Pape (= Suhrkamp Taschenbuch Wissenschaft, 425). Frankfurt am Main: Suhrkamp.
- Schegloff, Emanuel A. (1997): Practices and actions: Boundary cases of other-initiated repair. In: *Discourse Processes* 23:3, 499–545.
- Spitzmüller, Jürgen (2013): Graphische Variation als soziale Praxis. Eine soziolinguistische Theorie skripturaler „Sichtbarkeit“. Berlin/Boston: de Gruyter.
- Stöckl, Hartmut (2004): Typographie: Gewand und Körper des Textes. Linguistische Überlegungen zu typographischer Gestaltung. In: *Zeitschrift für Angewandte Linguistik* (41), 5–48.

## Is /tʃ/ a Phonaesteme in Mexican Spanish? Origins and Phonosemantic Fields

Carlos de Jesús Wagner Oviedo  
Escuela Nacional de Antropología e Historia

Mexican Spanish is one of the major Hispanic dialects, both in number of speakers and mass media presence throughout the American continent. Besides its own definitory linguistic characteristics, Mexican Spanish is well known in the Hispanosphere for its regionalisms and slang words, many of them containing the phoneme /tʃ/, represented orthographically as {ch}: *chido* ‘cool/great’, *chinga-* ‘to screw/to annoy’, *chale* ‘Oh no!’, *cheve* “beer”, *chavo* “kiddo”, etc.

The genesis of the phoneme /tʃ/ in patrimonial Spanish words came from the evolution of Latin intervocalic consonant groups /kt/ and nasal+obstruent+liquid, like *nocte-*, → *noche* ‘night’, *octo-* → *ocio* ‘eight’, *ampliu-* → *ancho* ‘wide’, *conc(u)la-* → *concha* ‘shell’, *infla-* → *hincha-* ‘to inflate’. It is noteworthy the fact that there are no word-initial groups containing /tʃ/ in those patrimonial words.

However, pre-Romanic Iberian language's influence, especially Basque, provided Spanish with words with initial /tʃ/: *chaparro* ‘short person’, *chueco* ‘bend’, *chatarra* ‘scrap metal’. In the same vein, phonosymbolic mechanisms have been proposed to explain some etymologies with initial /tʃ/, like *chorro* ‘flow/a lot’, *churro* ‘churro’ or *chispa* ‘spark’, all related to both sizzling or sparkling sounds, or the case of some patrimonial words that show /tʃ/ instead of an expected /s/ due to phonosymbolic motivations (Lara, 2019b; Malkiel, 1990): *cimice-* → *chinche* (vs. expected \**cince*) ‘bedbug’, *sibila-* → *chifla-* ‘to whistle’ (vs. Latinism *silba-*) or *fistula-/cistula-* → *chilla-* ‘to screech/to cry’. Other sources for /tʃ/ initial words came from other romance languages, especially Iberian ones, e.g., *chicharo* ‘pea’ from Mozarabic, *choza* ‘shack’ from Galician-Portuguese, or *chuleta* ‘chop’ from Catalan.

All those words are part of the everyday lexicon in essentially all Spanish dialects, however, since most specialized terminology came from Latin and classical Greek, languages without /tʃ/, there is an association between non-colloquial lexicon and the absence of /tʃ/. This association is like the /ts, dz/ correlation to colloquiality in Dimotiki vs. Katharevousa words in Modern Greek as described by Joseph (1994).

This association between colloquiality and /tʃ/ was further enhanced due to the introduction of words from Caló language, a mixed Romani-Iberian language from Roma people living in the Iberian Peninsula. In Mexico, most of these terms were associated with the slang used by thieves and countercultural movements in the early XX century (Lara, 2019b, 2019a): *chavo* ‘youngster’ (from *chavó* ‘boy’), *choro* ‘lip service’ (from *choro* ‘thief’), or *chinga-* ‘to screw/to annoy’ (from *chingarar* ‘to fight’).

Native Mexican languages, especially Nahuatl, have provided a lot of words with /tʃ/ (Lope Blanch, 1969): *chile* ‘chili’, *huarache* ‘sandal’, *chicle* ‘chewing gum’, *chapulín* ‘grasshopper’, or *chamaco* ‘kiddo’. Most of these words are associated with rural or colloquial lexical fields, a lot of them used in the same registers than Caló derived terms: *chte* ‘house’ (from Nahuatl *chantli*), *cholo* ‘Cholo’ (from Nahuatl *xolo*) or *chichi* ‘breasts’ (from Nahuatl *chichi* ‘to suck’).

All those factors contribute to a perceived colloquialism of words containing /tʃ/, causing most terms with this phoneme to be replaced by other words without it in formal or standardized settings, especially in international dubbing directed to Hispanic America, like *sandalia* ‘sandal’ for the more usual *chancla*, *joven* ‘youngster’ for *muchacho* or *chavo* or *mono* ‘monkey’ for *chango*.

/tʃ/ phoneme is also used in *motherese* and *baby talk* as a correspondent of /s/: *chi* ‘yes’ (*si*), *cheñol* ‘sir’ (*señor*), *chabicho* ‘tasty’ (*sabroso*). This endearment use is extended to the traditional

formation of hypocoristics in Mexico (Estrada, 2015; Lara, 2019b): *Chicho* for *Jesús*, *Checo* for *Sergio*, *Güicho* for *Luis*, *Charo* for *Rosario*, *Chero* for *Lucero*, or *Lucha* for *Lucía*.

Thus, there is a continuous association between /tʃ/ and the lexical fields of colloquiality, rurality, thieves' jargon, expressivity, endearment, and childishness in Mexican Spanish. These associations are confirmable by observing the use of /tʃ/ both in the creation of onomatopoeic words, like *chaz chaz* ‘to pay cash’, *chaca chaca* ‘the sound of a washing machine/intercourse’, *fuchi/guáchala* ‘ew!', or, the modification of existent words by adding them /tʃ/ and effectively making them sound colloquial: *chesco* for *refresco* ‘soda’, *cheve/chela* for *cerveza* ‘beer’, *chemo* for *cemento* ‘inhalant drugs’, *chon(es)* for *calzón(es)* ‘underwear’, *vocho* for *Volkswagen*, etc. The perceived colloquiality of /tʃ/ is also attestable in the variation of /tʃ/ and /ʃ/ in loanwords coming primarily from English, being the ones realized with /tʃ/ perceived as colloquial or unsophisticated and the ones with /ʃ/ as sophisticated or prestigious: *chor(t)/short* for ‘short’, *champú/shampú* for ‘shampoo’, or *champaña/shampáñ* from ‘Champagne’.

Last, but not least, it is worth mentioning that in Central Mexican dialects /tʃ/ is realized as an aspirated fricative [tʃʰ]. Both the fricative portion and the aspiration can be especially prominent in emphatic uses of colloquial interjections with initial /tʃ/, like *¡chale!*, *¡chin!* or *¡chinga!*, in which an extra-palatalization could also be added (Figure 1). It will be proposed that this emphatic realization of /tʃ/ is correlated to the perceived colloquiality of it.

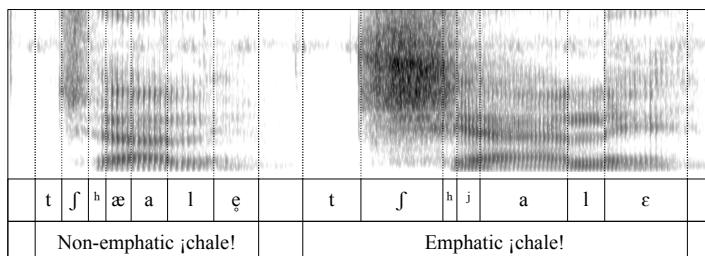


Figure 1. Non-emphatic and emphatic realization of *¡chale!*

Some of this evidence seems to suggest the possibility of /tʃ/ as a phonaesteme at least in some subsets of the lexical fields mentioned above. Those groups will be tested using Kwon and Round's (2015) criteria for the canonicity of phonaestemes to determine if /tʃ/ could be analyzed as a phonaesteme associated with some well-defined or recurrent pairings of sound and meaning or not.

## Bibliography

- ASALE, & RAE. (2021). Diccionario de la lengua española | Edición del Tricentenario. «Diccionario de la lengua española» - Edición del Tricentenario. <https://dle.rae.es/>
- Corominas, J., & Pascual, J. A. (2008). Breve diccionario etimológico de la lengua castellana (3. ed. muy rev. y mejorada, 14. reimpr). Gredos.
- El Colegio de México. (2023). DEM | Diccionario del español de México. <https://dem.colmex.mx/Inicio>
- Estrada, J. B. (2015). La formación de los hipocorísticos en el español de México. Anuario de Letras. Lingüística y Filología, 2(2), Article 2.
- Joseph, B. D. (1994). 15 Modern Greek ts: Beyond sound symbolism. En L. Hinton, J. Nichols, & J. J. Ohala (Eds.), Sound Symbolism (pp. 222-236). Cambridge University Press.

- Kwon, N., & Round, E. R. (2015). Phonaesthemes in morphological theory. *Morphology*, 25(1), 1-27. <https://doi.org/10.1007/s11525-014-9250-z>
- Lara, L. F. (2019a). «La Chilanga Banda»: Hibridización y tradición. En N. Palacios (Ed.), *Voces de la lingüística mexicana contemporánea*. El Colegio de México, Centro de Estudios Lingüísticos y Literarios.
- Lara, L. F. (2019b). ¿Nahuatlismos pedinche, llorinche, etc., o casos de fonosimbolismo? *Nueva Revista de Filología Hispánica*, LXVII(1), 201-212.
- Lope Blanch, J. M. (1969). Léxico indígena en el español de México (1.a ed., Vol. 63). Colegio de Mexico. <https://doi.org/10.2307/j.ctvbcd0zb>
- Malkiel, Y. (1990). Diachronic problems in phonosymbolism. J. Benjamins Pub. Co.